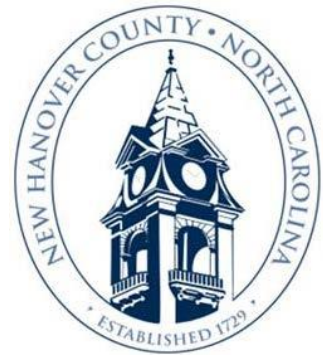


# THE HEALING PLACE of New Hanover County



*Wilmington, NC*

Construction Documents

**August 25, 2020**

VOLUME ONE

(Divisions 01-14)



219 North Boylan Avenue Suite 100  
Raleigh, North Carolina 27603

919 833 5400  
[www.isdesignpa.com](http://www.isdesignpa.com)





## Architectural Specifications Consultant

Joleen Alison Fuentes, AIA  
Architect (NC, NCARB)

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Cary, NC 27511

[www.FinePrintSpecs.com](http://www.FinePrintSpecs.com)



DESIGN TEAM

**The Healing Place of New Hanover County**

*Wilmington, North Carolina*

Owner-----New Hanover County  
*Wilmington, North Carolina*

Architect -----iS Design, PA  
*Raleigh, North Carolina*

Architectural Specifications ----- Fine Print Architectural Specifications PLLC  
*Cary, North Carolina*

Structural Engineer -----RED Engineering & Design  
*Raleigh, North Carolina*

Fire Suppression -----Crawford Sprinkler  
*Raleigh, North Carolina*

MEP Engineer -----Maple Engineering, PLLC  
*Raleigh, North Carolina*

Civil Engineer -----The Site Group  
*Raleigh, North Carolina*

Foodservice Consultant ----- MSH Consultant Group  
*Hillsborough, North Carolina*



Construction Documents

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- Structural Specifications: -----RED Engineering & Design – “**red**”
- Fountain Specifications: ----- Roman Fountains – “**rf**”
- Fire Suppression Specifications: ----- Crawford Sprinkler – “**cs**”
- MEP Specifications: ----- Maple Engineering, PLLC – “**me**”
- Civil Specifications: ----- The Site Group – “**tsg**”
- Foodservice Specifications: ----- MSH Consultant Group – “**msh**”

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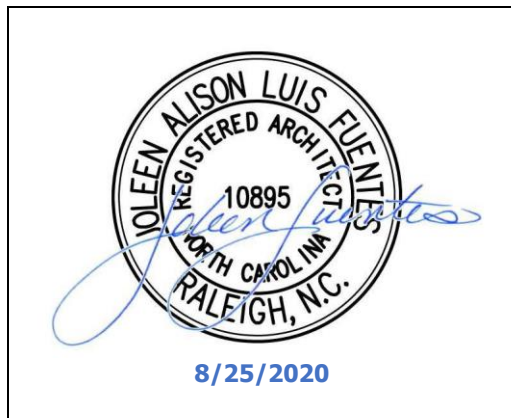
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I hereby certify that the Specifications indicated below and included within the Project Manual for the project titled **The Healing Place of New Hanover County** and dated **August 25, 2020** were prepared by me or under my direct supervision, and that I am a duly registered Architect under the Laws of the State of **North Carolina** and hereby affix my Professional Seal.



Architectural Specifications

Joleen Alison Luis Fuentes, AIA  
License No. 10895

- Section 011000 – Summary
- Section 012100 – Allowances
- Section 012200 – Unit Prices
- Section 012500 – Substitution Procedures
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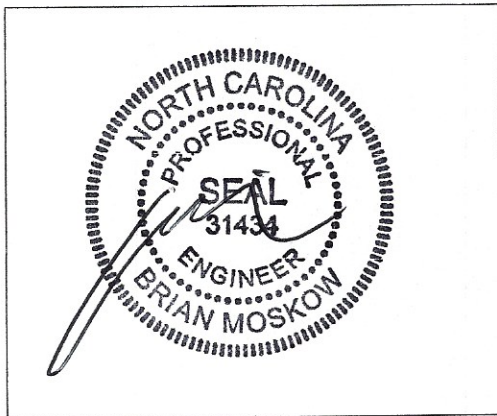
END OF DOCUMENT 000107.01



Construction Documents

DOCUMENT 000107.02 – CERTIFICATION AND SEALS PAGE – STRUCTURAL

I hereby certify that the Specifications indicated below and included within the Project Manual for the project titled **The Healing Place of New Hanover County** and dated **August 25, 2020** were prepared by me or under my direct supervision, and that I am a duly registered Professional Engineer under the Laws of the State of **North Carolina** and hereby affix my Professional Seal.



Structural Engineer

Brian Moskow, P.E.  
License No. 031434

Section 033000 – Cast-in-Place Concrete  
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Section 052100 – Steel Joist Framing  
Section 053100 – Steel Decking  
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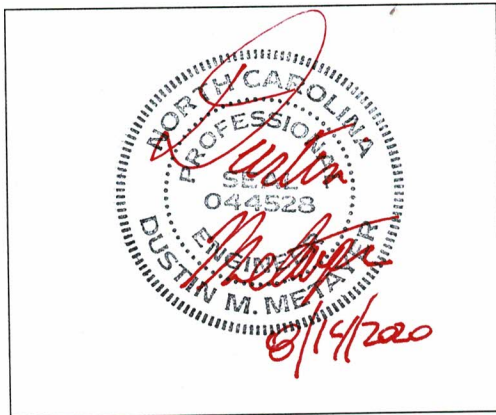
END OF DOCUMENT 000107.02



Construction Documents

DOCUMENT 000107.04 – CERTIFICATION AND SEAL SHEET – PLUMBING

I hereby certify that the Specifications indicated below and included within the Project Manual for the project titled **The Healing Place of New Hanover County** and dated **August 25, 2020** were prepared by me or under my direct supervision, and that I am a duly registered Professional Engineer under the Laws of the State of **North Carolina** and hereby affix my Professional Seal.



Plumbing Engineer

Dustin Metayer, P.E.  
 License No. 044528

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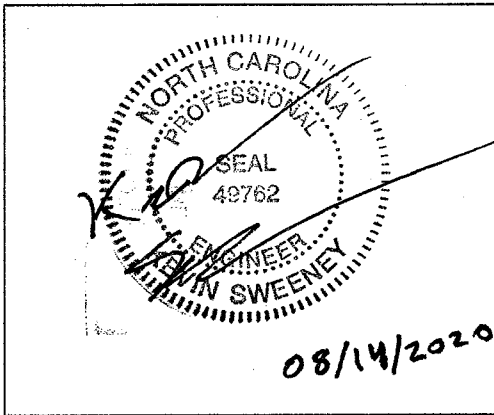
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END OF DOCUMENT 000107.04

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DOCUMENT 000107.05 – CERTIFICATION AND SEAL SHEET – MECHANICAL

I hereby certify that the Specifications indicated below and included within the Project Manual for the project titled **The Healing Place of New Hanover County** and dated **August 25, 2020** were prepared by me or under my direct supervision, and that I am a duly registered Professional Engineer under the Laws of the State of **North Carolina** and hereby affix my Professional Seal.



Mechanical Engineer

Kevin Sweeney, P.E.  
License No. 049762

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END OF DOCUMENT 000107.05



Construction Documents

DOCUMENT 000107.06 – CERTIFICATION AND SEAL SHEET – ELECTRICAL

I hereby certify that the Specifications indicated below and included within the Project Manual for the project titled **The Healing Place of New Hanover County** and dated **August 25, 2020** were prepared by me or under my direct supervision, and that I am a duly registered Professional Engineer under the Laws of the State of **North Carolina** and hereby affix my Professional Seal.



Electrical Engineer

Dustin Metayer, P.E.  
 License No. 044528

Division	Section Title	Pages
<b>DIVISION 26 - ELECTRICAL</b>		
260519	LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES	7
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263213.13	DIESEL-ENGINE-DRIVEN GENERATOR SETS	5
263323.11	CENTRAL BATTERY EQUIPMENT FOR EMERGENCY LIGHTING	5

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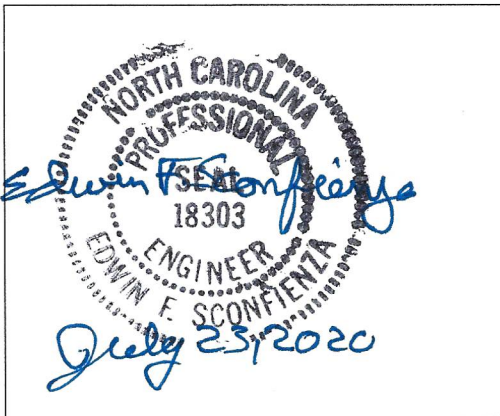
263343	BATTERY CHARGERS	3
263600	TRANSFER SWITCHES	6
264113	LIGHTNING PROTECTION FOR STRUCTURES	2
265119	LED INTERIOR LIGHTING	6
265213	EMERGENCY AND EXIT LIGHTING	6
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<b>DIVISION 27 - COMMUNICATIONS</b>		
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<b>DIVISION 28 - ELECTRONIC SAFETY AND SECURITY</b>		
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284621.11	ADDRESSABLE FIRE-ALARM SYSTEMS	19

END OF DOCUMENT 000107.06

Construction Documents

DOCUMENT 000107.07 – CERTIFICATION AND SEAL SHEET – CIVIL

I hereby certify that the Specifications indicated below and included within the Project Manual for the project titled **The Healing Place of New Hanover County** and dated **July 23, 2020** were prepared by me or under my direct supervision, and that I am a duly registered Professional Engineer under the Laws of the State of **North Carolina** and hereby affix my Professional Seal.



Civil Engineer

Edwin F. Sconfienza, P.E.  
License No. 18303

- Section 312000 – Excavation and Grading
- Section 315000 – Excavation Support Systems
- Section 321216 – Asphalt Paving
- Section 321313 – Portland Cement Concrete Paving
- Section 329300 – Landscaping
- Section 331200 – Water Piping
- Section 333000 – Sanitary Sewers
- Section 334100 – Storm Sewers

Cape Fear Public Utility Authority Specifications  
(SEE ATTACHED SPECIFICATIONS DATED 1 JULY 2020)

END OF DOCUMENT 000107.07





Geotechnical Exploration Report  
The Healing Place  
Wilmington, North Carolina  
S&ME Project No. 1306-19-006

PREPARED FOR:

**J.M. Thompson**  
**P.O. Box 33066**  
**Raleigh, North Carolina 27636**

PREPARED BY:

**S&ME, Inc.**  
**3006 Hall Waters Drive, Suite 100**  
**Wilmington, North Carolina 28405**

**April 30, 2019**



April 30, 2019

J. M. Thompson  
P.O. Box 33066  
Raleigh, North Carolina 27636

Attention: Mr. Dickie Thompson

Reference: **Geotechnical Exploration Report**  
**The Healing Place of New Hanover County**  
Wilmington, North Carolina  
S&ME Project No. 1306-19-006  
NC PE Firm License No. F-0176

Dear Mr. Thompson:

S&ME, Inc. (S&ME) is pleased to submit this geotechnical exploration report for the referenced project site. The work was completed in general accordance with our proposal number 13-1900153, dated March 29, 2019. The purpose of our geotechnical services is to explore the subsurface conditions at the site, evaluate those conditions, and provide recommendations for site preparation and foundation support of the proposed structures. This report presents a summary of pertinent project information, results of field testing, and our geotechnical engineering conclusions and recommendations. A Site Vicinity Plan, Field Test Location Plan, CPT sounding logs, and hand-auger boring logs are included in the appendix.

S&ME appreciates the opportunity to provide our services on this project. Please contact us if you have any questions regarding this report or if we may be of further assistance.

Sincerely,

**S&ME, Inc.**

A handwritten signature in blue ink, appearing to read 'N. Buffum', is positioned above the typed name of Nate Buffum.

Nate Buffum, P.E.  
Senior Geotechnical Engineer

Keith C. Brown, P.E.  
Vice President  
Registration No. 022540



## ◆ Project And Site Information

We understand that a new medical development is planned at 1000 Medical Center Drive in Wilmington, North Carolina. Based on the site grading plan provided, the development proposed will consist of four new buildings and three future proposed buildings. The proposed building plan footprints range from approximately 4,300 to 16,000 square feet. We anticipate the buildings will be single-story buildings with maximum column loads on the order of 100 kips and maximum wall loads on the order of 2 kips per foot. Associated access drives and parking areas are also planned. Based on the site grading plan, maximum excavation and fill depths planned appear to be on the order of 4 feet.

Specific structural information was not available at the time of our report preparation. Based on experience with similar construction, S&ME has assumed maximum column and wall loads will be on the order of 100 kips and 2 kip per foot, respectively. We also assume maximum fill heights of 4 to 5 feet will be required to grade some of the proposed building areas.

At the time of our exploration, the site was moderately to heavily wooded with some minor underbrush. The site ranges in elevation from 23 to 30 feet.

## ◆ Methods Of Exploration

Our exploration included a site reconnaissance by a geotechnical professional and the performance of nine cone penetrometer test (CPT) soundings (B-1 through B-7 and P-1 and P-2) including one seismic cone penetrometer test (SCPT) sounding (B-2). The near-surface soils were further evaluated with a hand-auger boring adjacent to soundings B-1, B-4, B-5 and B-7. Sounding locations were selected and established in the field by S&ME by hand held GPS unit and should be considered approximate. Approximate test locations are shown on Figure 2 in the Appendix.

### Cone Penetration Test Soundings

S&ME advanced seven CPT soundings (B-1, B-3 through B-7 and P-1 and P-2) as shown on the Field Test Location Plan (Figure 2) in the Appendix. In a CPT sounding (ASTM D5778), an electronically instrumented cone penetrometer is hydraulically pushed through the soil to measure point stress, pore water pressure, and sleeve friction. The CPT data is used to determine soil stratigraphy and to estimate soil parameters such as, friction angle, and undrained shear strength. Soil types presented on CPT sounding logs are derived from Robertson's (1990) Soil Behavior Type (SBT) Index. The soil type determined from the SBT index is more representative of soil behavior characteristics than traditional soil classification that is based on grain size and plasticity. Sounding logs are included in the Appendix.

### Seismic Cone Penetration Test Soundings

In a SCPT (B-2) sounding the travel times of shear waves generated by an impulsive force applied to the ground surface are measured by geophones mounted within the cone penetrometer. For each measurement, the distance traveled and travel time of the first shear wave arrival was determined. Interval velocities were calculated by



dividing the distance between adjacent depths by the difference in travel times. Measurements are collected every 3 feet.

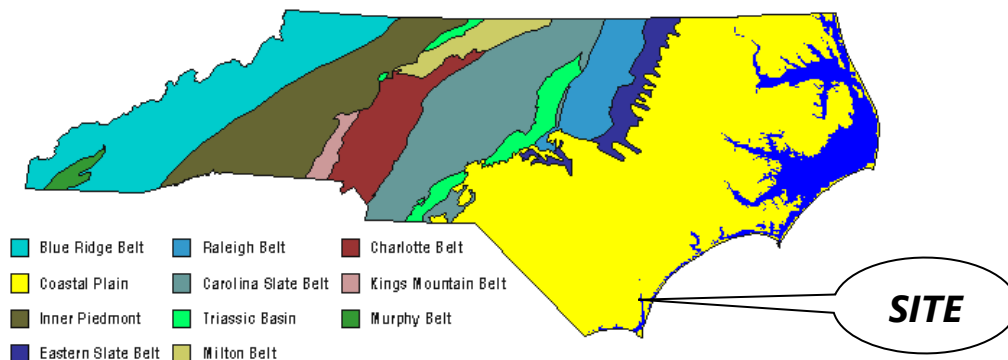
## Hand-Auger Boring

A 4-ft deep hand-auger boring was performed adjacent to soundings B-1, B-4, B-5 and B-7 to evaluate and classify the near-surface soils. The borings were drilled by manually turning a steel auger into the ground, and the soils encountered were visually classified in the field using the Unified Soil Classification System (USCS). Upon completion of the borings, each bore hole was backfilled with soil cuttings.

## ◆ Surface And Subsurface Conditions

### Physiography

Figure 1 - Physiography



The site is located within the Coastal Plain Physiographic Province of North Carolina as shown in Figure 1. The Coastal Plain Province is typically characterized by marine, alluvial, and aeolian sediments that were deposited during periods of fluctuating sea levels and moving shorelines. The soils and basal formations in the North Carolina Coastal Plain Physiographic Province are typical of those laid down in a shallow sloping sea bottom; interbedded sands and clays with irregular deposits of shells and layers of limestone and cemented sands. Alluvial sands, silts, and clays are typically present near rivers and creeks. Deposits of peat, organic silt, and organic clay are also typically present in or near current or former tidal marsh areas in the outer portion of the Coastal Plain.

According to the 1985 Geologic Map of North Carolina, the site is underlain by the Peedee Formation of Cretaceous age. This formation consists of fossiliferous and calcareous sand, clayey sand, and greenish gray to olive black clay. This type of formation is capable of developing solution cavities and voids. The top of the coastal formations on the geologic map are typically on the order of 30 to 100 feet below the ground surface. They represent basal, relatively hard formations with consistency over large areas.





## **Subsurface Conditions**

Details of the subsurface conditions encountered by the soundings and borings are shown on the logs in the Appendix. These logs represent our interpretation of the subsurface conditions based upon field data. Stratification lines on the logs represent approximate boundaries between soil types<sup>1</sup>; however, the actual transition may be gradual. The general subsurface conditions and their pertinent characteristics are discussed in the following paragraphs.

The exploration initially encountered approximately 6 to 8 inches of organic laden topsoil in HA-1, HA-4, HA-5 and HA-7. Beneath the surface materials, the hand auger boring exploration generally encountered very loose to loose relatively clean sand to the termination depth. From this depth, the exploration generally encountered medium dense to dense sand to a depth of approximately 18 to 20 ft below the existing ground surface. Very loose silty sand was encountered to approximately 29 to 31 ft below the existing ground surface.

Water levels were measured upon completion of the CPT soundings and hand-auger borings. Groundwater was encountered at a depth of 6 to 11 feet below the existing ground surface in all soundings.

## **◆ Conclusions And Recommendations**

The following conclusions and recommendations are based on our field exploration, our understanding of the proposed construction, our engineering analyses, experience with similar projects and subsurface conditions, and our correspondence with you. If structural loads and/or proposed site grades are different from those assumed or indicated, we should be provided the opportunity to review and comment upon the recommendations of this report so that they may be confirmed, extended, or modified as necessary. If subsurface conditions adverse to those indicated by this report are encountered during construction, those differences should be reported to us for review and comment.

## **General Discussion**

Based on our review of the provided project information and geotechnical analyses of field testing data, this site is suitable for the planned construction provided that site preparation recommendations presented herein are implemented during construction.

To reduce potential earthwork problems, site preparation and grading should be scheduled during the typically drier months of May through November, if possible. If late fall or winter grading is attempted, repair of near-surface soils and possible use of select off-site borrow will be necessary to adequately prepare subgrades for new construction. Heavy rubber-tired construction equipment should not be allowed to operate on exposed subgrades during wet conditions. Even during drier periods of the year, we recommend that exposed subgrades be sloped and sealed at the end of each day to promote runoff and reduce infiltration from rainfall. To further reduce potential deterioration of exposed subgrades, construction traffic patterns should be managed to limit

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<sup>1</sup> Soil Behavior Type is calculated based on empirical correlations with tip resistance, sleeve friction, and pore pressure. A CPT may define a soil based on its behavior as one type while its grain size and plasticity, the traditional basis for soil classification (USCS), may define it as a different type.



equipment passes across the site. An all-weather surface may be necessary for heavy construction traffic to reduce degrading the soil subgrade during construction.

The following sections present our geotechnical conclusions and recommendations regarding site development.

## **Earthwork**

### *Site Preparation*

Initial site preparation should begin by clearing vegetation and stripping of organics and topsoil, and any other deleterious materials for a lateral distance of at least 5 feet beyond the limits of new construction. Based on the hand-auger borings and past experience, we anticipate topsoil thicknesses will typically range from 4 to 6 inches. Stripping depths of 10 to 12 inches in heavily wooded areas are anticipated to remove roots and stumps. Any voids created from stripping and removing of trees or existing utilities should be cleaned and filled with well-compacted controlled fill.

After the required initial site work has been completed, we recommend that the exposed subgrade soils be proofrolled with a 10-ton smooth-drum self-propelled roller operating in the static mode or a loaded dump truck to locate any areas of soft, very loose, or otherwise unsuitable surface conditions. Any area that ruts or pumps should be disc, moisture conditioned to near the soil's optimum moisture content by drying or wetting, and recompacted. If groundwater is at its seasonal high (1.5 to 2.5 feet below the ground surface), operating the roller in the vibratory mode should be avoided. Alternatively, unstable soils could be undercut and replaced with compacted backfill, as discussed below.

The total amount of undercutting will depend on the design grades and the weather conditions at the time of proofrolling and site earthwork. It is typically more practical and economical to undercut and replace soft, wet subgrade soils, rather than disc, dry and recompact them, especially during the typically cooler, wetter months of the year (November through March) where the groundwater is at or near the seasonal high water table elevation. We recommend that the construction contract include an allowance for the undercutting of unsuitable soils and replacement with compacted structural fill. It should also include an allowance for the use of geotextile, such as a woven stabilization fabrics or geogrids (Mirafi 500x or equivalent). The use of geotextiles could be limited by proposed footing and utility depths below finish grade. Once the design grades have been determined S&ME should be contacted to discuss earthwork contract options with the design team.

### *Construction Dewatering*

During construction, we anticipate that the use of temporary wellpoints or pumps within the excavations will be required to lower and control groundwater levels. Depending on the depth of the excavations, in underground utility trenches, numerous wells, both internal and external to the excavations, in addition to internal sump pumps, may be necessary to keep the water table below the bottom of the excavations. Groundwater should be maintained a minimum of 2 to 3 feet below the excavation bottom throughout construction to maintain bottom stability. The dewatering system designer should also consider the influence of dewatering on any nearby structures and roadways.



The responsibility for dewatering of construction excavations should lie solely with the contractor. This information is provided only as a service and under no circumstance should S&ME be assumed to be responsible for the effectiveness of the construction dewatering method(s) selected by the contractor

### *Structural Fill*

We recommend that soils used as structural fill meet the following requirements:

- Contain less than 5 percent organics.
- Be free of trash or other deleterious materials.
- Have a maximum particle size of 2 inches or less.
- Have a minimum standard Proctor maximum dry density of 100 pounds per cubic foot.
- Contain no more than 20 percent fines (silt/clay) (Unified Soil Classification of SP, SP-SM, SP-SC or SM)

Based on the near-surface soils encountered in the hand augers and CPT soundings, the on-site soils down to a depth of approximately 6 feet should be suitable for use as structural fill and backfill. Groundwater was encountered within 6 to 11 feet of existing ground surface in the majority of the soundings. Soils excavated from below the water table will most likely require discing and drying prior to reuse as compacted structural fill.

Please note that the site contains clean sand (SP) and slightly silty sand (SP-SM) with less than 12% fines that have very little "binder" and can be difficult to compact and maintain a stable fill surface upon. Clean fine sands (SP) are common in the vicinity of the site and are locally known as "sugar sands". These soils typically require the addition of large amounts of water, even during wet, cool weather conditions, to achieve compaction. Also, the fill surfaces need to be covered with additional fill or ABC stone base immediately, as they will tend to degrade upon drying and rut under construction traffic. Alternatively, they can be moisture conditioned and re-compacted prior to subsequent fill or pavement material placement.

### *Fill Placement and Compaction*

All new structural fill soil should be placed in 8 to 10-inch loose lifts and compacted to at least 95 percent of the standard Proctor maximum dry density (MDD) (ASTM D 698). The top 12 inches should be compacted to at least 98 percent of the materials standard Proctor MDD. The moisture content of structural fill should be maintained at +/- 5 percent for SP-SM and within +/-3 percent for SP-SC, SC and SM materials of optimum moisture during compaction. A qualified soil technician working under the supervision of the geotechnical engineer should observe fill placement and compaction. An appropriate number of soil density tests should be conducted to confirm that adequate fill compaction is achieved.

### *Subgrade Repair and Improvement Methods*

The exposed subgrade of both cut and fill areas can deteriorate and lose support when exposed to construction traffic and adverse weather conditions. Deterioration can occur in the form of rutting, pumping, freezing, or erosion. We recommend that, during construction, exposed subgrade surfaces be sealed at the end of each day or when wet weather is forecast. Water should not be allowed to pond in fill or cut areas. Immediately prior to floor slab or pavement construction, exposed subgrade soils should be evaluated by proofrolling to determine their stability. Soils which rut, pump, or deflect under proofrolling should be repaired prior to ABC stone placement.



Repair measures may include scarifying/drying/recompacting, undercutting, placement of geotextiles, or some combination of these. Actual repair measures will be influenced by project schedule and weather conditions and can only be determined in the field.

### **Pavement Recommendations**

Pavement design procedures are based on AASHTO “Guide for Design of Pavement Structures” (1993) and associated literature. At the time of this report, traffic loading information was not available. For the purpose of our analysis, we have considered the following traffic loading.

<b>Vehicle Type</b>	<b>Volume &amp; Frequency</b>
Small Delivery Trucks	1 per day
Trash Trucks	2 per week
Fire Trucks	1 per month
Automobiles	200 per day

The pavement analysis was based on an initial serviceability index of 4.2 (4.5 for concrete), a terminal serviceability index of 2.0, and a 20-year design life.

#### *Asphalt Pavement*

Based on the field testing, and past experience, a design CBR value of 8 percent was used for pavement design. This CBR value is based on the subgrade soils consisting of sandy soils and the top 12 inches being uniformly compacted to at least 98% of the soil’s standard Proctor MDD. For the light-duty pavement areas (i.e. parking stalls) an 18-kip equivalent single axle loads (ESAL) value of 10,000 was used. For heavy-duty pavement area (i.e. access drives and route to dumpster pad) an ESAL value of 30,000 was used.

Recommendations for the standard and heavy duty pavements are provided in the table below.

<b>Material Type</b>	<b>Light Duty</b>	<b>Heavy Duty</b>
Asphalt Surface Course	2.0 inches (S-9.5B)	3.0 inches* (S-9.5B)
Aggregate Base Course	6 inches	8 inches

\*Placed in two lifts

All materials and construction methods should conform to the 2012 edition of the NCDOT “Standard Specifications for Roads and Structures.” The aggregate base course (ABC) stone should consist of stone meeting the requirements under Section 520. ABC stone should be compacted to at least 98 percent of the maximum dry density as determined by the modified Proctor compaction test, AASHTO T-180M as modified by NCDOT. To confirm that the base course stone has been uniformly compacted, in place density tests should be performed by a qualified soils technician and the area should be thoroughly proofrolled under his observation.



Asphaltic concrete should conform to Section 610 in the 2012 edition of the NCDOT “Standard Specifications for Roads and Structures.” Sufficient testing and observation should be performed during pavement construction to confirm that the required thickness, density, and quality requirements of the specifications are achieved.

Although our analysis was based on traffic loading for a 20-year design life, our experience indicates that pavement maintenance is necessary due to normal weathering of the asphaltic concrete. Normal weathering (i.e., oxidation) causes asphalt to become more brittle resulting in loss of tensional strength. This loss in strength can cause minor cracking which provides access for water infiltration into the stone base and subgrade. As the degree of saturation of the subgrade increases, the strength of the subgrade decreases leading to pavement failure. Routine maintenance in the form of sealing, patching, and maintaining proper drainage is required to increase pavement life. It is not uncommon for overlays to be required after 10 to 12 years.

### *Concrete Pavement (Dumpster Pad)*

The concrete pavement design was performed using the same design traffic as in the heavy-duty asphalt pavement areas (30,000 ESALs). The compressive strength of the concrete was assumed to be 4,000 psi. A modulus of subgrade reaction of 150 pci was used for design assuming 6 inches of compacted ABC stone is placed beneath the concrete pavement. We have assumed that load transfer across contraction (saw) joints will be handled by aggregate interlock. ABC should meet the material and compaction requirements stated in the “Flexible (Asphalt) Pavement” section above.

Concrete pavement is recommended for heavily loaded traffic and dumpster pad areas. The table below presents our recommended concrete pavement section thicknesses.

Material Type	Concrete Pavement Design
Air Entrained Concrete (4000 psi)	4.0 inches
Aggregate Base Course (ABC) stone	6.0 inches
Maximum Joint Spacing	12 feet in all directions

Saw joints should be cut to a depth of at least  $\frac{1}{4}$  of the thickness of the concrete pavement to promote shrinkage cracking along the joint. The ABC stone should be compacted to at least 98 percent of its modified Proctor maximum dry density.

### **Foundation Recommendations**

We have assumed maximum column and wall loads for the new building will be 100 kips and 2 kips per linear foot, respectively. Please let us know if assumed structural loads are different than our assumptions.

Foundations can be supported on shallow spread footings designed for a net allowable bearing pressure of 2,000 pounds per square foot (psf). This bearing pressure assumes that footings will bear in compacted structural fill or natural soils, and that the site is prepared as recommended above.



Footings should bear at least 18 inches below exterior grade to avoid frost penetration and develop the design bearing capacity. Continuous wall footings should be at least 18 inches wide, and isolated column footing should be at least 24 inches wide. This recommendation is made to prevent a localized or "punching" shear failure condition which can occur with very narrow footings.

Based on encountered subsurface conditions and assumed structural loads, we estimate that total settlement of building foundations will be 1 inch or less. These estimates assume that all structural fill is properly placed and compacted. A detailed foundation layout with structural loads is required to estimate differential settlement; however, based on the maximum column load and subsurface conditions encountered, we would estimate differential settlements of one half of the total settlement between adjacent columns.

### *Footing Evaluations*

The bottom of all footing excavations for the structure should be evaluated by the project geotechnical engineer or a soils technician working under the direction of the geotechnical engineer using a hand auger and dynamic cone penetrometer (DCP) to gauge the consistency of subgrade soils. Footing subgrades that are unstable should be overexcavated and replaced with NCDOT #57 stone or lean concrete.

### **Floor Slabs**

The ground floor slab may be constructed above suitable compacted fill or stable natural soils provided that the recommendations described above are implemented. The slab should be separated from footings to allow for relative displacement.

We recommend that at least 6 inches of compacted select granular material be placed beneath all ground floor slabs to provide a capillary break, provide more uniform slab support, and reduce damage to subgrade soils during construction. The select granular fill should classify as SP, SP-SM, SW, or SW-SM in accordance with the Unified Soil Classification System, which requires that these soils have less than 12 percent passing the No. 200 sieve. Manufactured materials such as aggregate base course (ABC) or processed fill (i.e., screenings) meeting this specification can be used. A modulus of subgrade reaction value of 175 psi/in may be used to design floor slab on subgrades consisting of these soils compacted to at least 98 percent of the soil's standard Proctor maximum dry density.

Exposure to the environment and construction activities will weaken the floor slab subgrade soils. Therefore, we recommend that subgrade soils in slab areas be evaluated prior to placement of the select granular fill. If near surface deterioration of the soils has occurred, undercutting or reworking of the fill may be necessary.

Based on the results of our exploration and the assumed finish floor elevation, the floor slab will not be below the exterior grade and will not be subjected to hydrostatic pressure from groundwater. However, water vapor transmission through the slab is still a design consideration. Evaluating the need for and design of a vapor retarder or vapor barrier for moisture control is outside our scope of services and should be determined by the project architect/structural engineer based on the planned floor coverings and the corresponding design constraints, as outlined in ACI 302.1R-04 Guide for Concrete Floor and Slab Construction. Further, health and



environmental considerations with respect to any potentially harmful vapor transmission are also outside of our scope.

## Seismic Design Considerations

The following sections pertain to seismic considerations.

### *Seismic Site Class*

Seismic site classification is based on the top 100 feet of a site's subsurface profile. Based on the Shear Wave velocity values in the Seismic CPT sounding recorded during the field exploration and S&ME's knowledge of the local geology, per Section 1613 of the *2018 North Carolina State Building Code* the site is considered as Seismic Site Class D.

### *Design Spectral Accelerations*

The current North Carolina Building Code (NCBC) references the 2015 International Building Code and ASCE 7-10 for determining the design spectral accelerations and liquefaction potential. However, Seismic Ground Motion Maps were updated in 2014 and are incorporated into ASCE 7-16. The updated maps, which result in lower spectral accelerations, represent the latest understanding of the seismic hazard and will presumably be eventually incorporated into the NCBC. Listed in the table below are the ground motion parameters from both resources.

**Ground Motion Parameters**

Method	Site Class	S <sub>s</sub>	S <sub>1</sub>	S <sub>Ds</sub>	S <sub>D1</sub>	PGA	Seismic Design Category
2018 North Carolina Building Code (ASCE 7-10)	D	0.221g	0.092g	0.236g	0.148g	0.178g	C
ASCE 7-16	D	0.157g	0.069g	0.168g	0.11g	0.127g	B

### *Liquefaction Triggering*

We performed a seismic liquefaction triggering evaluation using the methods presented by Youd et. al. (2001) and Boulanger and Idriss (2014) based on the design earthquake (M=7.3). The design earthquake has a 2 percent probability of exceedance in a 50 year period. This is equivalent to an earthquake that has the likelihood of occurring once every 2,475 years.

To help evaluate the consequences of liquefaction, the Liquefaction Potential Index (LPI) was computed. The LPI is an empirical tool used to evaluate the site liquefaction hazard and the potential for liquefaction-induced damages<sup>2</sup>. The LPI considers the factor of safety against liquefaction, the depth to the liquefiable soils, and the

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<sup>2</sup> Iwasaki et al. 1982, Toprak & Holzer (2003).



thickness of the liquefiable soils to compute an index that ranges from 0 to 100. An LPI of 0 means there is no risk of liquefaction; an LPI of 100 means the entire profile is expected to liquefy. The level of risk is generally defined as:

- LPI < 5 – surface manifestation and liquefaction-induced damage not expected.
- $5 \leq \text{LPI} \leq 15$  – moderate liquefaction with some surface manifestation possible.
- LPI > 15 – severe liquefaction and foundation damage is likely.

Based on the results of our analyses, we conclude that the site has a low potential for liquefaction for the design earthquake, with the exception of near soundings B-2 and B-5 under the 2018 NCBC. Liquefaction potential calculated with ASCE 7-10 and 7-16 are approximately 5 and 1, respectively. With the ground motions based on the most up-to-date maps, the liquefaction potential index is less than 5; therefore, liquefaction-induced damage is not expected. Maximum liquefaction settlement is estimated to be between 2 to 4 inches.

### *Liquefaction Mitigation – Earthquake Drains*

The project owner may elect to mitigate the liquefaction potential discussed above. Earthquake drain installation can mitigate liquefaction potential and reduce seismic settlement to acceptable levels (less than 2 inches); however, the drains cannot totally eliminate seismic settlement. The drains allow for the rapid dissipation of excess soil porewater pressures generated during a seismic event thus reducing liquefaction. The drains are composed of corrugated, perforated plastic pipe encased in a filter fabric which prevents migration of fines into the pipe. Pipe diameters and spacing's vary according to the anticipated liquefaction risk and may be supplemented with man-made gravel reservoirs for additional water storage. The drains are installed by vibrating a steel casing into the ground which helps densify the surrounding loose sands and allows insertion of the drain pipe.

Earthquake drains are typically provided in a design-build contract by a specialty contractor experienced with the design and installation of the system. If the owner decides to take measures to mitigate liquefaction potential, requests be submitted to qualified contractors to prepare a proposal to furnish all necessary labor, equipment, and materials to design and install EQ drains to reduce liquefaction-induced deformations for the IBC 2015 design earthquake in building areas to a magnitude acceptable to the structural engineer. The IBC 2015 design event comprises a 7.3 magnitude earthquake with a peak ground acceleration (PGA) of 0.178. A copy of this report should be submitted with the request to provide the necessary subsurface data to perform the design. The proposals should be evaluated by the project Geotechnical and Structural Engineers, and then a contractor should be selected based on technical approach, past experience, and cost.

If performed, EQ drain installation should be observed by a representative of the Geotechnical Engineer to confirm that 1) earthquake drains are installed in all locations, 2) earthquake drains are installed to the design depth, and 3) note any non-conformance with the EQ drain design.

If requested, S&ME can be retained to design the earthquake drain program, which in turn could then be provided to specialty contractors.





## Retaining Wall Recommendations

### *General*

Retaining walls must be designed to resist lateral earth pressures from backfill. In addition to the lateral stresses from backfill, walls may be subjected to surcharge loading from adjacent traffic, stockpiled materials, or stresses from nearby footings or floor slabs. If present, these surcharge stresses should be resolved into appropriate lateral stress distributions and added to the earth pressures outlined below. Walls should have adequate factors of safety against overturning, sliding, and global failure.

We recommend placing a drainage medium, such as washed stone (NCDOT #57) wrapped in geotextile fabric or a prefabricated geocomposite drain, behind the wall. The drainage medium should be connected to a footing drain or weep holes to reduce potential buildup of hydrostatic pressure due to surface water, perched water, or utility leaks.

Backfill materials placed behind retaining walls should be compacted to at least 95 percent of the soil's standard Proctor maximum dry density (ASTM D 698) and within 3 percent of optimum moisture. Operating heavy compaction equipment within 5 feet behind the retaining structures can create lateral earth pressures far in excess of those recommended for design. As such, we recommend that hand-operated equipment be used within 5 feet from walls.

We understand the site contractor intends to use quarry screenings as reinforced backfill (backfill containing mechanical reinforcement or geogrid) behind MSE walls. Recommended properties for reinforced backfill, retained soil, and foundation soils are provided in the table below. The parameters assume that soils are properly compacted in accordance with project specifications.

### Recommended Parameters for Segmental Block Wall Backfill

Material	Friction Angle	Cohesion	Moist Unit Weight
<b>Reinforced Material</b> (Quarry Screenings)	42°	0	125 pcf
<b>Retained Soils</b> (onsite SM-SP)	30°	0psf	115 pcf
<b>Foundation Soils:</b> Onsite SM-SP	30°	0	115 pcf



## ◆ Qualifications Of Report

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions and recommendations contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared. No other representation or warranty either express or implied, is made.

We relied on project information given to us to develop our conclusions and recommendations. If project information described in this report is not accurate, or if it changes during project development, we should be notified of the changes so that we can modify our recommendations based on this additional information if necessary.

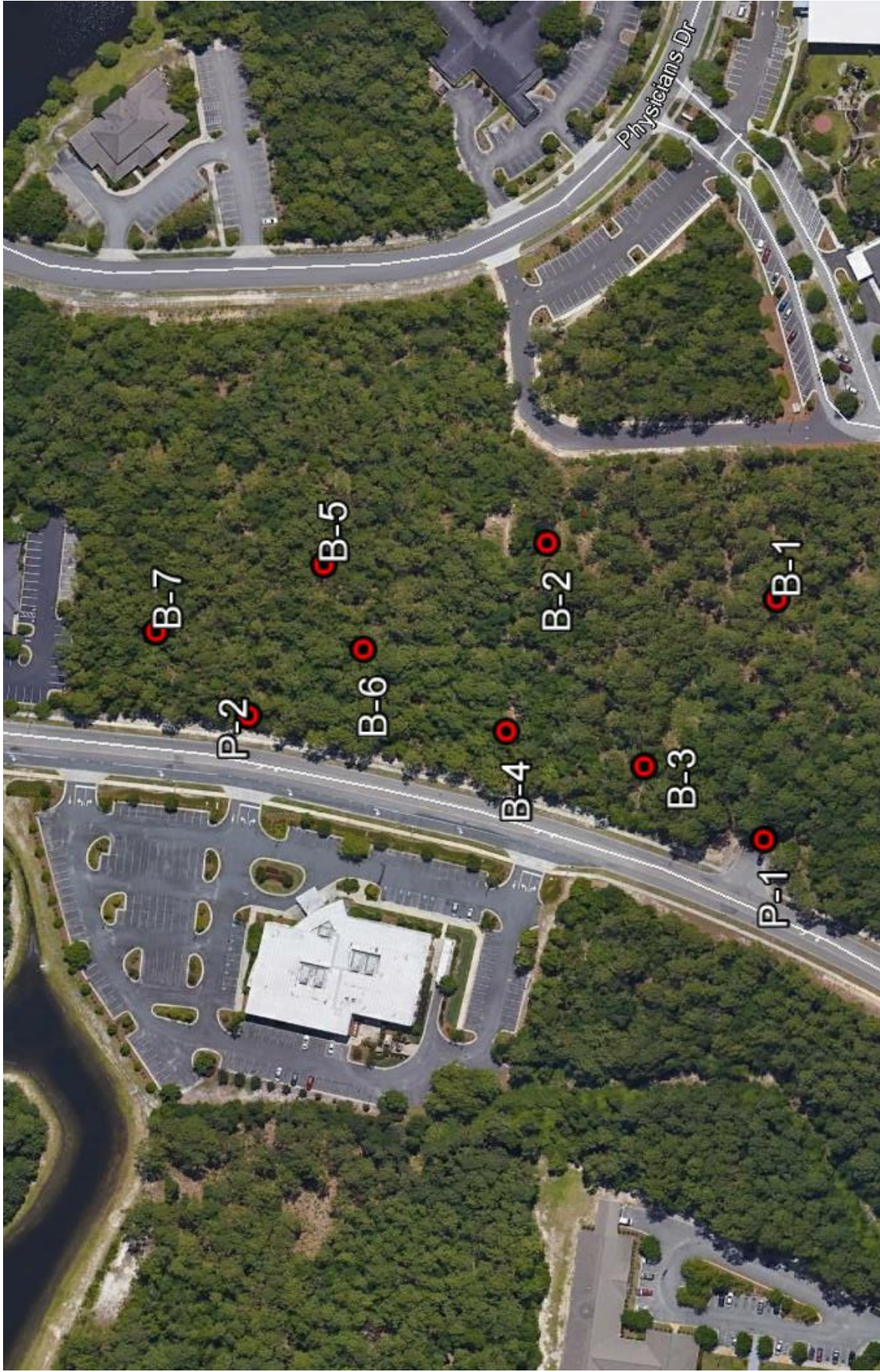
Our conclusions and recommendations are based on limited data from a field exploration program. Subsurface conditions can vary widely between explored areas. Some variations may not become evident until construction. If conditions are encountered which appear different than those described in our report, we should be notified. This report should not be construed to represent subsurface conditions for the entire site.

Unless specifically noted otherwise, our field exploration program did not include an assessment of regulatory compliance, environmental conditions or pollutants or presence of any biological materials (mold, fungi, bacteria). If there is a concern about these items, other studies should be performed. S&ME can provide a proposal and perform these services if requested.

S&ME should be retained to review the final plans and specifications to confirm that earthwork, foundation, and other recommendations are properly interpreted and implemented. The recommendations in this report are contingent on S&ME's review of final plans and specifications followed by our observation and monitoring of earthwork and foundation construction activities.

## **Appendices**

## **Appendix I – Figures**



REFERENCE: GOOGLE EARTH

**PROPOSED TEST LOCATION PLAN**

HEALING PLACE OF NEW HANOVER COUNTY  
 MEDICAL CENTER DRIVE  
 WILMINGTON, NORTH CAROLINA

SCALE:	NOT TO SCALE
DATE:	3/29/2019
PROJECT NUMBER	13-1900153

FIGURE NO.

**1**



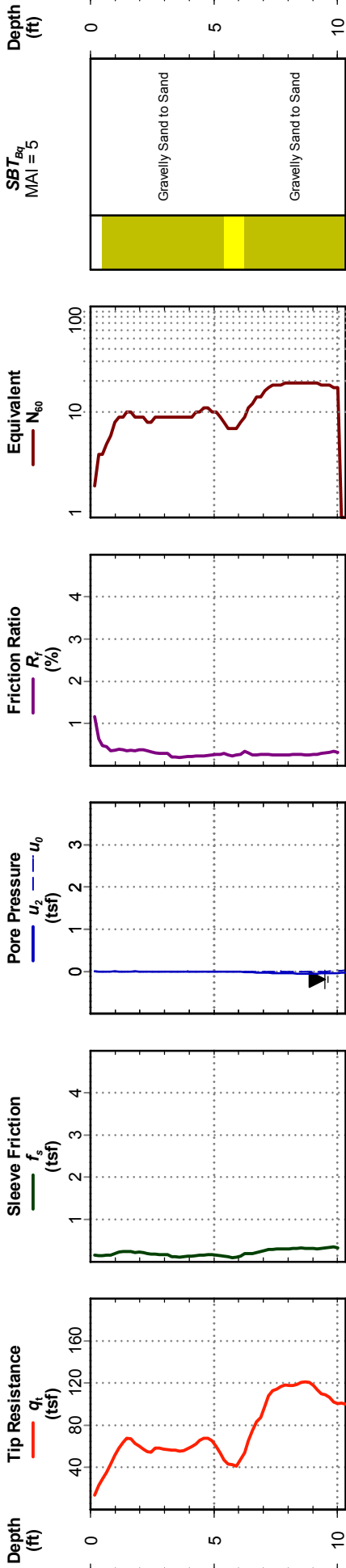
## **Appendix II – CPT Sounding and Hand-auger Boring Logs**



The Healing Place of New Hanover County  
Wilmington, North Carolina  
S&ME Project No: 1306-19-006

# Sounding ID: P-1

Date: Apr. 15, 2019  
Total Depth: 10.3 ft  
Termination Criteria: Target Depth  
Cone Size: 1.75  
Estimated Water Depth: 9.5 ft  
Rig/Operator: Mid Atlantic/A. Fowler



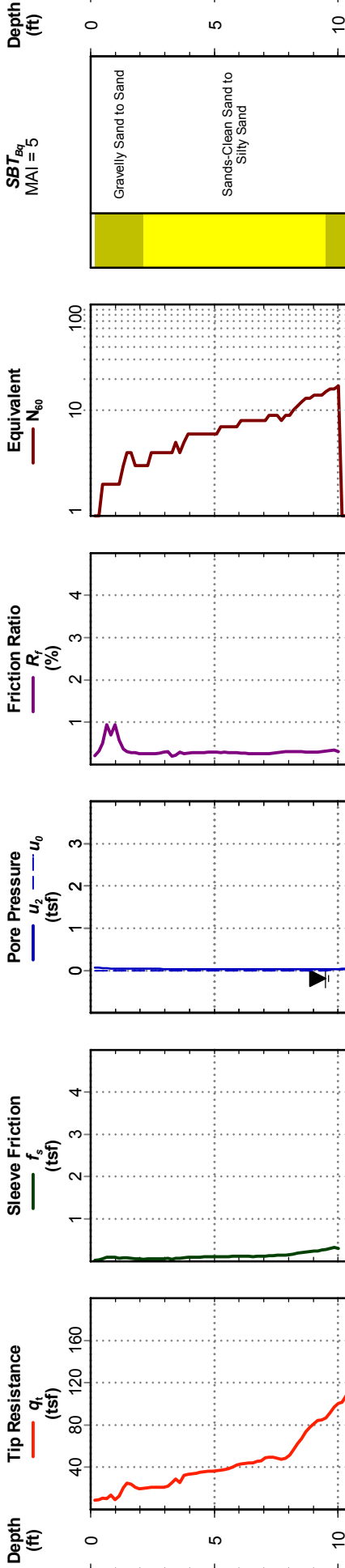
## Cone Penetration Test



The Healing Place of New Hanover County  
Wilmington, North Carolina  
S&ME Project No: 1306-19-006

# Sounding ID: P-2

Date: Apr. 15, 2019  
Total Depth: 10.3 ft  
Termination Criteria: Target Depth  
Estimated Water Depth: 9.5 ft  
Cone Size: 1.75  
Rig/Operator: Mid Atlantic/A. Fowler



## Cone Penetration Test

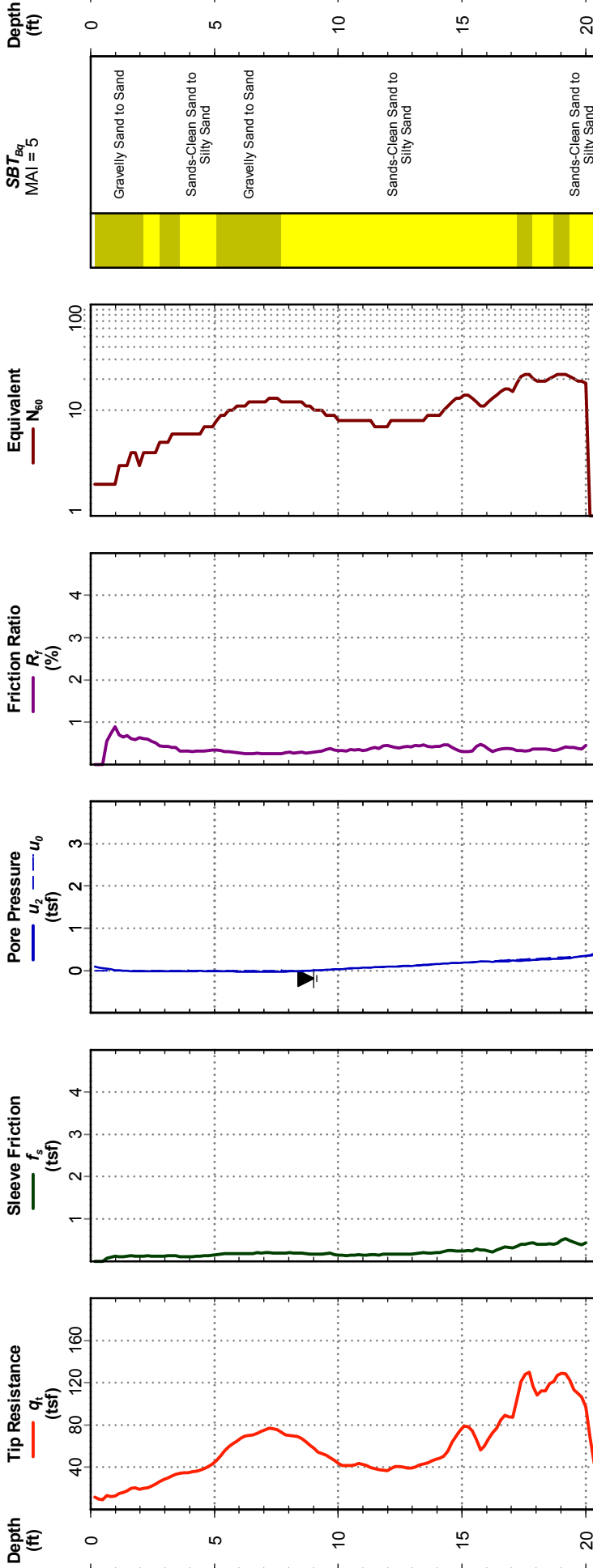




The Healing Place of New Hanover County  
Wilmington, North Carolina  
S&ME Project No: 1306-19-006

Sounding ID: S-1

Date: Apr. 15, 2019  
Total Depth: 20.3 ft  
Termination Criteria: Target Depth  
Estimated Water Depth: 9 ft  
Cone Size: 1.75  
Rig/Operator: Mid Atlantic/A. Fowler



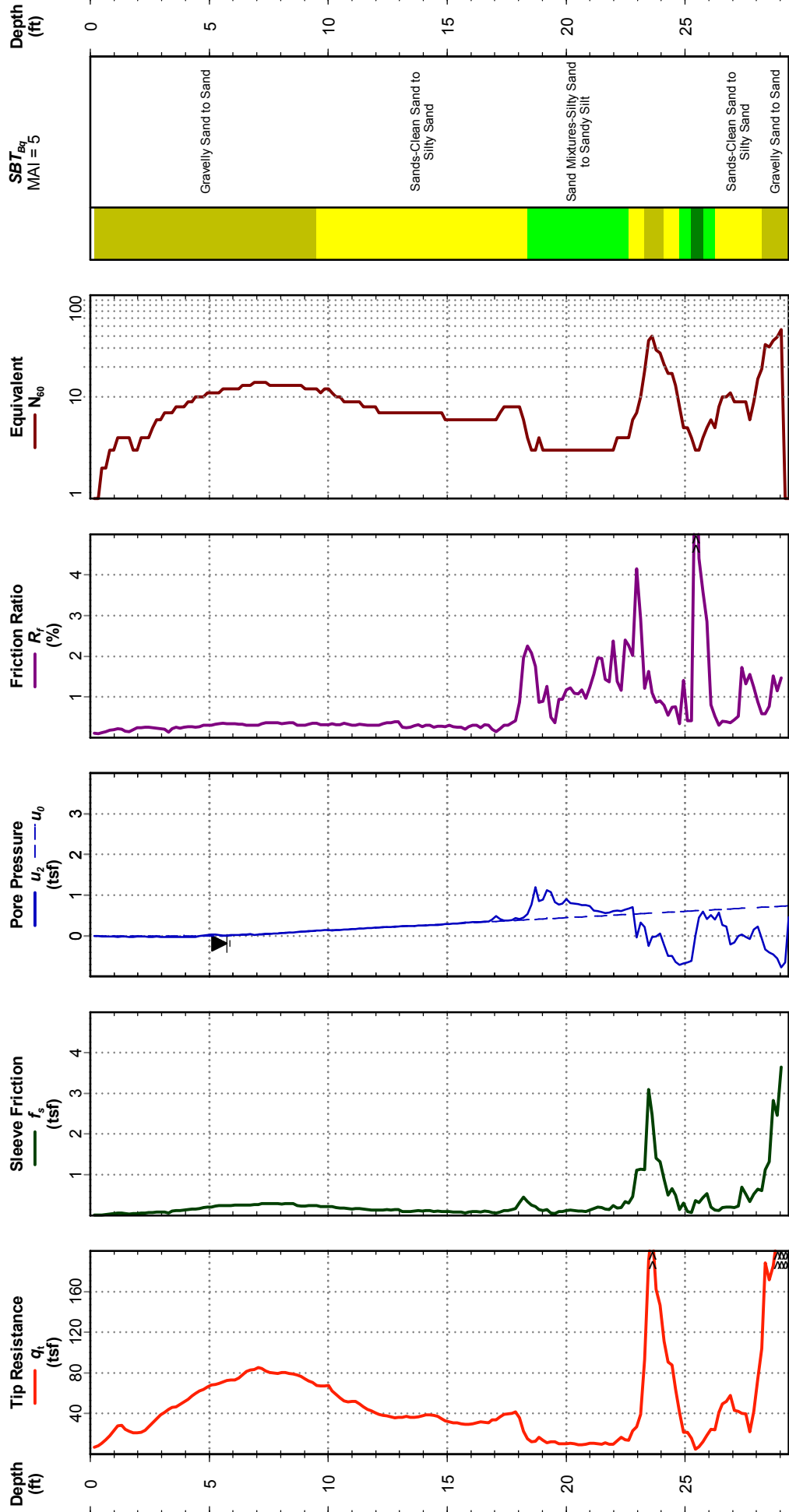
Cone Penetration Test



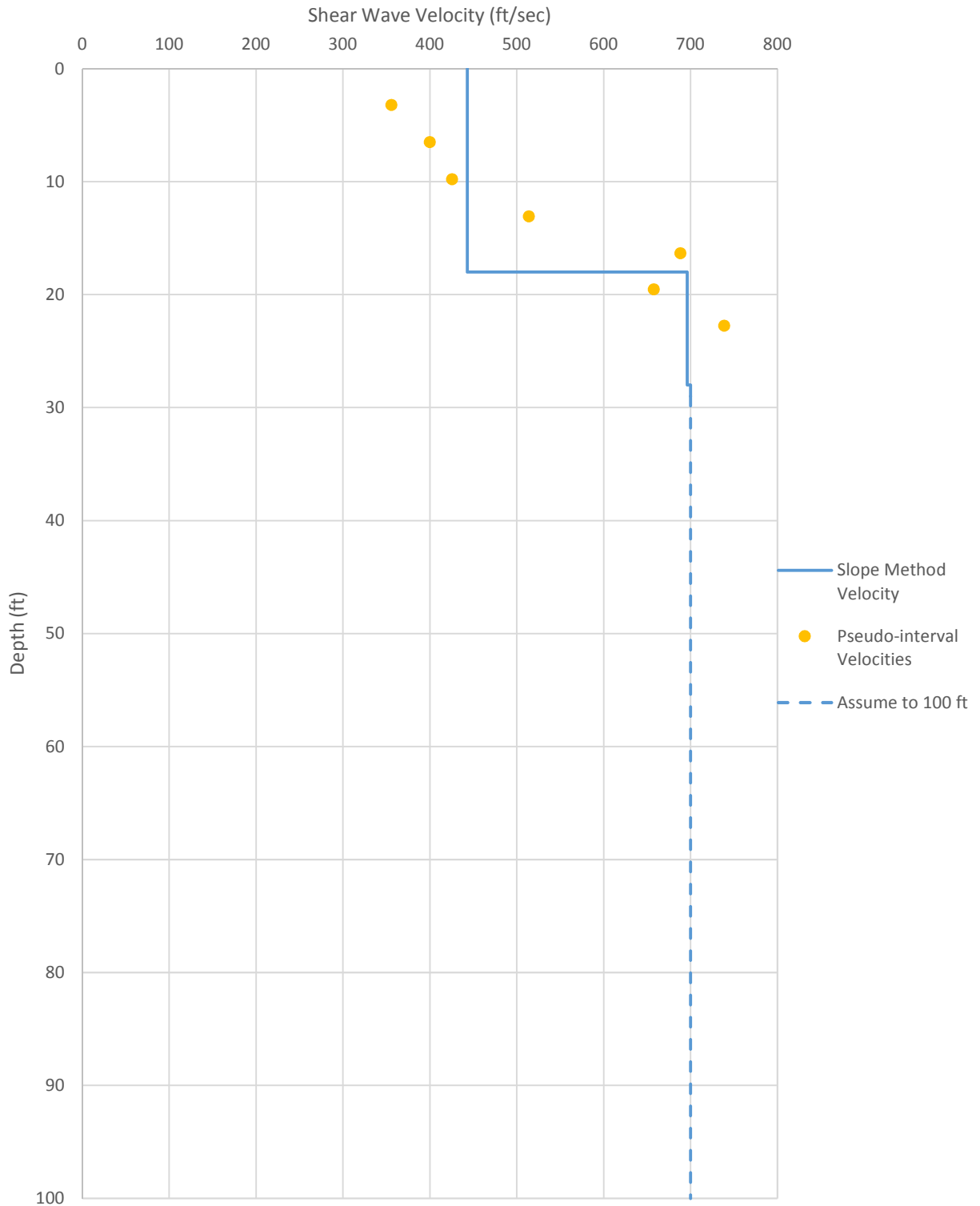
The Healing Place of New Hanover County  
 Wilmington, North Carolina  
 S&ME Project No: 1306-19-006

Sounding ID: S-2

Date: Apr. 15, 2019  
 Total Depth: 29.4 ft  
 Estimated Water Depth: 5.75 ft  
 Maximum Reaction Force  
 Termination Criteria: 1.75  
 Cone Size: 1.75  
 Rig/Operator: Mid Atlantic/A. Fowler



Cone Penetration Test



Drawn by:  
A. Yetman

Checked by:  
K. Brown

Date: 4/15/2019



**Shear Wave Velocity Profile**

The Healing Place of New Hanover County  
Wilmington, NC

Proj. No. 1306-19-006 S-2

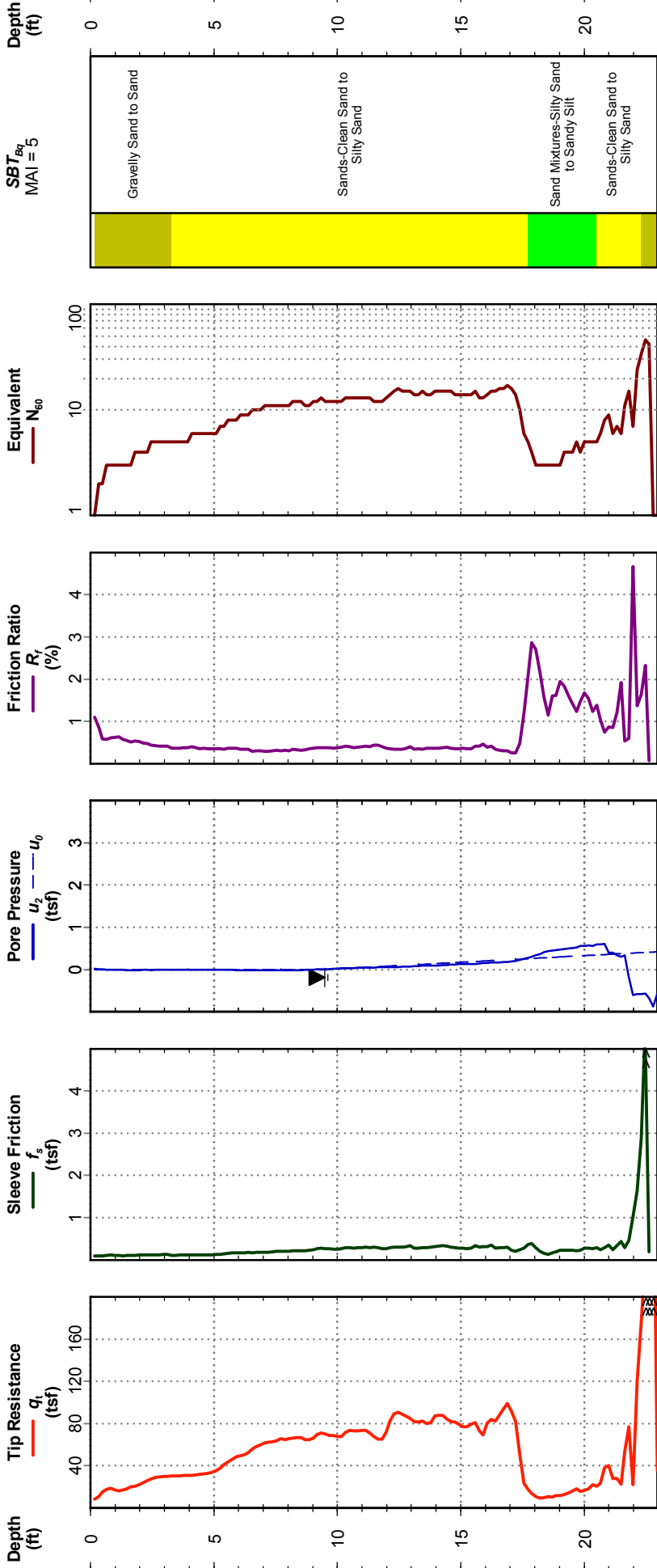
Fig. No.  
2



The Healing Place of New Hanover County  
Wilmington, North Carolina  
S&ME Project No: 1306-19-006

# Sounding ID: S-3

Date: Apr. 15, 2019  
Total Depth: 23.0 ft  
Termination Criteria: Target Depth  
Estimated Water Depth: 9.5 ft  
Cone Size: 1.75  
Rig/Operator: Mid Atlantic/A. Fowler



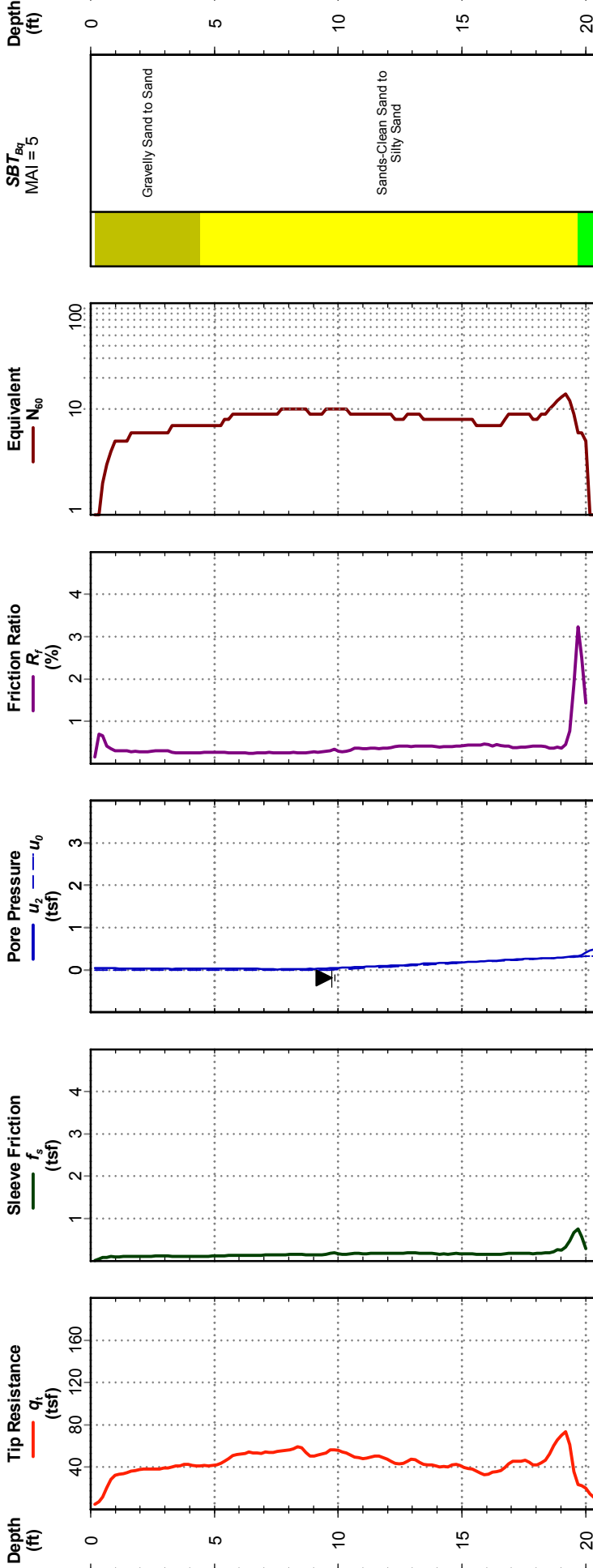
## Cone Penetration Test



The Healing Place of New Hanover County  
Wilmington, North Carolina  
S&ME Project No: 1306-19-006

# Sounding ID: S-4

Date: Apr. 15, 2019  
Total Depth: 20.3 ft  
Termination Criteria: Target Depth  
Cone Size: 1.75  
Estimated Water Depth: 9.75 ft  
Rig/Operator: Mid Atlantic/A. Fowler



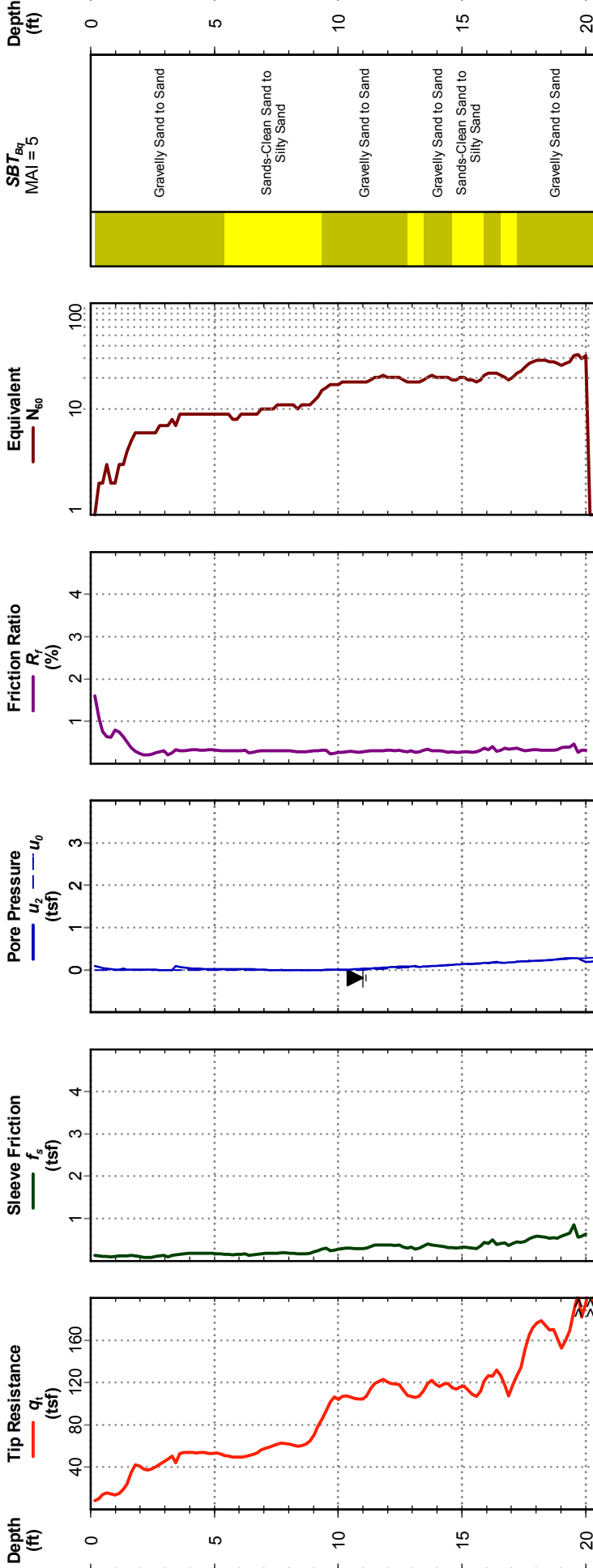
## Cone Penetration Test



The Healing Place of New Hanover County  
Wilmington, North Carolina  
S&ME Project No: 1306-19-006

Sounding ID: S-5

Date: Apr. 15, 2019  
Total Depth: 20.3 ft  
Termination Criteria: Target Depth  
Estimated Water Depth: 11 ft  
Cone Size: 1.75  
Rig/Operator: Mid Atlantic/A. Fowler



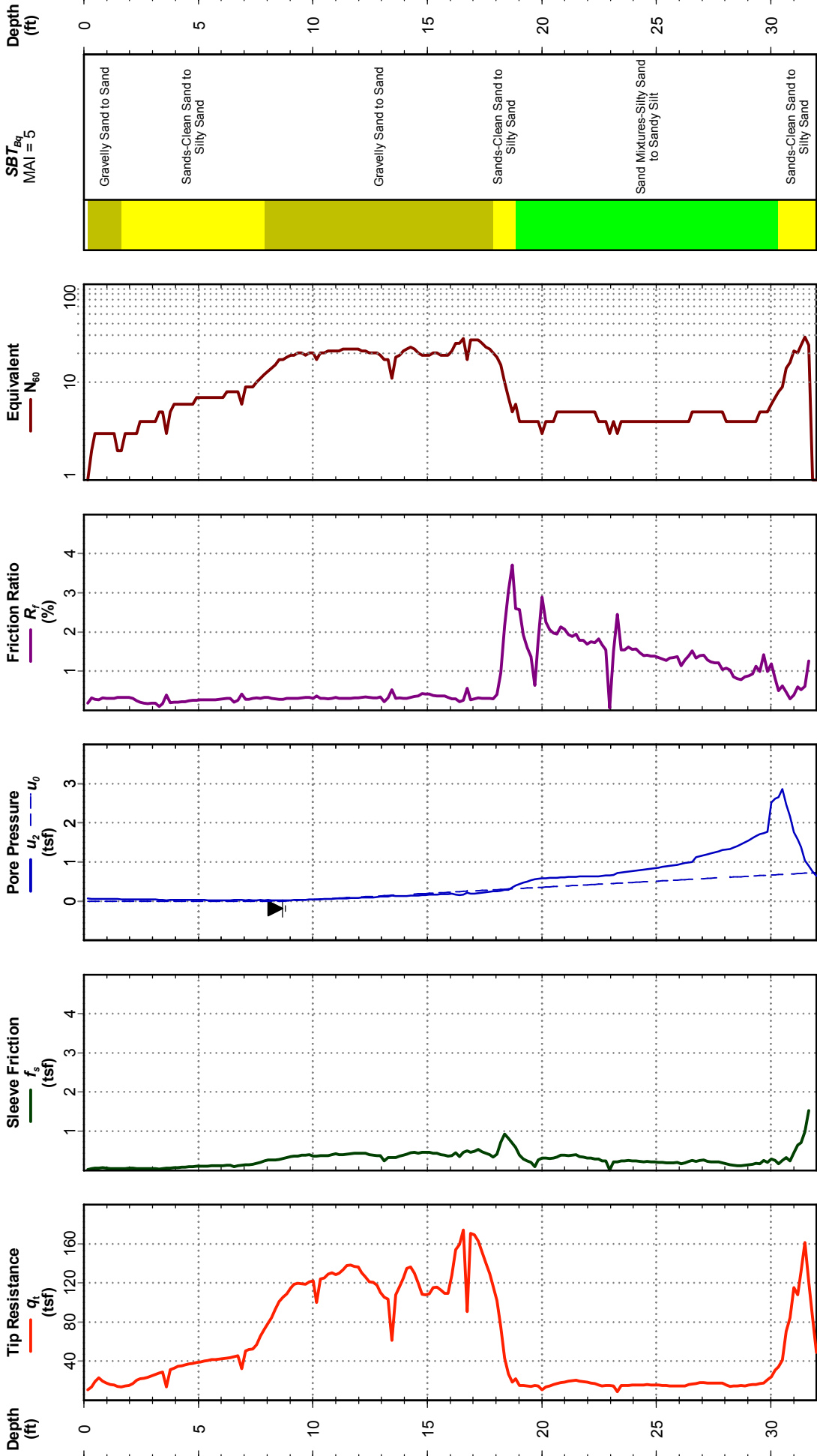
Cone Penetration Test



The Healing Place of New Hanover County  
 Wilmington, North Carolina  
 S&ME Project No: 1306-19-006

Sounding ID: S-6

Date: Apr. 15, 2019  
 Total Depth: 32.0 ft  
 Estimated Water Depth: 8.67 ft  
 Termination Criteria: Maximum Reaction Force  
 Cone Size: 1.75  
 Rig/Operator: Mid Atlantic/A. Fowler



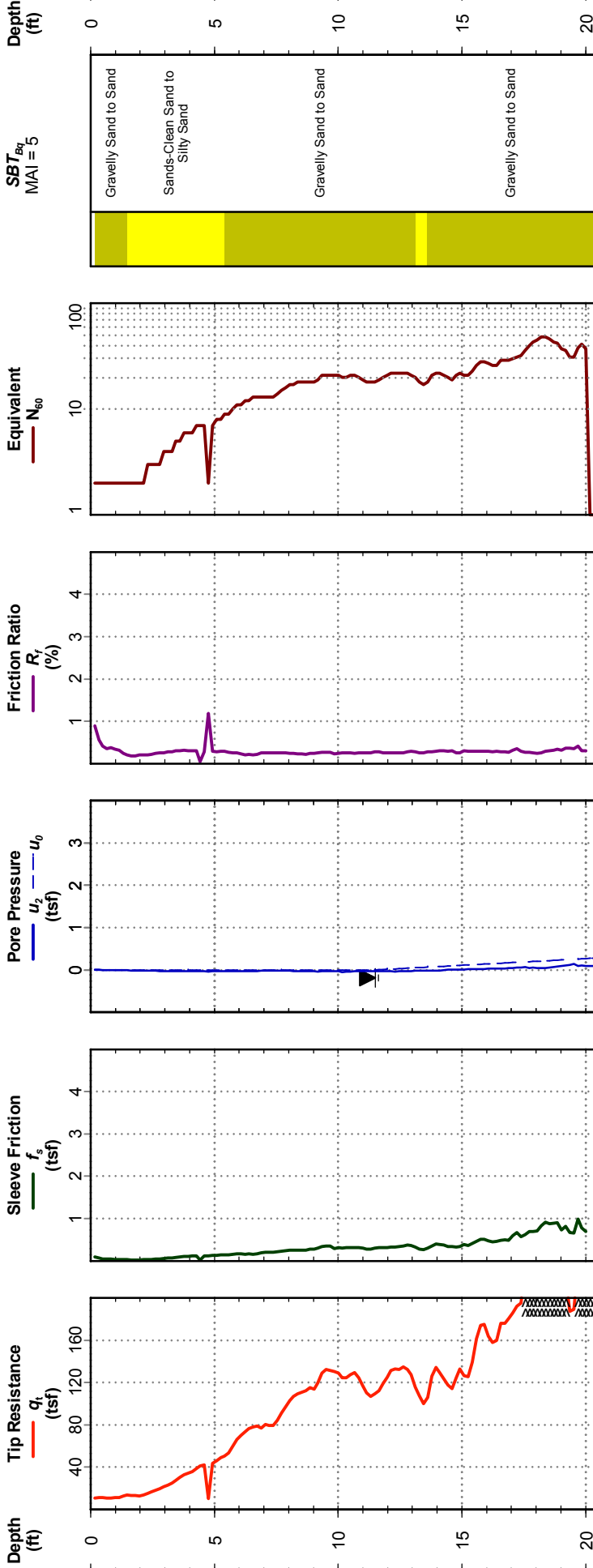
Cone Penetration Test



The Healing Place of New Hanover County  
Wilmington, North Carolina  
S&ME Project No: 1306-19-006

Sounding ID: S-7

Date: Apr. 15, 2019  
Total Depth: 20.3 ft  
Termination Criteria: Target Depth  
Estimated Water Depth: 11.5 ft  
Cone Size: 1.75  
Rig/Operator: Mid Atlantic/A. Fowler



Cone Penetration Test



## FIELD TESTING PROCEDURES

### Cone Penetrometer Test (CPT) Sounding

The cone penetrometer test soundings (ASTM D 5778) were performed by hydraulically pushing an electronically instrumented cone penetrometer through the soil at a constant rate. As the cone penetrometer tip was advanced through the soil, nearly continuous readings of point stress, sleeve friction and pore water pressure were recorded and stored in the on-site computers. Using theoretical and empirical relationships, CPT data can be used to determine soil stratigraphy and estimate soil properties and parameters such as effective stress, friction angle, Young's Modulus and undrained shear strength.

The consistency and relative density designations, which are based on the cone tip resistance,  $q_t$  for sands and cohesive soils (silts and clays) are as follows:

<u>SANDS</u>		<u>SILTS AND CLAYS</u>	
Cone Tip Resistance, $q_t$ (tsf)	Relative Density	Cone Tip Resistance, $q_t$ (tsf)	Consistency
<20	Very Loose	<5	Very Soft
20 – 40	Loose	5 – 10	Soft
40 – 120	Medium Dense	10 – 15	Firm
		15 – 30	Stiff
120 – 200	Dense	30 – 60	Very Stiff
>200	Very Dense	>60	Hard

### CPT Correlations

References are in parenthesis next to the appropriate equation.

#### General

$p_a$  = atmospheric pressure (for unit normalization)

$q_t$  = corrected cone tip resistance (tsf)

$f_s$  = friction sleeve resistance (tsf)

$R_f = 100\% * (f_s/q_t)$

$u_2$  = pore pressure behind cone tip (tsf)

$u_0$  = hydrostatic pressure

$B_q = (u_2 - u_0)/(q_t - \sigma_{v0})$

$Q_t = (q_t - \sigma_{v0}) / \sigma'_{v0}$

$F_r = 100\% * f_s / (q_t - \sigma_{v0})$

$I_c = ((3.47 - \log Q_t)^2 + (\log F_r + 1.22)^2)^{0.5}$

#### N-Value

$$N_{60} = (q_t/p_a) / [8.5(1 - I_c/4.6)] \quad (6)$$

(6) Jefferies, M.G. and Davies, M.P., (1993), "Use of CPTu to estimate equivalent SPT N60", ASTM Geotechnical Testing Journal, Vol. 16, No. 4

## CPT Soil Classification Legend

Zone	Color	Q <sub>t</sub> /N	Description
1	<span style="color: red;">■</span>	2	Sensitive, Fine Grained
2	<span style="color: orange;">■</span>	1	Organic Soils-Peats
3	<span style="color: blue;">■</span>	1.5	Clays-Clay to Silty Clay
4	<span style="color: green;">■</span>	2	Silt Mixtures-Clayey Silt to Silty Clay
5	<span style="color: lightgreen;">■</span>	3	Sand Mixtures-Silty Sand to Sandy Silt
6	<span style="color: yellow;">■</span>	4.5	Sands-Clean Sand to Silty Sand
7	<span style="color: olive;">■</span>	6	Gravelly Sand to Sand
8	<span style="color: lightgrey;">■</span>	1	Very Stiff Clay to Clayey Sand*
9	<span style="color: grey;">■</span>	2	Very Stiff, Fine Grained*

(\*) Heavily Overconsolidated or Cemented

Robertson's Soil Behavior Type (SBT), 1990			
Group #	Description	I <sub>c</sub>	
		Min	Max
1	Sensitive, fine grained	N/A	
2	Organic soils - peats	3.60	N/A
3	Clays - silty clay to clay	2.95	3.60
4	Silt mixtures - clayey silt to silty clay	2.60	2.95
5	Sand mixtures - silty sand to sandy silt	2.05	2.60
6	Sands - clean sand to silty sand	1.31	2.05
7	Gravelly sand to dense sand	N/A	1.31
8	Very stiff sand to clayey sand (High OCR or cemented)	N/A	
9	Very stiff, fine grained (High OCR or cemented)	N/A	

Soil behavior type is based on empirical data and may not be representative of soil classification based on plasticity and grain size distribution.

Relative Density and Consistency Table			
SANDS		SILTS and CLAYS	
Cone Tip Stress, qt (tsf)	Relative Density	Cone Tip Stress, qt (tsf)	Consistency
Less than 20	Very Loose	Less than 5	Very Soft
20 - 40	Loose	5 - 15	Soft to Firm
40 - 120	Medium Dense	15 - 30	Stiff
120 - 200	Dense	30 - 60	Very Stiff
Greater than 200	Very Dense	Greater than 60	Hard

## **FIELD TESTING PROCEDURES**

### **Hand-auger Borings**

Hand-auger borings are performed by manually turning a steel auger into the ground. The soils encountered are visually classified in the field using the Unified Soil Classification System (USCS). If encountered, subsurface water level depths are measured from the existing ground surface at the time of boring. Upon completion, the bore hole was immediately backfilled with the cuttings.

Form No. TR-HAPT-01  
 Revision No. : 0  
 Revision Date: 6/11/10

**HAND AUGER & PENETROMETER TESTING**



Reference

S&ME, Inc. - Wilmington 3006 Hall Waters Drive, Suite 100, Wilmington, NC 28405

Project No.: **1306-19-007** Project Name: **The Healing Place** Report Date:  
 Client: New Hanover County Address: Medical Center Drive Test Date(s):

Project Location: Wilmington, NC

Technicians: Nate Buffum, P.E. Hammer Weight:

Test Location	Depth <i>feet</i>	Soil Description	Stratification			Hammer Blows			Average									
			Depth <i>feet</i>	1st	2nd	3rd	Increment	2nd		3rd								
B-01	0-0.8	Topsoil - Organically stained no roots																
	0.4-4.0	Brown to Gray, Fine, Silty Sand (SP-SM)																
B-04	0-0.6	Topsoil - Organically stained no roots																
	0.4-4	Brown to Gray, Fine, Silty Sand (SP-SM)																
B-05	0-0.7	Topsoil - Organically stained no roots																
	0.4-4	Brown to Gray, Fine, Silty Sand (SP-SM)																
B-07	0-0.8	Topsoil - Organically stained no roots																
	0.4-4	Brown to Gray, Fine, Silty Sand (SP-SM)																

References / Comments / Deviations:

Nathan Buffum, P.E.  
 Technician Name

\_\_\_\_\_  
 Certification / No.      \_\_\_\_\_  
 Date      \_\_\_\_\_  
 Technical Responsibility

\_\_\_\_\_  
 Position

\_\_\_\_\_  
 Date

*This report shall not be reproduced, except in full without the written approval of S&ME, Inc.*

Construction Documents

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Project information.
- 2. Work covered by Contract Documents.
- 3. Access to site.
- 4. Work restrictions.
- 5. Specification and Drawing conventions.
- 6. Miscellaneous provisions.

B. Related Requirements:

- 1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: The Healing Place of New Hanover County.

- 1. Project Location: Wilmington, North Carolina.

B. Owner: New Hanover County.

C. Architect: iS Design, P.A.

D. Construction Manager:

- 1. Construction Manager has been engaged for this Project to serve as an advisor to Owner and to provide assistance in administering the Contract for construction between Owner and Contractor, according to a separate contract between Owner and Construction Manager.
- 2. Construction Manager for this Project is Project's constructor. The terms "Construction Manager" and "Contractor" are synonymous.

Construction Documents

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined as indicated on the Drawings.
- B. Type of Contract:
  - 1. Project will be constructed under a single prime contract.

1.5 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
  - 1. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

1.6 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
  - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work to normal business working hours of 7 a.m. to 6 p.m., Monday through Friday, unless otherwise allowed by the Owner and the local jurisdiction.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
  - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
  - 2. Obtain Owner's written permission before proceeding with utility interruptions.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

Construction Documents

2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
  1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000





Construction Documents

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances include the following:
  - 1. Lump-sum allowances.
  - 2. Unit-cost allowances.
- C. Related Requirements:
  - 1. Section 014000 "Quality Requirements" for procedures governing the use of allowances for field testing by an independent testing agency.

1.3 DEFINITIONS

- A. Allowance is a quantity of work or dollar amount established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.4 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

Construction Documents

1.5 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

1.6 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.7 LUMP-SUM ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
  - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.8 UNIT-COST ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

Construction Documents

- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
  - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.9 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
  - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
  - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.
  - 3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.
  - 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
  - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.
  - 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

Construction Documents

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. Allowance No. 1: Lump-Sum Allowance: Fountain.

- 1. Description: Include fountain design, fountain materials, fountain materials delivery, and installation as specified in Section 131200 "Fountains" and as shown on Drawings. Include the lump sums as indicated below:
  - a. Fountain Design, Fountain Materials, and Fountain Materials Delivery: Include the lump sum of \$35,000.
  - b. Fountain Installation: Include the sum of \$15,000.
- 2. This allowance includes material cost, receiving, handling, and installation, and Contractor overhead and profit.

B. Allowance No. 2: Lump-Sum Allowance: Signage.

- 1. Description: Include exterior and interior signage as indicated on the Architect's signage quote from ASI, as shown on the Drawings, and as specified in Section 101400 "Panel Signage," Section 101419 "Dimensional Letter Signage," and Section 101426 "Post and Panel Signage." Include the lump sums as indicated below:
  - a. Exterior and Interior Signage: Include the lump sum of \$60,000.
- 2. This allowance includes design, material cost, delivery, permits, and installation. It does not include Contractor overhead and profit.

C. Allowance No. 3: Unit-Cost Allowance: Brick.

- 1. Description: Include brick as specified in Section 042000 "Unit Masonry" and as shown on Drawings, include the unit-cost items as indicated below:
  - a. Modular Size Brick: Include the unit-cost of \$450 per thousand.
- 2. This allowance includes material cost, receiving, handling, and installation, and Contractor overhead and profit.

END OF SECTION 012100

Construction Documents

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.
- B. Related Requirements:
  - 1. Section 012100 "Allowances" for procedures for using unit prices to adjust quantity allowances.
  - 2. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
  - 3. Section 014000 "Quality Requirements" for field testing by an independent testing agency.

1.3 DEFINITIONS

- A. Unit price is an amount incorporated into the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

Construction Documents

- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

- A. Unit Price No. 1: Rock removal in Open Areas (Mass Rock), on-site and off-site disposal as indicated on the Drawings, and replacement with off-site suitable soils compacted in place.
  - 1. Purpose: To adjust the contract sum in case a quantity different from that indicated in the base bid quantity is required.
  - 2. Unit of measurement: Cubic yard.
  - 3. Include the following in the unit price:
    - a. Suitable soil from Contractor's off-site source.
    - b. Excavation, loading, transport, placement and compaction of all materials.
    - c. Disposal fees.
    - d. Overhead and profit.
  - 4. Include all other related costs in the contract sum.
  - 5. Method of measurement: Quantities will be verified by a soils and materials engineer employed by the Owner.
  - 6. Base Bid Quantity: To be determined.
- B. Unit Price No. 2: Rock removal in Trenches and Pits (Trench Rock), on-site and off-site disposal as indicated on the Drawings, and replacement with off-site suitable soils compacted in place.
  - 1. Purpose: To adjust the contract sum in case a quantity different from that indicated in the base bid quantity is required.
  - 2. Unit of measurement: Cubic yard.
  - 3. Include the following in the unit price:
    - a. Suitable soil from Contractor's off-site source.
    - b. Excavation, loading, transport, placement and compaction of all materials.
    - c. Disposal fees.
    - d. Overhead and profit.
  - 4. Include all other related costs in the contract sum.
  - 5. Method of measurement: Quantities will be verified by a soils and materials engineer employed by the Owner.
  - 6. Base Bid Quantity: To be determined.

Construction Documents

- C. Unit Price No. 3: Unsuitable soils removal, on-site and off-site disposal as indicated on the Drawings, and replacement with off-site suitable soil, and compacted in place.
  - 1. Purpose: To adjust the contract sum in case a quantity different from that indicated in the base bid quantity is required.
  - 2. Unit of measurement: Cubic yard.
  - 3. Include the following in the unit price:
    - a. Suitable soil materials from off-site source.
    - b. Excavation, loading, transport, placement and compaction of all materials.
    - c. Overhead and profit.
  - 4. Include all other related costs in the contract sum.
  - 5. Method of measurement: Quantities will be verified by a soils and materials engineer employed by the Owner.
  - 6. Base Bid Quantity: To be determined.

END OF SECTION 012200





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Construction Documents

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
  - 1. Section 012100 "Allowances" for products selected under an allowance.
  - 2. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Substitution Request Form: Use CSI Form 13.1A, or comparable form as acceptable to the Architect.
  - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.

Construction Documents

- b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
  - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
  - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
  - e. Samples, where applicable or requested.
  - f. Certificates and qualification data, where applicable or requested.
  - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
  - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
  - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
  - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
  - k. Cost information, including a proposal of change, if any, in the Contract Sum.
  - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
  - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor through Construction Manager of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
  - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

Construction Documents

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
  - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - b. Substitution request is fully documented and properly submitted.
    - c. Requested substitution will not adversely affect Contractor's construction schedule.
    - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - e. Requested substitution is compatible with other portions of the Work.
    - f. Requested substitution has been coordinated with other portions of the Work.
    - g. Requested substitution provides specified warranty.
    - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

Construction Documents

- B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
  - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
    - b. Requested substitution does not require extensive revisions to the Contract Documents.
    - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - d. Substitution request is fully documented and properly submitted.
    - e. Requested substitution will not adversely affect Contractor's construction schedule.
    - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - g. Requested substitution is compatible with other portions of the Work.
    - h. Requested substitution has been coordinated with other portions of the Work.
    - i. Requested substitution provides specified warranty.
    - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

Construction Documents

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
  - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue through Construction Manager supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, or comparable form acceptable to the Architect.

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Construction Manager will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Work Change Proposal Requests issued by Construction Manager are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.

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Construction Documents

- d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
  - e. Quotation Form: Use forms acceptable to Architect.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Construction Manager.
- 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
  - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
  - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  - 4. Include costs of labor and supervision directly attributable to the change.
  - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
  - 6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
  - 7. Proposal Request Form: Use form acceptable to Architect.

1.5 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Change Proposal Request, Construction Manager will issue a Change Order for signatures of Owner and Contractor on AIA Document G701, or comparable form acceptable to the Architect.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Construction Manager may issue a Construction Change Directive on AIA Document G714CMA or comparable form acceptable to the Construction Manager. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
  - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

Construction Documents

- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
  - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600





Construction Documents

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
  - 1. Section 012100 "Allowances" for procedural requirements governing the handling and processing of allowances.
  - 2. Section 012200 "Unit Prices" for administrative requirements governing the use of unit prices.
  - 3. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
  - 4. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule. Cost-loaded Critical Path Method Schedule may serve to satisfy requirements for the schedule of values.
  - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
  - 2. Submit the schedule of values to Architect through Construction Manager at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

Construction Documents

- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the schedule of values:
    - a. Project name and location.
    - b. Name of Architect.
    - c. Architect's Project number.
    - d. Contractor's name and address.
    - e. Date of submittal.
  2. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:
    - a. Related Specification Section or Division.
    - b. Description of the Work.
    - c. Name of subcontractor.
    - d. Name of manufacturer or fabricator.
    - e. Name of supplier.
    - f. Change Orders (numbers) that affect value.
    - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.
      - 1) Labor.
      - 2) Materials.
      - 3) Equipment.
  3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
  4. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
    - a. Differentiate between items stored on-site and items stored off-site.
  5. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
  6. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
  7. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

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Construction Documents

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and Construction Manager and paid for by Owner.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as forms for Applications for Payment.
  - 1. Other Application for Payment forms proposed by the Contractor shall be acceptable to Construction Manager and Owner. Submit forms for approval with initial submittal of schedule of values.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Construction Manager will return incomplete applications without action.
  - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
  - 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
  - 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  - 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
  - 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
  - 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
  - 3. Provide summary documentation for stored materials indicating the following:
    - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

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Construction Documents

- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Construction Manager by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
  - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
  
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
  - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  - 2. When an application shows completion of an item, submit conditional final or full waivers.
  - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  - 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
  - 5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
  
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
  - 1. List of subcontractors.
  - 2. Schedule of values.
  - 3. Contractor's construction schedule (preliminary if not final).
  - 4. Products list (preliminary if not final).
  - 5. Schedule of unit prices.
  - 6. Submittal schedule (preliminary if not final).
  - 7. List of Contractor's staff assignments.
  - 8. List of Contractor's principal consultants.
  - 9. Copies of building permits.
  - 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  - 11. Initial progress report.
  - 12. Report of preconstruction conference.
  - 13. Certificates of insurance and insurance policies, if not submitted before executing the Contract.
  - 14. Performance and payment bonds, if not submitted before executing the Contract.
  - 15. Data needed to acquire Owner's insurance, if not submitted before executing the Contract.

Construction Documents

- I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
  - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
  - 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
  
- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
  - 1. Evidence of completion of Project closeout requirements.
  - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  - 3. Updated final statement, accounting for final changes to the Contract Sum.
  - 4. AIA Document G706.
  - 5. AIA Document G706A.
  - 6. AIA Document G707.
  - 7. Evidence that claims have been settled.
  - 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
  - 9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900



Construction Documents

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. General coordination procedures.
  - 2. RFIs.
  - 3. Digital project management procedures.
  - 4. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
  - 1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
  - 2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
  - 3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. BIM: Building Information Modeling.
- B. RFI: Request for Information. Request from Owner, Construction Manager, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

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Construction Documents

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
  - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
  - 2. Number and title of related Specification Section(s) covered by subcontract.
  - 3. Drawing number and detail references, as appropriate, covered by subcontract.
  
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
  - 1. Post copies of list in project meeting room, in temporary field office, and in prominent location in built facility. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
  
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
  
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of Contractor's construction schedule.
  - 2. Preparation of the schedule of values.
  - 3. Installation and removal of temporary facilities and controls.
  - 4. Delivery and processing of submittals.



Construction Documents

5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.6 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
  1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
  2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
  1. Project name.
  2. Project number.
  3. Date.
  4. Name of Contractor.
  5. Name of Architect and Construction Manager.
  6. RFI number, numbered sequentially.
  7. RFI subject.
  8. Specification Section number and title and related paragraphs, as appropriate.
  9. Drawing number and detail references, as appropriate.
  10. Field dimensions and conditions, as appropriate.
  11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  12. Contractor's signature.
  13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: AIA Document G716 or comparable form acceptable to the Architect.
  1. Attachments shall be electronic files in PDF format.

Construction Documents

- D. Architect's and Construction Manager's Action: Architect and Construction Manager will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect or Construction Manager after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for approval of Contractor's means and methods.
    - d. Requests for coordination information already indicated in the Contract Documents.
    - e. Requests for adjustments in the Contract Time or the Contract Sum.
    - f. Requests for interpretation of Architect's actions on submittals.
    - g. Incomplete RFIs or inaccurately prepared RFIs.
  2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect or Construction Manager of additional information.
  3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect and Construction Manager in writing within 10 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:
1. Project name.
  2. Name and address of Contractor.
  3. Name and address of Architect and Construction Manager.
  4. RFI number including RFIs that were returned without action or withdrawn.
  5. RFI description.
  6. Date the RFI was submitted.
  7. Date Architect's and Construction Manager's response was received.
  8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
- F. On receipt of Architect's and Construction Manager's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect and Construction Manager within seven days if Contractor disagrees with response.
- 1.7 DIGITAL PROJECT MANAGEMENT PROCEDURES
- A. Architect's Data Files Not Available: Architect will not provide Architect's BIM model or CAD drawing digital data files for Contractor's use during construction.

Construction Documents

- B. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
  - 1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
  - 2. Name file with submittal number or other unique identifier, including revision identifier.
  - 3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.8 PROJECT MEETINGS

- A. General: Construction Manager will schedule and conduct meetings and conferences at Project site unless otherwise indicated.
  - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
  - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  - 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Construction Manager, and Architect, within three days of the meeting.
- B. Preconstruction Conference: Construction Manager will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
  - 1. Attendees: Authorized representatives of Owner, Construction Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Responsibilities and personnel assignments.
    - b. Tentative construction schedule.
    - c. Phasing.
    - d. Critical work sequencing and long lead items.
    - e. Designation of key personnel and their duties.
    - f. Lines of communications.
    - g. Use of web-based Project software.
    - h. Procedures for processing field decisions and Change Orders.
    - i. Procedures for RFIs.
    - j. Procedures for testing and inspecting.
    - k. Procedures for processing Applications for Payment.
    - l. Distribution of the Contract Documents.
    - m. Submittal procedures.
    - n. Preparation of Record Documents.
    - o. Use of the premises.
    - p. Work restrictions.

Construction Documents

- q. Working hours.
  - r. Owner's occupancy requirements.
  - s. Responsibility for temporary facilities and controls.
  - t. Procedures for moisture and mold control.
  - u. Procedures for disruptions and shutdowns.
  - v. Construction waste management and recycling.
  - w. Parking availability.
  - x. Office, work, and storage areas.
  - y. Equipment deliveries and priorities.
  - z. First aid.
  - aa. Security.
  - bb. Progress cleaning.
3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, Construction Manager of scheduled meeting dates.
  - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related RFIs.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Review of mockups.
    - i. Possible conflicts.
    - j. Compatibility requirements.
    - k. Time schedules.
    - l. Weather limitations.
    - m. Manufacturer's written instructions.
    - n. Warranty requirements.
    - o. Compatibility of materials.
    - p. Acceptability of substrates.
    - q. Temporary facilities and controls.
    - r. Space and access limitations.
    - s. Regulations of authorities having jurisdiction.
    - t. Testing and inspecting requirements.
    - u. Installation procedures.
    - v. Coordination with other work.

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Construction Documents

- w. Required performance results.
  - x. Protection of adjacent work.
  - y. Protection of construction and personnel.
- 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
  - 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
  - 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: Construction Manager will schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.
- 1. Conduct the conference to review requirements and responsibilities related to Project closeout.
  - 2. Attendees: Authorized representatives of Owner, Construction Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
    - a. Preparation of Record Documents.
    - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    - c. Procedures for completing and archiving web-based Project software site data files.
    - d. Submittal of written warranties.
    - e. Requirements for preparing operations and maintenance data.
    - f. Requirements for delivery of material samples, attic stock, and spare parts.
    - g. Requirements for demonstration and training.
    - h. Preparation of Contractor's punch list.
    - i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    - j. Submittal procedures.
    - k. Coordination of separate contracts.
    - l. Owner's partial occupancy requirements.
    - m. Installation of Owner's furniture, fixtures, and equipment.
    - n. Responsibility for removing temporary facilities and controls.
  - 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

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Construction Documents

- E. Progress Meetings: Construction Manager will conduct progress meetings at regular intervals approved by the Architect.
  - 1. Coordinate dates of meetings with preparation of payment requests.
  - 2. Attendees: In addition to representatives of Owner, Construction Manager, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
      - 1) Review schedule for next period.
    - b. Review present and future needs of each entity present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Status of submittals.
      - 4) Deliveries.
      - 5) Off-site fabrication.
      - 6) Access.
      - 7) Site use.
      - 8) Temporary facilities and controls.
      - 9) Progress cleaning.
      - 10) Quality and work standards.
      - 11) Status of correction of deficient items.
      - 12) Field observations.
      - 13) Status of RFIs.
      - 14) Status of Proposal Requests.
      - 15) Pending changes.
      - 16) Status of Change Orders.
      - 17) Pending claims and disputes.
      - 18) Documentation of information for payment requests.
  - 4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
    - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

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Construction Documents

- F. Coordination Meetings: Construction Manager will conduct Project coordination meetings at regular intervals approved by the Construction Manager. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of Owner, Construction Manager, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    - b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
    - c. Review present and future needs of each contractor present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Status of submittals.
      - 4) Deliveries.
      - 5) Off-site fabrication.
      - 6) Access.
      - 7) Site use.
      - 8) Temporary facilities and controls.
      - 9) Work hours.
      - 10) Hazards and risks.
      - 11) Progress cleaning.
      - 12) Quality and work standards.
      - 13) Status of RFIs.
      - 14) Proposal Requests.
      - 15) Change Orders.
      - 16) Pending changes.
  3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

Construction Documents

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100



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Construction Documents

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Startup construction schedule.
  - 2. Contractor's Construction Schedule.
  - 3. Construction schedule updating reports.
  - 4. Daily construction reports.
  - 5. Material location reports.
  - 6. Site condition reports.
  - 7. Unusual event reports.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.
  - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
  - 2. Predecessor Activity: An activity that precedes another activity in the network.
  - 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the schedule of values for completing an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.

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Construction Documents

- F. Float: The measure of leeway in starting and completing an activity.
  - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
  - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
  - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
  
- G. Resource Loading: The allocation of manpower and equipment necessary for completing an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in one of the following formats as acceptable to the Architect:
  - 1. Working electronic copy of schedule file, where indicated.
  - 2. PDF file.
  - 3. Two paper copies, of sufficient size to display entire period or schedule, as required.
  
- B. Startup construction schedule.
  - 1. Submittal of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.
  
- C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
  
- D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
  - 1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.
  
- E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
  - 1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
  - 2. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.
  - 3. Total Float Report: List of activities sorted in ascending order of total float.
  - 4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.

Construction Documents

- F. Construction Schedule Updating Reports: Submit with Applications for Payment.
- G. Daily Construction Reports: Submit at weekly intervals.
- H. Material Location Reports: Submit at weekly intervals.
- I. Site Condition Reports: Submit at time of discovery of differing conditions.
- J. Unusual Event Reports: Submit at time of unusual event.
- K. Qualification Data: For scheduling consultant.

1.5 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.
- B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's Construction Schedule, including, but not limited to, the following:
  - 1. Review software limitations and content and format for reports.
  - 2. Verify availability of qualified personnel needed to develop and update schedule.
  - 3. Discuss constraints, including work stages, area separations, and interim milestones.
  - 4. Review delivery dates for Owner-furnished products.
  - 5. Review schedule for work of Owner's separate contracts.
  - 6. Review submittal requirements and procedures.
  - 7. Review time required for review of submittals and resubmittals.
  - 8. Review requirements for tests and inspections by independent testing and inspecting agencies.
  - 9. Review time required for Project closeout and Owner startup procedures.
  - 10. Review and finalize list of construction activities to be included in schedule.
  - 11. Review procedures for updating schedule.

1.6 COORDINATION

- A. Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
  - 1. Secure time commitments for performing critical elements of the Work from entities involved.
  - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

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Construction Documents

1.7 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
- B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
  - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
  - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
  - 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  - 3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
  - 4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
  - 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's and Construction Manager's administrative procedures necessary for certification of Substantial Completion.
  - 6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
  - 1. Products Ordered in Advance: Include a separate activity for each product. Delivery dates indicated stipulate the earliest possible delivery date.
  - 2. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Coordination with existing construction.
    - b. Limitations of continued occupancies.
    - c. Uninterruptible services.
    - d. Use-of-premises restrictions.
    - e. Provisions for future construction.
    - f. Seasonal variations.
    - g. Environmental control.
  - 3. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
    - a. Subcontract awards.

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Construction Documents

- b. Submittals.
  - c. Purchases.
  - d. Mockups.
  - e. Fabrication.
  - f. Sample testing.
  - g. Deliveries.
  - h. Installation.
  - i. Tests and inspections.
  - j. Adjusting.
  - k. Curing.
  - l. Building flush-out.
  - m. Startup and placement into final use and operation.
  - n. Commissioning.
4. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
- a. Structural completion.
  - b. Temporary enclosure and space conditioning.
  - c. Permanent space enclosure.
  - d. Completion of mechanical installation.
  - e. Completion of electrical installation.
  - f. Substantial Completion.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- F. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
- 1. See Section 012900 "Payment Procedures" for cost reporting and payment procedures.
- G. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
- 1. Unresolved issues.
  - 2. Unanswered Requests for Information.
  - 3. Rejected or unreturned submittals.
  - 4. Notations on returned submittals.
  - 5. Pending modifications affecting the Work and the Contract Time.
- H. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
- 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.

Construction Documents

2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  3. As the Work progresses, indicate final completion percentage for each activity.
- I. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.
  - J. Distribution: Distribute copies of approved schedule to Architect, Construction Manager, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
    1. Post copies in Project meeting rooms and temporary field offices.
    2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.8 STARTUP CONSTRUCTION SCHEDULE

- A. Gantt-Chart Schedule: Submit startup, horizontal, Gantt-chart-type construction schedule within seven days of date established for the Notice to Proceed.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

1.9 CPM SCHEDULE REQUIREMENTS

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

Construction Documents

- C. CPM Schedule: Prepare Contractor's Construction Schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.
  - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 60 days after date established for the Notice to Proceed.
    - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates.
  - 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
  - 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
  - 4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.
  
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
  - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
    - a. Preparation and processing of submittals.
    - b. Mobilization and demobilization.
    - c. Purchase of materials.
    - d. Delivery.
    - e. Fabrication.
    - f. Utility interruptions.
    - g. Installation.
    - h. Work by Owner that may affect or be affected by Contractor's activities.
    - i. Testing and inspection.
    - j. Commissioning.
    - k. Punch list and final completion.
    - l. Activities occurring following final completion.
  - 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
  - 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
  - 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
    - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

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Construction Documents

5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Architect's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
  - a. Each activity cost shall reflect an appropriate value subject to approval by Architect.
  - b. Total cost assigned to activities shall equal the total Contract Sum.
  
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.
  
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
  1. Contractor or subcontractor and the Work or activity.
  2. Description of activity.
  3. Main events of activity.
  4. Immediate preceding and succeeding activities.
  5. Early and late start dates.
  6. Early and late finish dates.
  7. Activity duration in workdays.
  8. Total float or slack time.
  9. Average size of workforce.
  10. Dollar value of activity (coordinated with the schedule of values).
  
- G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
  1. Identification of activities that have changed.
  2. Changes in early and late start dates.
  3. Changes in early and late finish dates.
  4. Changes in activity durations in workdays.
  5. Changes in the critical path.
  6. Changes in total float or slack time.
  7. Changes in the Contract Time.
  
- H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
  1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
  2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
  3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.



Construction Documents

4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
  - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
  - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

1.10 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Testing and inspection.
8. Accidents.
9. Meetings and significant decisions.
10. Unusual events.
11. Stoppages, delays, shortages, and losses.
12. Meter readings and similar recordings.
13. Emergency procedures.
14. Orders and requests of authorities having jurisdiction.
15. Change Orders received and implemented.
16. Construction Change Directives received and implemented.
17. Services connected and disconnected.
18. Equipment or system tests and startups.
19. Partial completions and occupancies.
20. Substantial Completions authorized.

- B. Material Location Reports: At weekly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
2. Material stored prior to previous report and since removed from storage and installed.
3. Material stored following previous report and remaining in storage.

Construction Documents

- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.
  
- D. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.
  - 1. Submit unusual event reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

Construction Documents

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Submittal schedule requirements.
- 2. Administrative and procedural requirements for submittals.

B. Related Requirements:

- 1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
- 2. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
- 3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
- 4. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
- 5. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
- 6. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
- 7. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
- 8. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's and Construction Manager's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

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- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's and Construction Manager's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.4 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and Construction Manager and additional time for handling and reviewing submittals required by those corrections.
  - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
  - 2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
  - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
    - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
  - 4. Format: Arrange the following information in a tabular format:
    - a. Scheduled date for first submittal.
    - b. Specification Section number and title.
    - c. Submittal Category: Action; informational.
    - d. Name of subcontractor.
    - e. Description of the Work covered.
    - f. Scheduled date for Architect's and Construction Manager's final release or approval.
    - g. Scheduled dates for purchasing.
    - h. Scheduled date of fabrication.
    - i. Scheduled dates for installation.
    - j. Activity or event number.

1.5 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
  - 1. Project name.
  - 2. Date.
  - 3. Name of Architect.
  - 4. Name of Contractor.

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5. Name of firm or entity that prepared submittal.
  6. Names of subcontractor, manufacturer, and supplier.
  7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
  8. Category and type of submittal.
  9. Submittal purpose and description.
  10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
  11. Drawing number and detail references, as appropriate.
  12. Indication of full or partial submittal.
  13. Location(s) where product is to be installed, as appropriate.
  14. Other necessary identification.
  15. Remarks.
  16. Signature of transmitter.
- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect and Construction Manager on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- D. Paper Submittals: Digital submittals may be provided in lieu of paper submittals if permitted by the Architect.
1. Place a permanent label or title block on each submittal item for identification; include name of firm or entity that prepared submittal.
  2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect and Construction Manager.
  3. Action Submittals: Submit three paper copies of each submittal unless otherwise indicated. Architect, through Construction Manager, will return two copies.
  4. Informational Submittals: Submit two paper copies of each submittal unless otherwise indicated. Architect and Construction Manager will not return copies.
  5. Additional Copies: Unless additional copies are required for final submittal, and unless Architect or Construction Manager observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
  6. Transmittal for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using AIA Document G810 transmittal form or comparable form acceptable to the Architect.
- E. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

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1.6 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
  - 1. Email: Prepare submittals as PDF package, and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.
    - a. Architect, through Construction Manager, will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.
  - 2. Paper: Prepare submittals in paper form, and deliver to Architect.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
  - 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
  - 4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Architect and Construction Manager reserve the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Construction Manager's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  - 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Construction Manager will advise Contractor when a submittal being processed must be delayed for coordination.
  - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  - 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
  - 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.

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5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Construction Manager, through Architect, before being returned to Contractor.

- a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect and Construction Manager.

- D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's and Construction Manager's action stamp.

- E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's and Construction Manager's action stamp.

## 1.7 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

- a. Manufacturer's catalog cuts.
- b. Manufacturer's product specifications.
- c. Standard color charts.
- d. Statement of compliance with specified referenced standards.
- e. Testing by recognized testing agency.
- f. Application of testing agency labels and seals.
- g. Notation of coordination requirements.
- h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

- a. Wiring diagrams that show factory-installed wiring.
- b. Printed performance curves.

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- c. Operational range diagrams.
    - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
  5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.
  1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.
    - f. Relationship and attachment to adjoining construction clearly indicated.
    - g. Seal and signature of professional engineer if specified.
  2. Paper Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
    - a. Two opaque (bond) copies of each submittal. Architect, through Construction Manager, will return one copy.
    - b. Three opaque copies of each submittal. Architect and Construction Manager will retain two copies; remainder will be returned.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
  1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
    - a. Project name and submittal number.
    - b. Generic description of Sample.
    - c. Product name and name of manufacturer.
    - d. Sample source.
    - e. Number and title of applicable Specification Section.
    - f. Specification paragraph number and generic name of each item.
  3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics, and identification information for record.
  4. Paper Transmittal: Include paper transmittal including complete submittal information indicated.



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5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
  6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
    - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, through Construction Manager, will return submittal with options selected.
  7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
    - a. Number of Samples: Submit three sets of Samples. Architect and Construction Manager will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.
      - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
  2. Manufacturer and product name, and model number if applicable.
  3. Number and name of room or space.
  4. Location within room or space.

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- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
  
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
  
- G. Certificates:
  - 1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
  - 2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
  - 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
  - 4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
  - 5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
  - 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
  
- H. Test and Research Reports:
  - 1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
  - 2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
  - 3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
  - 4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

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5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
  - a. Name of evaluation organization.
  - b. Date of evaluation.
  - c. Time period when report is in effect.
  - d. Product and manufacturers' names.
  - e. Description of product.
  - f. Test procedures and results.
  - g. Limitations of use.

1.8 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file and three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
  1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.9 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect and Construction Manager.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
  1. Architect and Construction Manager will not review submittals received from Contractor that do not have Contractor's review and approval.

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1.10 ARCHITECT'S AND CONSTRUCTION MANAGER'S REVIEW

- A. Action Submittals: Architect and Construction Manager will review each submittal, indicate corrections or revisions required, and return it.
  - 1. PDF Submittals: Architect and Construction Manager will indicate, via markup on each submittal, the appropriate action.
  - 2. Paper Submittals: Architect and Construction Manager will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- B. Informational Submittals: Architect and Construction Manager will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect and Construction Manager will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect and Construction Manager.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Architect and Construction Manager will return without review submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

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SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.
  - 4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

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- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
  - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
  
- D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
  - 1. Integrated Exterior Mockups: Mockups of the exterior envelope constructed on-site as freestanding temporary built elements or as part of permanent construction, consisting of multiple products, assemblies, and subassemblies.
  
- E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
  
- F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
  
- G. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
  
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
  
- I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
  
- J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect or Construction Manager.

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1.4 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.5 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for direction before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.6 ACTION SUBMITTALS

- A. Shop Drawings: For integrated exterior mockups.
  - 1. Include plans, sections, and elevations, indicating materials and size of mockup construction.
  - 2. Indicate manufacturer and model number of individual components.
  - 3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.
- B. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.7 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Qualification Data: For Contractor's quality-control personnel.

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- C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:
  - 1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
  - 2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
  
- D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
  
- E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
  - 1. Specification Section number and title.
  - 2. Entity responsible for performing tests and inspections.
  - 3. Description of test and inspection.
  - 4. Identification of applicable standards.
  - 5. Identification of test and inspection methods.
  - 6. Number of tests and inspections required.
  - 7. Time schedule or time span for tests and inspections.
  - 8. Requirements for obtaining samples.
  - 9. Unique characteristics of each quality-control service.
  
- F. Reports: Prepare and submit certified written reports and documents as specified.
  
- G. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.8 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's Construction Schedule.
  
- B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
  - 1. Project quality-control manager may also serve as Project superintendent.
  
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.



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- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
  - 1. Contractor-performed tests and inspections including Subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
  - 2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
  - 3. Owner-performed tests and inspections indicated in the Contract Documents.
  
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
  
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.9 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
  - 1. Date of issue.
  - 2. Project title and number.
  - 3. Name, address, telephone number, and email address of testing agency.
  - 4. Dates and locations of samples and tests or inspections.
  - 5. Names of individuals making tests and inspections.
  - 6. Description of the Work and test and inspection method.
  - 7. Identification of product and Specification Section.
  - 8. Complete test or inspection data.
  - 9. Test and inspection results and an interpretation of test results.
  - 10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
  - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  - 12. Name and signature of laboratory inspector.
  - 13. Recommendations on retesting and reinspecting.

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- B. **Manufacturer's Technical Representative's Field Reports:** Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
  - 1. Name, address, telephone number, and email address of technical representative making report.
  - 2. Statement on condition of substrates and their acceptability for installation of product.
  - 3. Statement that products at Project site comply with requirements.
  - 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  - 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  - 6. Statement whether conditions, products, and installation will affect warranty.
  - 7. Other required items indicated in individual Specification Sections.
  
- C. **Factory-Authorized Service Representative's Reports:** Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
  - 1. Name, address, telephone number, and email address of factory-authorized service representative making report.
  - 2. Statement that equipment complies with requirements.
  - 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  - 4. Statement whether conditions, products, and installation will affect warranty.
  - 5. Other required items indicated in individual Specification Sections.

1.10 **QUALITY ASSURANCE**

- A. **General:** Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
  
- B. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
  
- C. **Fabricator Qualifications:** A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
  
- D. **Installer Qualifications:** A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

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- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar in material, design, and extent to those indicated for this Project.
  
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
  
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
  
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
  
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
  
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
  - 1. Contractor responsibilities include the following:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
    - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    - f. When testing is complete, remove test specimens and test assemblies, and mockups; do not reuse products on Project.

Construction Documents

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, through Construction Manager, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups of size indicated.
2. Build mockups in location indicated or, if not indicated, as directed by Architect or Construction Manager.
3. Notify Architect and Construction Manager seven days in advance of dates and times when mockups will be constructed.
4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed to perform same tasks during the construction at Project.
5. Demonstrate the proposed range of aesthetic effects and workmanship.
6. Obtain Architect's and Construction Manager's approval of mockups before starting corresponding work, fabrication, or construction.
  - a. Allow seven days for initial review and each re-review of each mockup.
7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
8. Demolish and remove mockups when directed unless otherwise indicated.

- L. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials. Comply with requirements in "Mockups" Paragraph.

1.11 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
  2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

Construction Documents

- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
  - 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  - 2. Engage a qualified testing agency to perform quality-control services.
    - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
  - 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
  - 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  - 5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  - 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Architect, Construction Manager, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
  - 1. Notify Architect, Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  - 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
  - 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  - 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  - 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
  - 6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

Construction Documents

- F. **Manufacturer's Technical Services:** Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
  
- G. **Associated Contractor Services:** Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
  - 1. Access to the Work.
  - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
  - 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
  - 4. Facilities for storage and field curing of test samples.
  - 5. Delivery of samples to testing agencies.
  - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  - 7. Security and protection for samples and for testing and inspection equipment at Project site.
  
- H. **Coordination:** Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
  - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
  
- I. **Schedule of Tests and Inspections:** Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update as the Work progresses.
  - 1. **Distribution:** Distribute schedule to Owner, Architect, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.12 SPECIAL TESTS AND INSPECTIONS

- A. **Special Tests and Inspections:** Owner will engage a qualified testing agency or special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
  - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
  - 2. Notifying Architect, Construction Manager, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.

Construction Documents

3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect, through Construction Manager, with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
  1. Date test or inspection was conducted.
  2. Description of the Work tested or inspected.
  3. Date test or inspection results were transmitted to Architect.
  4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's and Construction Manager's reference during normal working hours.
  1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000





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Construction Documents

DOCUMENT 014100 – SPECIAL INSPECTIONS

1.1 All testing will be by the Owner. The scope of inspections will include:

A. Earthwork and Foundations:

1. Site Utilities and Building Pad Observations and Testing.
2. Shallow Foundation Bearing Evaluations.
3. Proofroll Observations.
4. Building Pad Field Observations and In-Place Field Density Testing.
5. Sitework In-Place Field Density Testing.
6. Laboratory Testing.
7. Undercutting Observations.
8. Shallow Foundations Evaluations.

B. Structural Reinforced Concrete:

1. Sitework Concrete.
2. Building Concrete.

C. Structural Observations:

1. Structural Steel.
2. Cold Formed Steel Framing.

D. Fire Resistant Penetrations and Stops.

E. Building Envelope:

1. Roofing.
2. Windows.
3. Curtainwall.
4. Brick Veneer Cavity Inspection.
5. Pull Testing of Sealant Installations.
6. Review of Mockup Panels prepared by the Contractor and approved by the Design Team for acceptance criteria.
7. EIFS Inspections.

F. Special Inspections as listed in the Structural Drawings.

END OF DOCUMENT 014100



Construction Documents

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if

Construction Documents

bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
  - 1. IAPMO - International Association of Plumbing and Mechanical Officials; [www.iapmo.org](http://www.iapmo.org).
  - 2. ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).
  - 3. ICC-ES - ICC Evaluation Service, LLC; [www.icc-es.org](http://www.icc-es.org).
- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.
  - 1. CPSC - Consumer Product Safety Commission; [www.cpsc.gov](http://www.cpsc.gov).
  - 2. DOC - Department of Commerce; National Institute of Standards and Technology; [www.nist.gov](http://www.nist.gov).
  - 3. DOE - Department of Energy; [www.energy.gov](http://www.energy.gov).
  - 4. EPA - Environmental Protection Agency; [www.epa.gov](http://www.epa.gov).
  - 5. HUD - Department of Housing and Urban Development; [www.hud.gov](http://www.hud.gov).
  - 6. OSHA - Occupational Safety & Health Administration; [www.osha.gov](http://www.osha.gov).
  - 7. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; [www.ars.usda.gov](http://www.ars.usda.gov).
  - 8. USDA - Department of Agriculture; Rural Utilities Service; [www.usda.gov](http://www.usda.gov).
  - 9. USPS - United States Postal Service; [www.usps.com](http://www.usps.com).

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D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. USAB - United States Access Board; [www.access-board.gov](http://www.access-board.gov).
2. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200



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Construction Documents

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Pay sewer-service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Pay water-service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Pay electric-power-service use charges for electricity used by all entities for construction operations.

1.4 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.

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- C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- D. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- E. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.
- F. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
  - 1. Locations of dust-control partitions at each phase of work.
  - 2. HVAC system isolation schematic drawing.
  - 3. Location of proposed air-filtration system discharge.
  - 4. Waste-handling procedures.
  - 5. Other dust-control measures.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts, with 1-5/8-inch-OD top and bottom rails. Provide concrete or galvanized-steel bases for supporting posts.



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Construction Documents

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
  
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, Construction Manager, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
  - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
  - 2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot-square tack and marker boards.
  - 3. Drinking water and private toilet.
  - 4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
  - 5. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.
  
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
  - 1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
  
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
  - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
  - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 017700 "Closeout Procedures."

Construction Documents

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
  - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
  - 1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
  - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
  - 1. Connect temporary sewers to municipal system or private system as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

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- E. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
  - 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
  
- F. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
  
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
  - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
  
- H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install WiFi cell phone access equipment and one land-based telephone line(s) for each field office.
  - 1. Provide additional telephone lines for the following:
  - 2. At each telephone, post a list of important telephone numbers.
    - a. Police and fire departments.
    - b. Ambulance service.
    - c. Contractor's home office.
    - d. Contractor's emergency after-hours telephone number.
    - e. Architect's office.
    - f. Construction Manager's home office.
    - g. Engineers' offices.
    - h. Owner's office.
    - i. Principal subcontractors' field and home offices.
  
- I. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access Project electronic documents and maintain electronic communications. Equip computer with not less than the following:
  - 1. Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions.
  - 2. Internet Service: Broadband modem, router and ISP, equipped with hardware firewall.
  - 3. Internet Security: Integrated software, providing software firewall, virus, spyware, phishing, and spam protection in a combined application.

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Construction Documents

3.4 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
  - 1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
  - 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
  - 1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
  - 1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
  - 2. Prepare subgrade and install subbase and base for temporary roads and paved areas as indicated on the Civil Drawings.
  - 3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
  - 4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Section 321216 "Asphalt Paving."
- D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
  - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
  - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- E. Parking: Provide temporary parking areas for construction personnel.
- F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
  - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
  - 2. Remove snow and ice as required to minimize accumulations.

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Construction Documents

- G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
  - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
  - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
    - a. Provide temporary, directional signs for construction personnel and visitors.
  - 3. Maintain and touch up signs so they are legible at all times.
- H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."
- I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
  - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- J. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- K. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
  - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
  - 1. Comply with work restrictions specified in Section 011000 "Summary."
- C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings.
  - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.

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Construction Documents

2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
  3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
  4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.
- G. Site Enclosure Fence: Prior to commencing earthwork, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.
1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
  2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- J. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- K. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

Construction Documents

- L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
  - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
  - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
  - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
  - 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
  - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
  - 2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
  - 3. Indicate methods to be used to avoid trapping water in finished work.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
  - 1. Protect porous materials from water damage.
  - 2. Protect stored and installed material from flowing or standing water.
  - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
  - 4. Remove standing water from decks.
  - 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
  - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
  - 2. Keep interior spaces reasonably clean and protected from water damage.
  - 3. Periodically collect and remove waste containing cellulose or other organic matter.
  - 4. Discard or replace water-damaged material.
  - 5. Do not install material that is wet.

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Construction Documents

6. Discard and replace stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
  - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.
  - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
  - c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

### 3.7 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
  1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.



Construction Documents

2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000



Construction Documents

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
  - 1. Section 012100 "Allowances" for products selected under an allowance.
  - 2. Section 012500 "Substitution Procedures" for requests for substitutions.
  - 3. Section 014200 "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

Construction Documents

- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

1.4 ACTION SUBMITTALS

- A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
  - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
    - a. Form of Architect's Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
    - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
  - 1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.

Construction Documents

2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:
  - a. Name of product and manufacturer.
  - b. Model and serial number.
  - c. Capacity.
  - d. Speed.
  - e. Ratings.
3. See individual identification sections in Divisions 21, 22, 23, and 26 for additional identification requirements.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
  1. Store products to allow for inspection and measurement of quantity or counting of units.
  2. Store materials in a manner that will not endanger Project structure.
  3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
  4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
  5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
  6. Protect stored products from damage and liquids from freezing.
  7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

Construction Documents

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
  - 1. **Manufacturer's Warranty:** Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  - 2. **Special Warranty:** Written warranty required by the Contract Documents to provide specific rights for Owner.
  
- B. **Special Warranties:** Prepare a written document that contains appropriate terms and identification, ready for execution.
  - 1. **Manufacturer's Standard Form:** Modified to include Project-specific information and properly executed.
  - 2. **Specified Form:** When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
  
- C. **Submittal Time:** Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. **General Product Requirements:** Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
  - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  - 2. **Standard Products:** If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  - 3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
  - 4. Where products are accompanied by the term "as selected," Architect will make selection.
  - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

Construction Documents

6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," or "or comparable," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
  - a. Submit additional documentation required by Architect through Construction Manager in order to establish equivalency of proposed products. Evaluation of "or equal" product status is by the Architect, whose determination is final.

B. Product Selection Procedures:

1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  - a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: ..."
2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  - a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: ..."
3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
  - a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: ..."
4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, which complies with requirements.
  - a. Non-limited list of products is indicated by the phrase: "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following: ..."
5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
  - a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: ..."

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Construction Documents

6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, which complies with requirements.
  - a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: ..."
7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
  - a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
  1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
  1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
  2. Evidence that proposed product provides specified warranty.
  3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.



Construction Documents

4. Samples, if requested.

- B. Submittal Requirements: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000



Construction Documents

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

- 1. Construction layout.
- 2. Field engineering and surveying.
- 3. Installation of the Work.
- 4. Cutting and patching.
- 5. Progress cleaning.
- 6. Starting and adjusting.
- 7. Protection of installed construction.

- B. Related Requirements:

- 1. Section 011000 "Summary" for limits on use of Project site.
- 2. Section 013300 "Submittal Procedures" for submitting surveys.
- 3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.
- 4. Section 078413 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer.

Construction Documents

- B. Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- D. Certified Surveys: Submit two copies signed by land surveyor or professional engineer.
- E. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.5 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
  - 1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
  - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
    - a. Primary operational systems and equipment.
    - b. Fire separation assemblies.
    - c. Air or smoke barriers.
    - d. Fire-suppression systems.
    - e. Plumbing piping systems.
    - f. Mechanical systems piping and ducts.
    - g. Control systems.
    - h. Communication systems.
    - i. Fire-detection and -alarm systems.
    - j. Conveying systems.
    - k. Electrical wiring systems.
    - l. Operating systems of special construction.
  - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
    - a. Water, moisture, or vapor barriers.
    - b. Membranes and flashings.
    - c. Equipment supports.

Construction Documents

- d. Piping, ductwork, vessels, and equipment.
  - e. Noise- and vibration-control elements and systems.
4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
- 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
- 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
  - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

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Construction Documents

- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
  - 1. Description of the Work.
  - 2. List of detrimental conditions, including substrates.
  - 3. List of unacceptable installation tolerances.
  - 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

Construction Documents

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect and Construction Manager promptly.
- B. General: Engage a professional engineer to lay out the Work using accepted surveying practices.
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - 2. Establish limits on use of Project site.
  - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - 4. Inform installers of lines and levels to which they must comply.
  - 5. Check the location, level and plumb, of every major element as the Work progresses.
  - 6. Notify Architect and Construction Manager when deviations from required lines and levels exceed allowable tolerances.
  - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect and Construction Manager.

3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
  - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect or Construction Manager. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect and Construction Manager before proceeding.
  - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

Construction Documents

- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
  - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
  - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Engage a professional engineer to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
  - 1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
  - 2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  - 1. Make vertical work plumb and make horizontal work level.
  - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
  - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.



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Construction Documents

- F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
  - 2. Allow for building movement, including thermal expansion and contraction.
  - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Repair or remove and replace damaged, defective, or nonconforming Work.
  - 1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

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Construction Documents

- E. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
  5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  6. Proceed with patching after construction operations requiring cutting are complete.
- F. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.
  3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
  4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
  5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

Construction Documents

- G. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
  - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

Construction Documents

- J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

Construction Documents

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures.
  - 2. Final completion procedures.
  - 3. Warranties.
  - 4. Final cleaning.
  - 5. Repair of the Work.
- B. Related Requirements:
  - 1. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
  - 2. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
  - 3. Section 017900 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at final completion.

1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.

Construction Documents

- C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

- 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
- 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
- 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
- 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Construction Manager. Label with manufacturer's name and model number.

- a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Construction Manager's signature for receipt of submittals.

- 5. Submit testing, adjusting, and balancing records.
- 6. Submit sustainable design submittals not previously submitted.
- 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

- 1. Advise Owner of pending insurance changeover requirements.
- 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.

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3. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
  4. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  5. Complete final cleaning requirements.
  6. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
  2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  4. Submit pest-control final inspection report.
  5. Submit final completion photographic documentation.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

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Construction Documents

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
  2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Architect and Construction Manager.
    - d. Name of Contractor.
    - e. Page number.
  4. Submit list of incomplete items in one of the following formats as acceptable to the Architect:
    - a. MS Excel electronic file. Architect, through Construction Manager, will return annotated file.
    - b. PDF electronic file. Architect, through Construction Manager, will return annotated file.
    - c. Three paper copies. Architect, through Construction Manager, will return two copies.

1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
1. Submit on digital media acceptable to Architect or by email to Architect.



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E. Warranties in Paper Form:

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

F. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.

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- e. Remove snow and ice to provide safe access to building.
  - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
  - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
  - h. Sweep concrete floors broom clean in unoccupied spaces.
  - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
  - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
  - k. Remove labels that are not permanent.
  - l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
  - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
  - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  - o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
  - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
  - q. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
  - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.

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2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
  - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700



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Construction Documents

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

- 1. Operation and maintenance documentation directory manuals.
- 2. Emergency manuals.
- 3. Systems and equipment operation manuals.
- 4. Systems and equipment maintenance manuals.
- 5. Product maintenance manuals.

- B. Related Requirements:

- 1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

- 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
- 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

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Construction Documents

- B. Format: Submit operation and maintenance manuals in one of the following formats as acceptable to the Owner and the Architect:
  - 1. Submit on digital media acceptable to Architect by email to Architect. Enable reviewer comments on draft submittals.
  - 2. Submit three paper copies. Architect, through Construction Manager, will return two copies.
  
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
  
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
  - 1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.
  
- E. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.5 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
  - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
  - 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
  
- B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.
  - 1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf or post-type binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
    - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.

Construction Documents

- b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
  - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
  - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.6 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  1. Title page.
  2. Table of contents.
  3. Manual contents.
- B. Title Page: Include the following information:
  1. Subject matter included in manual.
  2. Name and address of Project.
  3. Name and address of Owner.
  4. Date of submittal.
  5. Name and contact information for Contractor.
  6. Name and contact information for Construction Manager.
  7. Name and contact information for Architect.
  8. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.

Construction Documents

- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
  - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.7 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:
  - 1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
  - 2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
  - 3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.8 EMERGENCY MANUALS

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Content: Organize manual into a separate section for each of the following:
  - 1. Type of emergency.
  - 2. Emergency instructions.
  - 3. Emergency procedures.
- C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
  - 1. Fire.
  - 2. Flood.



Construction Documents

3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

E. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

1.9 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

Construction Documents

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.10 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

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**Construction Documents**

- C. **Source Information:** List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. **Manufacturers' Maintenance Documentation:** Include the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
    - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
  2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  3. Identification and nomenclature of parts and components.
  4. List of items recommended to be stocked as spare parts.
- E. **Maintenance Procedures:** Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
  2. Troubleshooting guide.
  3. Precautions against improper maintenance.
  4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  5. Aligning, adjusting, and checking instructions.
  6. Demonstration and training video recording, if available.
- F. **Maintenance and Service Schedules:** Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. **Scheduled Maintenance and Service:** Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  2. **Maintenance and Service Record:** Include manufacturers' forms for recording maintenance.
- G. **Spare Parts List and Source Information:** Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- H. **Maintenance Service Contracts:** Include copies of maintenance agreements with name and telephone number of service agent.

Construction Documents

- I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.
- J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
  - 1. Do not use original project record documents as part of maintenance manuals.

1.11 PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Product Information: Include the following, as applicable:
  - 1. Product name and model number.
  - 2. Manufacturer's name.
  - 3. Color, pattern, and texture.
  - 4. Material and chemical composition.
  - 5. Reordering information for specially manufactured products.
- E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - 1. Inspection procedures.
  - 2. Types of cleaning agents to be used and methods of cleaning.
  - 3. List of cleaning agents and methods of cleaning detrimental to product.
  - 4. Schedule for routine cleaning and maintenance.
  - 5. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

Construction Documents

- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823



Construction Documents

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.
  - 4. Miscellaneous record submittals.
- B. Related Requirements:
  - 1. Section 017300 "Execution" for final property survey.
  - 2. Section 017700 "Closeout Procedures" for general closeout procedures.
  - 3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit copies of record Drawings as follows:
    - a. Initial Submittal:
      - 1) Submit PDF electronic files of scanned record prints and one of file prints.
      - 2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
    - b. Final Submittal:
      - 1) Submit PDF electronic files of scanned record prints and three set(s) of prints.
      - 2) Print each drawing, whether or not changes and additional information were recorded.

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Construction Documents

- B. Record Specifications: Submit one paper copy or annotated PDF electronic files of Project's Specifications as acceptable to the Architect, including addenda and contract modifications.
- C. Record Product Data: Submit one paper copy or annotated PDF electronic files and directories of each submittal as acceptable to the Architect.
  - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy annotated PDF electronic files and directories of each submittal as acceptable to the Architect.
- E. Reports: Submit written report weekly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.4 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
  - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an acceptable drawing technique.
    - c. Record data as soon as possible after obtaining it.
    - d. Record and check the markup before enclosing concealed installations.
    - e. Cross-reference record prints to corresponding photographic documentation.
  - 2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or Construction Change Directive.
    - k. Changes made following Architect's written orders.
    - l. Details not on the original Contract Drawings.



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Construction Documents

- m. Field records for variable and concealed conditions.
    - n. Record information on the Work that is shown only schematically.
  - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
  - 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
  - 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect and Construction Manager. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
  - 1. Format: Annotated PDF electronic file with comment function enabled.
  - 2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
  - 3. Refer instances of uncertainty to Architect through Construction Manager for resolution.
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
  - 1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  - 2. Format: Annotated PDF electronic file with comment function enabled.
  - 3. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Architect and Construction Manager.
    - e. Name of Contractor.

1.5 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
  - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  - 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  - 4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.

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5. Note related Change Orders, record Product Data, and record Drawings where applicable.

- B. Format: Submit record Specifications as annotated PDF electronic file, paper copy, or scanned PDF electronic file(s) of marked-up paper copy of Specifications as acceptable to the Architect and the Owner.

1.6 RECORD PRODUCT DATA

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

- B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

- C. Format: Submit record Product Data as annotated PDF electronic file, paper copy, or scanned PDF electronic file(s) of marked-up paper copy of Product Data as acceptable to the Architect and the Owner.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.7 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

- B. Format: Submit miscellaneous record submittals as PDF electronic file, paper copy, or scanned PDF electronic file(s) of marked-up miscellaneous record submittals as acceptable to the Architect and the Owner.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.8 MAINTENANCE OF RECORD DOCUMENTS

- A. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible

Construction Documents

condition, protected from deterioration and loss. Provide access to project record documents for Architect's and Construction Manager's reference during normal working hours.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017839



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Construction Documents

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Instruction in operation and maintenance of systems, subsystems, and equipment.
  - 2. Demonstration and training video recordings.

1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
  - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Qualification Data: For facilitator and instructor.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
  - 1. Identification: On each copy, provide an applied label with the following information:
    - a. Name of Project.

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Construction Documents

- b. Name and address of videographer.
  - c. Name of Architect.
  - d. Name of Construction Manager.
  - e. Name of Contractor.
  - f. Date of video recording.
2. Transcript: Prepared and bound in format matching operation and maintenance manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
  3. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
  4. At completion of training, submit complete training manual(s) for Owner's use prepared in same paper and PDF file format required for operation and maintenance manuals specified in Section 017823 "Operation and Maintenance Data."

1.5 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
  1. Inspect and discuss locations and other facilities required for instruction.
  2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
  3. Review required content of instruction.
  4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.6 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

Construction Documents

- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.7 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

- 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

- a. System, subsystem, and equipment descriptions.
- b. Performance and design criteria if Contractor is delegated design responsibility.
- c. Operating standards.
- d. Regulatory requirements.
- e. Equipment function.
- f. Operating characteristics.
- g. Limiting conditions.
- h. Performance curves.

- 2. Documentation: Review the following items in detail:

- a. Emergency manuals.
- b. Systems and equipment operation manuals.
- c. Systems and equipment maintenance manuals.
- d. Product maintenance manuals.
- e. Project Record Documents.
- f. Identification systems.
- g. Warranties and bonds.
- h. Maintenance service agreements and similar continuing commitments.

- 3. Emergencies: Include the following, as applicable:

- a. Instructions on meaning of warnings, trouble indications, and error messages.
- b. Instructions on stopping.
- c. Shutdown instructions for each type of emergency.
- d. Operating instructions for conditions outside of normal operating limits.
- e. Sequences for electric or electronic systems.
- f. Special operating instructions and procedures.

- 4. Operations: Include the following, as applicable:

- a. Startup procedures.

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Construction Documents

- b. Equipment or system break-in procedures.
  - c. Routine and normal operating instructions.
  - d. Regulation and control procedures.
  - e. Control sequences.
  - f. Safety procedures.
  - g. Instructions on stopping.
  - h. Normal shutdown instructions.
  - i. Operating procedures for emergencies.
  - j. Operating procedures for system, subsystem, or equipment failure.
  - k. Seasonal and weekend operating instructions.
  - l. Required sequences for electric or electronic systems.
  - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
- a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
- a. Diagnostic instructions.
  - b. Test and inspection procedures.
7. Maintenance: Include the following:
- a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning.
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
8. Repairs: Include the following:
- a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.
- 1.8 PREPARATION
- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."



Construction Documents

- B. Set up instructional equipment at instruction location.

1.9 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
  - 2. At Owner's option, the Owner may furnish an instructor to describe Owner's operational philosophy.
  - 3. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule training with Owner, through Architect, through Construction Manager, with at least seven days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral, a written, or a demonstration performance-based test.
- F. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.10 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode with vibration reduction technology.
  - 1. Submit video recordings on CD-ROM or thumb drive.
  - 2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.
  - 3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.

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Construction Documents

4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:
  - a. Name of Contractor/Installer.
  - b. Business address.
  - c. Business phone number.
  - d. Point of contact.
  - e. Email address.
  
- B. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
  1. Film training session(s) in segments not to exceed 15 minutes.
    - a. Produce segments to present a single significant piece of equipment per segment.
    - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
    - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
  
- C. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
  1. Furnish additional portable lighting as required.
  
- D. Narration: Describe scenes on video recording by audio narration by microphone while or dubbing audio narration off-site after video recording is recorded. Include description of items being viewed.
  
- E. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
  
- F. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017900

Construction Documents

**SECTION 03 30 00  
CAST-IN-PLACE CONCRETE**

**PART 1 - GENERAL**

**1.1 SUMMARY**

A. Section Includes:

1. Cast-in-place structural concrete.
2. Slab on grade.
3. Foundation walls.
4. Footings.
5. Equipment pads.
6. Preparation of existing surfaces to receive concrete.
7. Preparation of existing surface to received concrete topping.

**1.2 RELATED REQUIREMENTS**

**1.3 APPLICABLE PUBLICATIONS**

A. Comply with references to extent specified in this Section.

B. American Concrete Institute (ACI):

1. 117-15 - Tolerances for Concrete Construction, Materials and Commentary.
2. 117M-10 (R2015) - Tolerances for Concrete Construction, Materials and Commentary.
3. 211.1-91 (R2009) - Proportions for Normal, Heavyweight, and Mass Concrete.
4. 211.2-98 (R2004) - Selecting Proportions for Structural Lightweight Concrete.
5. 301/310M-10 - Structural Concrete.
6. 305.1-14 - Hot Weather Concreting.
7. 306.1-90 (R2002) - Cold Weather Concreting.
8. 318/318M-14 - Building Code Requirements for Structural Concrete and SP-66-04-ACI Detailing Manual.
9. 347-04 - Guide to Formwork for Concrete.

C. ASTM International (ASTM):

1. A615/A615M-15ae1 - Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

**Construction Documents**

2. A996/A996M-15 - Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.
  3. A1064/A1064M-15 - Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
  4. C33/C33M-13 - Concrete Aggregates.
  5. C39/C39M-15a - Compressive Strength of Cylindrical Concrete Specimens.
  6. C94/C94M-15a - Ready-Mixed Concrete.
  7. C143/C143M-15 - Slump of Hydraulic Cement Concrete.
  8. C150/C150M-15 - Portland Cement.
  9. C171-07 - Sheet Material for Curing Concrete.
  10. C192/C192M-15 - Making and Curing Concrete Test Specimens in the Laboratory.
  11. C219-14a - Terminology Relating to Hydraulic Cement.
  12. C260/C260M-10a - Air-Entraining Admixtures for Concrete.
  13. C330/C330M-14 - Lightweight Aggregates for Structural Concrete.
  14. C494/C494M-15 - Chemical Admixtures for Concrete.
  15. C618-15 - Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
  16. C881/C881M-14 - Epoxy-Resin-Base Bonding Systems for Concrete.
  17. C989/C989M-14 - Slag Cement for Use in Concrete and Mortars.
  18. C1240-15 - Silica Fume Used in Cementitious Mixtures.
  19. D1751-04(2013el) - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
  20. E1155-14 - Determining FF Floor Flatness and FL Floor Levelness Numbers.
  21. E1745-11 - Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
- D. International Concrete Repair Institute:
1. 310.2R-2013 - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.

**1.4 SUBMITTALS**

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submittal Drawings:

**Construction Documents**

1. Large scale drawings of reinforcing steel.
- C. Manufacturer's Literature and Data:
  1. Concrete Mix Design.
  2. Air-entraining admixture, chemical admixtures, and curing compounds.
  3. Indicate manufacturer's recommendation for each application.
- D. Sustainable Construction Submittals:
  1. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.
- E. Certificates: Certify products comply with specifications.
  - a. Each ready mix concrete batch delivered to site.

**1.5 DELIVERY**

- A. Deliver each ready-mixed concrete batch with mix certification in duplicate according to ASTM C94/C94M.

**1.6 WARRANTY**

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Portland Cement: ASTM C150/C150M, Type I or II.
- B. Pozzolans:
  1. Fly Ash: ASTM C618, Class C or F including supplementary optional physical requirements.
  2. Slag: ASTM C989/C989M; Grade 80.
  3. Silica Fume: ASTM C1240.
- C. Coarse Aggregate: ASTM C33/C33M.
  1. Size 467 for footings and walls over 300 mm (12 inches) thick.
  2. Size 7 for coarse aggregate for applied topping and metal pan stair fill.
  3. Size 67 for other applications.
- D. Fine Aggregate: ASTM C33/C33M.
- E. Lightweight Aggregate for Structural Concrete: ASTM C330/C330M, Table 1.
- F. Mixing Water: Fresh, clean, and potable.
- G. Air-Entraining Admixture: ASTM C260/C260M.
- H. Chemical Admixtures: ASTM C494/C494M.

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**Construction Documents**

- I. Vapor Barrier: ASTM E1745, Class A with a minimum puncture resistance of 2200 g (3000 lbs.); minimum 0.38 mm (15 mil) thick.
- J. Reinforcing Steel: ASTM A615/A615M or ASTM A996/A996M, deformed. See Structural Drawings for grade.
- K. Forms: Wood, plywood, metal, or other materials, approved by COR, of grade or type suitable to obtain type of finish specified.
  - 1. Plywood: Exterior grade, free of defects and patches on contact surface.
  - 2. Lumber: Sound, grade-marked, S4S stress graded softwood.
  - 3. Form coating: As recommended by Contractor.
- L. Welded Wire Fabric: ASTM A1064/A1064M, plain, sized as indicated.
- M. Expansion Joint Filler: ASTM D1751.
- N. Sheet Materials for Curing Concrete: ASTM C171.
- O. Abrasive Aggregates: Aluminum oxide grains or emery grits.
- P. Liquid Densifier/Sealer: 100 percent active colorless aqueous silicate solution.
- Q. Grout, Non-Shrinking: Premixed ferrous or non-ferrous. Grout to show no settlement or vertical drying shrinkage at 3 days. Compressive strength for grout, at least 18 MPa (2500 psi) at 3 days and 35 MPa (5000 psi) at 28 days.

**2.2 ACCESSORIES**

- A. Bonding Agent: ASTM C 1059/C 1059M, Type II.
- B. Structural Adhesive: ASTM C881, 2-component material suitable for use on dry or damp surfaces. Provide material Type, Grade, and Class to suit Project requirements.
- C. Water Stops: Rubber base with self-healing properties. Expanding clay based products not acceptable.
- D. Weeps: Geotextile type as recommended by Contractor and approved by COR

**2.3 CONCRETE MIXES**

- A. Design concrete mixes according to ASTM C94/C94M, Option C.
- B. Compressive strength at 28 days: minimum 25 MPa (3,000 psi).
- C. Submit mix design and results of compression tests to the COR for his evaluation. Identify all materials, including admixtures, making-up the concrete.
- D. Maximum Slump for Vibrated Concrete: 100 mm (4 inches) tested according to ASTM C143.

Construction Documents

E. Cement and Water Factor (See Table I):

TABLE I - CEMENT AND WATER FACTORS FOR CONCRETE				
Concrete: Strength	Non-Air-Entrained		Air-Entrained	
Min. 28 Day Comp. Str. MPa (psi)	Min. Cement kg/cu. m (lbs./cu. yd.)	Max. Water Cement Ratio	Min. Cement kg/cu. m (lbs./cu. yd.)	Max. Water Cement Ratio
35 (5000)1,3	375 (630)	0.45	385 (650)	0.40
30 (4000)1,3	325 (550)	0.55	340 (570)	0.50
25 (3000)1,3	280 (470)	0.65	290 (490)	0.55
25 (3000)1,2	300 (500)	*	310 (520)	*

Footnotes:

1. If trial mixes are used, achieve a compressive strength 8.3 MPa (1 200 psi) in excess of f'c. For concrete strengths greater than 35 MPa (5,000 psi), achieve a compressive strength 9.7 MPa (1,400 psi) in excess of f'c.
2. Lightweight Structural Concrete: Pump mixes may require higher cement values as specified in ACI 318/318M.
3. For Concrete Exposed to High Sulfate Content Soils: Maximum water cement ratio is 0.44.

\* Laboratory Determined according to ACI 211.1 for normal weight concrete or ACI 211.2 for lightweight structural concrete.

F. Air-entrainment as specified, and conform with the following for air content table:

TABLE II - TOTAL AIR CONTENT FOR VARIOUS SIZES OF COARSE AGGREGATES	
Nominal Maximum Size of Coarse Aggregate	Total Air Content, percent
10 mm (3/8 inches)	6 Moderate exposure; 7.5 severe exposure
13 mm (1/2 inches)	5.5 Moderate exposure; 7 severe exposure
19 mm (3/4 inches)	5 Moderate exposure; 6 severe exposure

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TABLE II - TOTAL AIR CONTENT FOR VARIOUS SIZES OF COARSE AGGREGATES	
Nominal Maximum Size of Coarse Aggregate	Total Air Content, percent
25 mm (1 inches)	4.5 Moderate exposure; 6 severe exposure
40 mm (1 1/2 inches)	4.5 Moderate exposure; 5.5 severe exposure

**2.4 BATCHING AND MIXING**

- A. Store, batch, and mix materials according to ASTM C94/C94M.
  - 1. Job-Mixed: Batch mix concrete in stationary mixers as specified in ASTM C94/C94M.
  - 2. Ready-Mixed Concrete: Comply with ASTM C94/C94M, except use of non-agitating equipment for transporting concrete to Site is not acceptable.
  - 3. Mixing Structural Lightweight Concrete: Charge mixer with 2/3 of total mixing water and total aggregate for each batch. Mix ingredients minimum 30 seconds in stationary mixer or minimum 10 revolutions at mixing speed in truck mixer. Add remaining mixing water and other ingredients and continue mixing. Above procedure shall be modified as recommended by aggregate producer.
  - 4. When aggregate producer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

**PART 3 - EXECUTION**

**3.1 FORMWORK**

- A. Installation: Conform to ACI 347. Construct forms to obtain concrete of the shapes, dimensions and profiles indicated, with tight joints.
- B. Design and construct forms to prevent bowing-out of forms between supports and to be removable without prying against or otherwise damaging fresh concrete.
- C. When patching formed concrete, seal form edges against existing surface to prevent leakage; set forms so that patch is flush with adjacent surfaces.
- D. Treating and Wetting: Treat or wet concrete contact surfaces:



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1. Coat plywood and lumber forms with non-staining form sealer.
  2. Wet wood forms thoroughly when they are not treated with form release agent.
  3. Prevent water from accumulating and remaining within forms.
  4. Clean and coat removable metal forms with light form oil before reinforcement is placed.
  5. In hot weather, cool metal forms by thoroughly wetting with water just before placing concrete.
  6. Prevent water from accumulating and remaining within forms.
- E. Inserts, Sleeves, and Similar Items: Install flashing reglets, masonry ties, anchors, inserts, wires, hangers, sleeves, boxes for floor hinges, and other cast-in items specified in other Sections. Place where indicated, square, flush and secured to formwork.
- F. Construction Tolerances - General: Install and maintain concrete formwork to assure completion of work within specified tolerances.
- G. Adjust or replace completed work exceeding specified tolerances before placing concrete.

**3.2 REINFORCEMENT**

- A. Install concrete reinforcement according to ACI 318 and ACI SP-66.
- B. Support and securely tie reinforcing steel to prevent displacement during placing of concrete.
- C. Drilling for Dowels in Existing Concrete: Use sharp bits, drill hole slightly oversize, fill with epoxy grout, inset the dowel, and remove excess epoxy.

**3.3 VAPOR BARRIER**

- A. Except where membrane waterproofing is required, place interior concrete slabs on a continuous vapor barrier.
- B. Lap joints 150 mm (6 inches) and seal with a compatible pressure-sensitive tape.
- C. Patch punctures and tears.

**3.4 PLACING CONCRETE**

- A. Remove water from excavations before concrete is placed. Remove hardened concrete, debris and other foreign materials from interior of forms, and from inside of mixing and conveying equipment. Obtain

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approval from Contracting Officer's Representative before placing concrete.

- B. Install screeds at required elevations for concrete slabs.
- C. Roughen and clean free from laitance, foreign matter, and loose particles before placing new concrete on existing concrete.
  - 1. Blow-out areas with compressed air and immediately coat contact areas with adhesive in compliance with manufacturer's instructions.
- D. Place structural concrete according to ACI 301 and ACI 318.
- E. Convey concrete from mixer to final place of deposit by method that shall prevent segregation or loss of ingredients. Do not deposit, in Work, concrete that has attained its initial set or has contained its water or cement more than 1 1/2 hours. Do not allow concrete to drop freely more than 1500 mm (5 feet) in unexposed work nor more than 900 mm (3 feet) in exposed work.
- F. Place and consolidate concrete in horizontal layers not exceeding 300 mm (12 inches) in thickness. Consolidate concrete by spading, rodding, and mechanical vibrator. Do not secure vibrator to forms or reinforcement. Continuously vibrate during placement of concrete.
- G. Concrete Fill in Stair Tread and Landing Pans: Coat steel with bonding agent and fill pans with concrete. Reinforce with 2 inch by 2 inch by 1.6 mm (0.06 inch) welded wire mesh at midpoint.
- H. Hot Weather Concrete Placement: As recommended by ACI 305.1 to prevent adversely affecting properties and serviceability of hardened concrete.
- I. Cold Weather Concrete Placement: As recommended by ACI 306.1, to prevent freezing of thin sections less than 300 mm (12 inches) and to permit concrete to gain strength properly.
  - 1. Do not use calcium chloride without written approval from Contracting Officer's Representative.

**3.5 TOLERANCES**

- A. Slab on Grade Finish Tolerance: Comply with ACI 117, FF-number and FL-number method.
  - 1. Paragraph 4.8.3, Class A 3 mm (1/8 inches) for offset in form-work.
  - 2. Table R4.8.4, "Flat" 6 mm (1/4 inch) in 3 m (10 feet) for slabs.

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**3.6 PROTECTION AND CURING**

- A. Protect exposed surfaces of concrete from premature drying, wash by rain or running water, wind, mechanical damage, and excessive hot or cold temperatures.
- B. Curing Methods: Cure concrete with curing compound using wet method with sheets.
- C. Formed Concrete Curing: Wet the tops and exposed portions of formed concrete and keep moist until forms are removed.
  - 1. If forms are removed before 14 days after concrete is cast, install sheet curing materials as specified above.
- D. Concrete Flatwork Curing:
  - 1. Install sheet materials according to the manufacturer's instructions.
    - a. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

**3.7 FORM REMOVAL**

- A. Maintain forms in place until concrete is self-supporting, with construction operation loads.
- B. Remove fins, laitance and loose material from concrete surfaces when forms are removed. Repair honeycombs, rock pockets, sand runs, spalls, or otherwise damaged surfaces by patching with the same mix as concrete minus the coarse aggregates.
- C. Finish to match adjacent surfaces.

**3.8 FINISHES**

- A. Vertical and Overhead Surface Finishes:
  - 1. Surfaces Concealed in Completed Construction: As-cast; no additional finishing required.
  - 2. Surfaces Exposed in Unfinished Areas: As-cast; no additional finishing required.
    - a. Mechanical rooms.
    - b. Electrical rooms.
  - 3. Surfaces Exposed to View Scheduled for Paint Finish: Remove fins, burrs and similar projections by mechanical means approved by Contracting Officer's Representative flush with adjacent surface. Lightly rub with fine abrasive stone or hone. Use ample amount of

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water during rubbing without working up a lather of mortar or changing texture of concrete.

4. Surfaces Exposed to View in Finished Areas: Grout finish, unless otherwise shown, for uniform color and smooth finish treated.
  - a. Remove laitance, fins and burrs.
  - b. Scrub concrete with wire brushes. Clean stained concrete surfaces with hone or stone.
  - c. Apply grout composed of 1 part Portland cement and 1 part clean, fine sand (smaller than 600 micro-m (No. 30) sieve). Work grout into surface of concrete with cork floats or fiber brushes until pits and honeycomb are filled.
  - d. After grout has hardened, but is still plastic, remove surplus grout with sponge rubber float and by rubbing with clean burlap.
  - e. In hot, dry weather fog spray surfaces with water to keep grout wet during setting period. Complete finished areas in same day. Confine limits of finished areas to natural breaks in wall surface. Do not leave grout on concrete surface overnight.

B. Slab Finishes:

1. Allow bleed water to evaporate before surface is finished. Do not sprinkle dry cement on surface to absorb water.
2. Scratch Finish: Rake or wire broom after partial setting slab surfaces to received bonded applied cementitious application, within 2 hours after placing, to roughen surface and provide permanent bond between base slab and applied cementitious materials.
3. Float Finish: Interior ramps, interior stair treads, and platforms, both equipment pads, and slabs to receive non-cementitious materials, except as specified.
  - a. Screen and float to smooth dense finish.
  - b. After first floating, while surface is still soft, check surfaces for alignment using straightedge or template. Correct high spots by cutting down with trowel or similar tool. Correct low spots by filling in with material same composition as floor finish. Remove any surface projections on floated finish by rubbing or dry grinding. Refloat slab to uniform sandy texture.
4. Steel Trowel Finish: Applied toppings, concrete surfaces to receive resilient floor covering or carpet, future floor roof and other

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monolithic concrete floor slabs exposed to view without other finish indicated or specified.

- a. Delay final steel troweling to secure smooth, dense surface, usually when surface can no longer be dented by fingers. During final troweling, tilt steel trowel at slight angle and exert heavy pressure on trowel to compact cement paste and form dense, smooth surface.
  - b. Finished surface: Free from trowel marks. Uniform in texture and appearance.
5. Broom Finish: Finish exterior slabs, ramps, and stair treads with bristle brush moistened with clear water after surfaces have been floated.
  6. Finished Slab Flatness (FF) and Levelness (FL):
    - a. Slab on Grade: Specified overall value FF 25/FL 20. Minimum local value FF 17/FL 15.
    - b. Test flatness and levelness according to ASTM E1155.

**3.9 SURFACE TREATMENTS**

- A. Mix and apply the following surface treatments according to manufacturer's instructions.
  1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.
- B. Liquid Densifier/Sealer: Use for exposed concrete floors and concrete floors to receive carpeting except those specified to receive non-slip finish.
- C. Slip Resistant Finish:
  1. Except where safety nosing and tread coverings are shown, apply abrasive aggregate to treads and platforms of concrete steps and stairs, and to surfaces of exterior concrete ramps and platforms.
    - a. Broadcast aggregate uniformly over concrete surface. Trowel concrete surface to smooth dense finish. After curing, rub treated surface with abrasive brick and water sufficiently to slightly expose abrasive aggregate.

**3.10 APPLIED TOPPING**

- A. Install concrete topping with thickness and strength shown with only enough water to ensure stiff, workable, plastic mix.

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- B. Continuously place applied topping until entire area is complete, struck off with straightedge, compact by rolling or tamping, float and steel trowel to hard smooth finish.

**3.11 RESURFACING FLOORS**

- A. Remove existing flooring by abrasive blasting or grinding, in areas to receive resurfacing, to expose existing structural slab. Achieve a surface profile of 2 to 4 according to ICRI 310.2R for the condition found at Site.
- B. Prepare exposed structural slab surface by cleaning, wetting, and applying adhesive according to manufacturer's instructions as specified in the flooring section.

**3.12 FOUNDATION WALL INFILL**

- A. Install air-entrained concrete at foundation wall infill, as indicated.
- B. Install expansion and contraction joints, waterstops, weep holes, reinforcement and railing sleeves, as indicated.
- C. Finish exposed surfaces to match adjacent concrete surfaces, new or existing.
- D. Place porous backfill, as indicated on Drawings.

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SECTION 034900 - GLASS-FIBER-REINFORCED CONCRETE (GFRC)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes glass-fiber-reinforced concrete (GFRC) shapes consisting of GFRC, shape frames, anchors, and connection hardware.
  - 1. GFRC shapes include exterior column covers.
- B. Related Requirements:
  - 1. Section 033000 "Cast-in-Place Concrete" for embedding weld plates and angles in concrete for attaching connection devices.
  - 2. Section 051200 "Structural Steel Framing" for attaching connection devices to steel framing.
  - 3. Section 079200 "Joint Sealants" for elastomeric joint sealants and sealant backings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include GFRC design mixes.
- B. Shop Drawings: Show fabrication and installation details for GFRC shapes including the following:
  - 1. Shape elevations, sections, and dimensions.
  - 2. Thickness of facing mix, GFRC backing, and bonding pads for typical shapes.
  - 3. Finishes.
  - 4. Joint and connection details.
  - 5. Erection details.
  - 6. Shape frame details for typical shapes including sizes, spacings, thicknesses, and yield strengths of various members.
  - 7. Locations and details of connection hardware attached to structure.
  - 8. Sizes, locations, and details of flex, gravity, and seismic anchors for typical shapes.
  - 9. Other items sprayed into shapes.
  - 10. Erection sequence for special conditions.
  - 11. Relationship to adjacent materials.
  - 12. Description of loose, cast-in, and field hardware.

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- C. Samples for Verification: For each type of finish indicated on exposed GFRC surfaces, representative of finish, color, and texture variations expected, approximately 12 by 12 inches by actual thickness.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Welding certificates.
- C. Mill Certificates: For structural-steel shapes and hollow structural sections used in shape framing.
- D. Source Quality-Control Program: For GFRC manufacturer.
- E. Source Quality-Control Test Reports: For GFRC, inserts, and anchors.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Designated a PCI-certified plant for Group G - Glass Fiber Reinforced Concrete or designated an APA-certified plant for GFRC production.
- B. Installer Qualifications: Manufacturer of GFRC shapes.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," and AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
- D. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for fabrication and installation.
  - 1. Build mockup of typical wall area as shown on Drawings.
    - a. Include typical components, attachments to building structure, and methods of installation.
    - b. Include window opening with GFRC returns.
    - c. Include sealant-filled joint complying with requirements in Section 079200 "Joint Sealants."
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handle and transport GFRC shapes supported on nonstaining material and with nonstaining resilient spacers between shapes.



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- B. Store GFRC shapes off of ground on firm, level, and smooth surfaces supported on nonstaining material and with nonstaining resilient spacers between shapes. Place stored shapes so identification marks are clearly visible.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain GFRC shapes from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: GFRC shapes, including shape frames, anchors, and connections, shall withstand the following design loads as well as the effects of thermal- and moisture-induced dimensional changes within limits and under conditions indicated:
  - 1. Loads: As indicated on Structural Drawings.
  - 2. Deflection Limits: Design shape frames to withstand design loads without lateral deflections greater than 1/240 of wall span.
  - 3. Thermal Movements: Provide for thermal movements resulting from annual ambient temperature changes of 80 deg F.
- B. PCI Manuals: Comply with requirements and recommendations in the following PCI manuals unless more stringent requirements are indicated:
  - 1. PCI MNL 130, "Manual for Quality Control for Plants and Production of Glass Fiber Reinforced Concrete Products."
- C. AISI Specifications: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

2.3 MOLD MATERIALS

- A. Molds: Rigid, dimensionally stable, non-absorptive material, warp and buckle free, that provides continuous GFRC surfaces within tolerances; nonreactive with GFRC and capable of producing required finish surfaces.
  - 1. Mold-Release Agent: Commercially produced liquid-release agent that does not bond with, stain, or adversely affect GFRC surfaces and does not impair subsequent surface or joint treatments of GFRC.
- B. Form Liners: Units of face design, texture, arrangement, and configuration indicated. Provide solid backing and form supports to ensure that form liners remain in place during GFRC application. Use with manufacturer's recommended liquid-release agent that does not bond with, stain, or adversely affect GFRC surfaces and does not impair subsequent surface or joint treatments of GFRC.

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- C. Surface Retarder: Chemical liquid-set retarder capable of temporarily delaying hardening of newly placed GFRC face mix to depth of reveal specified.

2.4 GFRC MATERIALS

- A. Portland Cement: ASTM C 150/C 150M; Type I, II, or III.
  - 1. For surfaces exposed to view in finished structure, use gray or white of same type, brand, and source throughout GFRC production.
- B. Glass Fibers: Alkali resistant, with a minimum zirconia content of 16 percent, 1 to 2 inches long, specifically produced for use in GFRC, and complying with ASTM C 1666/C 1666M.
- C. Sand: Washed and dried silica, complying with composition requirements in ASTM C 144; passing a No. 20 sieve with a maximum of 2 percent passing a No. 100 sieve.
- D. Facing Aggregate: ASTM C 33/C 33M, except for gradation, and PCI MNL 130, 1/4-inch maximum size.
  - 1. Aggregates: Selected, hard, and durable; free of material that reacts with cement or causes staining; to match sample.
  - 2. Fine Aggregate: Natural or manufactured sand with a maximum of 5 percent passing a No. 100 sieve and a maximum of 3 percent passing a No. 200 sieve.
- E. Coloring Admixture: ASTM C 979/C 979M, synthetic mineral-oxide pigments or colored water-reducing admixtures, temperature stable, nonfading, and alkali resistant.
- F. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of GFRC and complying with chemical limits in PCI MNL 130.
- G. Polymer-Curing Admixture: Acrylic thermoplastic copolymer dispersion complying with PCI MNL 130.
- H. Air-Entraining Admixture: ASTM C 260/C 260M, containing not more than 0.1 percent chloride ions.
- I. Chemical Admixtures: ASTM C 494/C 494M, containing not more than 0.1 percent chloride ions.

2.5 ANCHORS, CONNECTORS, AND MISCELLANEOUS MATERIALS

- A. Stainless-Steel Plates: ASTM A 240/A 240M or ASTM A 666, Type 304.
- B. Carbon-Steel Shapes and Plates: ASTM A 36/A 36M, finished as follows:
  - 1. Finish: Zinc coated by hot-dip process according to ASTM A 123/A 123M, after fabrication, or ASTM A 153/A 153M, as applicable.

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- C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
- D. Carbon-Steel Bars: ASTM A 108, Grade 1018, not less than 1/4 inch in diameter, finished as follows:
  - 1. Finish: Zinc coated by hot-dip process according to ASTM A 123/A 123M, after fabrication, or ASTM A 153/A 153M, as applicable.
- E. Malleable-Iron Castings: ASTM A 47/ A 47M, Grade 32510.
- F. Carbon-Steel Castings: ASTM A 27/A 27M, Grade 60-30.
- G. Bolts: ASTM A 307 or ASTM A 325, finished as follows:
  - 1. Finish: Zinc coated by hot-dip process according to ASTM A 123/A 123M, after fabrication, and ASTM A 153/A 153M, as applicable.

2.6 SHAPE FRAME MATERIALS

- A. Cold-Formed Steel Framing: Manufacturer's standard C-shaped steel studs, complying with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members," with minimum uncoated steel thickness of 0.053 inch [ **of web depth indicated**]; with stiffened flanges, U-shaped steel track; and of the following steel sheet:
  - 1. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, structural-steel sheet, [**G60**] [**G90**] zinc coating, of grade required by structural performance of framing.
  - 2. Painted, Nonmetallic-Coated Steel Sheet: ASTM A 1011/A 1011M, hot rolled; or ASTM A 1008/A 1008M, cold rolled; nonmetallic coated according to ASTM A 1003/A 1003M; of grade required by structural performance of framing.
- B. Hollow Structural Sections: Steel tubing, ASTM A 500/A 500M, Grade B, or ASTM A 513, finished as follows:
  - 1. Finish: Shop primed with organic zinc-rich primer complying with SSPC-Paint 20 on surfaces prepared to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 2. Finish: Shop primed with paint complying with MPI#79 on surfaces prepared to comply with SSPC-SP 2, "Hand Tool Cleaning," or better.
- C. Steel Channels and Angles: ASTM A 36/A 36M, finished as follows:
  - 1. Finish: Shop primed with organic zinc-rich primer complying with SSPC-Paint 20 on surfaces prepared to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 2. Finish: Shop primed with paint complying with MPI#79 on surfaces prepared to comply with SSPC-SP 2, "Hand Tool Cleaning," or better.

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2.7 GFRC MIXES

- A. Mist Coat: Portland cement, sand slurry, and admixtures; of same proportions as backing mix without glass fibers.
- B. Face Mix: Proportion face mix of portland cement, sand, facing aggregates, and admixtures to comply with design requirements.
- C. Backing Mix: Proportion backing mix of portland cement, glass fibers, sand, and admixtures to comply with design requirements. Provide nominal glass-fiber content of not less than 5 percent by weight of total mix.
- D. Polymer-Curing Admixture: 6 to 7 percent by weight of polymer-curing admixture solids to dry portland cement.
- E. Air Content: 8 to 10 percent; ASTM C 185.
- F. Coloring Admixture: Not to exceed 10 percent of cement weight.

2.8 SHAPE FRAME FABRICATION

- A. Fabricate shape frames and accessories plumb, square, true to line, and with components securely fastened.
  - 1. Fabricate shape frames using jigs or templates.
  - 2. Cut cold-formed metal framing members by sawing or shearing; do not torch cut.
  - 3. Fasten cold-formed metal framing members by welding. Comply with AWS D1.3/D1.3M.
  - 4. Fasten framing members of hollow structural sections, steel channels, or steel angles by welding. Comply with AWS D1.1/D1.1M.
  - 5. Weld anchors to shape frames.
- B. Reinforce framing assemblies, as necessary, to withstand erection stresses.
- C. Galvanizing Repair: Touch up damaged galvanized surfaces according to ASTM A 780/A 780M.
- D. Painting Repair: Touch up damaged painted surfaces using same primer.

2.9 MOLD FABRICATION

- A. Construct molds that result in finished GFRC complying with profiles, dimensions, and tolerances indicated, without damaging GFRC during stripping. Construct molds to prevent water leakage and loss of cement paste.
  - 1. Coat contact surfaces of molds with form-release agent.

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- B. Place form liners accurately to provide finished surface texture indicated. Provide solid backing and supports to maintain stability of liners during GFRC application. Coat form liner with form-release agent.
- C. Locate, place, and secure flashing reglets accurately.

2.10 GFRC FABRICATION

- A. Proportioning and Mixing: For backing mix, meter sand/cement slurry and glass fibers to spray head at rates to achieve design mix proportions and glass-fiber content according to PCI MNL 130 procedures.
- B. Spray Application: Comply with general procedures as follows:
  - 1. Spray or place face mix in thickness indicated on Shop Drawings.
  - 2. Proceed with spraying backing mix before face mix has set, using procedures that produce a uniform thickness and even distribution of glass fibers and matrix.
  - 3. Consolidate backing mix by rolling or other technique to achieve complete encapsulation of glass fibers and compaction.
  - 4. Measure thickness with a pin gage or other acceptable method at least once for every 5 sq. ft. of shape surface. Take no fewer than six measurements per shape.
- C. Hand form and consolidate intricate details, incorporate formers or infill materials, and overspray before material reaches initial set to ensure complete bonding.
- D. Attach shape frame to GFRC before initial set of GFRC backing, maintaining a minimum clearance of 1/2 inch from GFRC backing, and without anchors protruding into GFRC backing.
- E. Build up homogeneous GFRC bonding pads over anchor feet, maintaining a minimum thickness of 1/2 inch over tops of anchor feet, before initial set of GFRC backing. Measure bonding pad thickness at 25 percent of anchor locations.
- F. Inserts and Embedments: Build up homogeneous GFRC bosses or bonding pads over inserts and embedments to provide enough anchorage and embedment to comply with design requirements.
- G. Curing: Employ initial curing method that ensures sufficient strength for removing units from mold. Comply with PCI MNL 130 procedures.
  - 1. Keep moisture off of the surfaces of mixes with polymer curing admixtures during the first three hours of curing. Maintain temperature between 60 and 120 deg F during the first 16 hours.
  - 2. Prevent drying of moist curing mixes during the first 24 hours. Maintain units in surface-damp condition at a temperature above 60 deg F and 95 percent relative humidity for seven days.
- H. Shape Identification: Mark each GFRC shape to correspond with identification mark on Shop Drawings. Mark each shape with its casting date.

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2.11 FABRICATION TOLERANCES

- A. Manufacturing Tolerances: Manufacture GFRC shapes so each finished unit complies with PCI MNL 130 for dimension, position, and tolerances.
- B. Position Tolerances: Measured from datum line locations, as indicated on Shop Drawings.
  - 1. Shape Frame: Plus or minus 1/4 inch.
  - 2. Flashing Reglets at Edge of Shape: Plus or minus 1/4 inch.
  - 3. Inserts: Plus or minus 1/2 inch.
  - 4. Special Handling Devices: Plus or minus 3 inches.
  - 5. Location of Bearing Devices: Plus or minus 1/4 inch.
  - 6. Blockouts: Plus or minus 3/8 inch.
- C. Shape Frame Tolerances: As follows:
  - 1. Vertical and Horizontal Alignment: 1/4 inch per 10 feet.
  - 2. Spacing of Framing Member: Plus or minus 3/8 inch.
  - 3. Squareness of Frame: Difference in length of diagonals of 3/8 inch.
  - 4. Overall Size of Frame: Plus or minus 3/8 inch.

2.12 FINISHES

- A. Exposed faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints, shall be uniform, straight, and sharp. Finish exposed-face surfaces of GFRC to match approved mockups and as selected by the Architect from the following:
  - 1. As-Cast-Surface Finish: Provide surfaces to match approved sample for acceptable surface, air voids, sand streaks, and honeycomb, with uniform color and texture.
  - 2. Textured-Surface Finish: Impart by form liners.
  - 3. Retarded Finish: Use chemical-retarding agents applied to concrete forms and washing and brushing procedures to expose aggregate and surrounding matrix surfaces after form removal.
  - 4. Sand- or Abrasive-Blast Finish: Use abrasive grit, equipment, application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces.
  - 5. Acid-Etched Finish: Use acid and hot-water solution equipment, application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces.

2.13 SOURCE QUALITY CONTROL

- A. Quality-Control Testing: Establish and maintain a quality-control program for manufacturing GFRC shapes according to PCI MNL 130.
  - 1. Test materials and inspect production techniques.
  - 2. Quality-control program shall monitor glass-fiber content, spray rate, unit weight, product physical properties, anchor pull-off and shear strength, and curing period and conditions.

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3. Prepare test specimens and test according to ASTM C 1228, PCI MNL 130, and PCI MNL 128 procedures.
4. Test GFRC inserts and anchors according to ASTM C 1230 to validate design values.
5. Produce test boards at a rate of no fewer than one per work shift per operator for each spray machine and for each mix design.
  - a. For each test board, determine glass-fiber content according to ASTM C 1229 and flexural yield and ultimate strength according to ASTM C 947.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine structure and conditions for compliance with requirements for installation tolerances, bearing surfaces, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 ERECTION**

- A. Install clips, hangers, and other accessories required for connecting GFRC shapes to supporting members and backup materials.
- B. Install GFRC shapes level, plumb, square, and in alignment. Provide temporary supports and bracing as required to maintain position, stability, and alignment of shapes until permanent connections are completed.
  1. Maintain horizontal and vertical joint alignment and uniform joint width.
  2. Remove projecting hoisting devices.
- C. Connect GFRC shapes in position by bolting or welding, or both, as indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as possible after connecting is completed.
- D. Welding: Comply with applicable AWS D1.1/D1.1M and AWS D1.3/D1.3M requirements for welding, appearance, quality of welds, and methods used in correcting welding work.
  1. Protect GFRC shapes from damage by field welding or cutting operations, and provide noncombustible shields as required.
- E. At bolted connections, use lock washers or other acceptable means to prevent loosening of nuts.

**3.3 ERECTION TOLERANCES**

- A. Erect GFRC shapes to comply with the following noncumulative tolerances:

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Construction Documents

1. Plan Location from Building Grid Datum: Plus or minus 1/2 inch.
2. Top Elevation from Nominal Top Elevation: As follows:
  - a. Exposed Individual Shape: Plus or minus 1/4 inch.
  - b. Nonexposed Individual Shape: Plus or minus 1/2 inch.
  - c. Exposed Shape Relative to Adjacent Shape: 1/4 inch.
  - d. Nonexposed Shape Relative to Adjacent Shape: 1/2 inch.
3. Support Elevation from Nominal Elevation: As follows:
  - a. Maximum Low: 1/2 inch.
  - b. Maximum High: 1/4 inch.
4. Maximum Plumb Variation over the Lesser of Height of Structure or 100 Feet: 1 inch.
5. Plumb in Any 10 Feet of Element Height: 1/4 inch.
6. Maximum Offset in Alignment of Matching Edges: 1/4 inch.
7. Face Width of Joint: As follows (governs over joint taper):
  - a. Shape Dimension 20 Feet or Less: Plus or minus 1/4 inch.
  - b. Shape Dimension More Than 20 Feet: Plus or minus 3/8 inch.
8. Maximum Joint Taper: 3/8 inch.
9. Maximum Joint Taper in 10 Feet: 1/4 inch.
10. Differential Bowing, as Erected, between Adjacent Members of Same Design: 1/4 inch.

3.4 REPAIRS

- A. Repairs are permitted provided structural adequacy of GFRC shape and appearance are not impaired, as approved by Architect.
- B. Mix patching materials and repair GFRC so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces.
- C. Prepare and repair accessible damaged galvanized coatings with galvanizing repair paint according to ASTM A 780/A 780M.
- D. Wire brush and clean accessible weld areas on prime-painted components and paint with same type of shop primer.
- E. Remove and replace damaged GFRC shapes when repairs do not comply with requirements.



Construction Documents

3.5 CLEANING AND PROTECTION

- A. Perform cleaning procedures, if necessary, according to GFRC manufacturer's written instructions. Clean soiled GFRC surfaces with detergent and water, using soft fiber brushes and sponges, and rinse with clean water. Prevent damage to GFRC surfaces and staining of adjacent materials.

END OF SECTION 034900



Construction Documents

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Clay face brick.
3. Mortar and grout.
4. Steel reinforcing bars.
5. Masonry-joint reinforcement.
6. Ties and anchors.
7. Embedded flashing.
8. Miscellaneous masonry accessories.

B. Products Installed but not Furnished under This Section:

1. Cast-stone trim in unit masonry.
2. Steel lintels in unit masonry.
3. Steel shelf angles for supporting unit masonry.
4. Cavity wall insulation.

C. Related Requirements:

1. Section 012100 "Allowances" for brick unit price allowance.
2. Section 072100 "Thermal Insulation" for cavity wall insulation.
3. Section 076200 "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

1.3 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

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Construction Documents

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:
  - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
  - 2. Stone Trim Units: Show sizes, profiles, and locations of each stone trim unit required.
  - 3. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.
  - 4. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Initial Selection:
  - 1. Clay face brick, in the form of straps of five or more bricks.
  - 2. Colored mortar.
  - 3. Weep holes/cavity vents.

1.5 INFORMATIONAL SUBMITTALS

- A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
  - 1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- B. Qualification Data: For testing agency.
- C. Material Certificates: For each type and size of the following:
  - 1. Masonry units.
    - a. Include data on material properties and, if required by authorities having jurisdiction, material test reports substantiating compliance with requirements.
    - b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
    - c. For exposed brick, include test report for efflorescence according to ASTM C 67.
    - d. For surface-coated brick, include test report for durability of surface appearance after 50 cycles of freezing and thawing according to ASTM C 67 or a list of addresses of buildings in Project's area where proposed brick has been used successfully and with a history of durability.
    - e. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
  - 2. Cementitious materials. Include name of manufacturer, brand name, and type.
  - 3. Mortar admixtures.

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Construction Documents

4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
  5. Grout mixes. Include description of type and proportions of ingredients.
  6. Reinforcing bars.
  7. Joint reinforcement.
  8. Anchors, ties, and metal accessories.
- D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.
  2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- E. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.
- B. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 014000 "Quality Requirements" for mockups.
1. Build sample panels for each type of exposed unit masonry construction in sizes approximately 60 inches long by 48 inches high by full thickness.
  2. Build sample panels facing south.
  3. Where masonry is to match existing, build panels adjacent and parallel to existing surface.
  4. Clean one-half of exposed faces of panels with masonry cleaner indicated.
  5. Protect approved sample panels from the elements with weather-resistant membrane.
  6. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
    - a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless Architect specifically approves such deviations in writing.

Construction Documents

- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  - 1. Build mockups for each type of exposed unit masonry construction in sizes approximately 60 inches long by 60 inches high by full thickness, including face and backup wythes and accessories.
    - a. Include a sealant-filled joint at least 16 inches long in exterior wall mockup.
    - b. Include lower corner of window opening at upper corner of exterior wall mockup. Make opening approximately 12 inches wide by 16 inches high.
    - c. Include through-wall flashing installed for a 24-inch length in corner of exterior wall mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).
    - d. Include studs, sheathing, water-resistive barrier, sheathing joint-and-penetration treatment, air barrier, veneer anchors, flashing, cavity drainage material, and weep holes in exterior masonry-veneer wall mockup.
    - e. Include clay face brick on one face of interior unit masonry wall mockup.
  - 2. Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.
  - 3. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.
  - 4. Protect accepted mockups from the elements with weather-resistant membrane.
  - 5. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
    - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
    - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 6. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

Construction Documents

- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  - 1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
  - 2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe, and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
  - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

Construction Documents

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

- A. Provide unit masonry that develops indicated net-area compressive strengths at 28 days.
  - 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.
  - 2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

2.3 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 feet vertically and horizontally of a walking surface.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
  - 1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.4 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
  - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
  - 2. Provide bullnose units for all exposed outside corners unless otherwise indicated.



Construction Documents

B. CMUs: ASTM C 90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi unless otherwise indicated on the Structural Drawings.
2. Density Classification: Lightweight unless otherwise indicated on the Structural Drawings.
3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

2.5 CONCRETE AND MASONRY LINTELS

A. General: Provide one of the following:

- B. Concrete Lintels: ASTM C 1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength not less than that of CMUs. Comply with requirements indicated on the Structural Drawings.
- C. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.6 BRICK

A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Clay Face Brick: Facing brick complying with ASTM C 216.

1. Brick Type:

- a. Product: As selected by the Architect from the manufacturer's full range.
- b. Color: As selected by the Architect from the manufacturer's full range.
- c. Style: As selected by the Architect from the manufacturer's full range.
- d. Size: As selected by the Architect from the manufacturer's full range.

2. Grade: SW.
3. Type: FBX or FBS.

Construction Documents

4. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3350 psi unless otherwise indicated on the Structural Drawings.
5. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested according to ASTM C 67.
6. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
7. Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing according to ASTM C 67 with no observable difference in the applied finish when viewed from 10 feet.

2.7 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
  1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C 91/C 91M.
- E. Mortar Cement: ASTM C 1329/C 1329M.
- F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979/C 979M. Use only pigments with a record of satisfactory performance in masonry mortar.
- G. Colored Cement Products: Packaged blend made from portland cement and hydrated lime or masonry cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.
  1. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
  2. Pigments shall not exceed 10 percent of portland cement by weight.
  3. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
- H. Aggregate for Mortar: ASTM C 144.
  1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
  2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
  3. White-Mortar Aggregates: Natural white sand or crushed white stone.
- I. Aggregate for Grout: ASTM C 404.

Construction Documents

- J. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- K. Water: Potable.

2.8 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
- C. Masonry-Joint Reinforcement, General: ASTM A 951/A 951M.
  - 1. Interior Walls: Hot-dip galvanized carbon steel.
  - 2. Exterior Walls: Hot-dip galvanized carbon steel.
  - 3. Wire Size for Side Rods: 0.187-inch diameter.
  - 4. Wire Size for Cross Rods: 0.148-inch diameter.
  - 5. Wire Size for Veneer Ties: 0.148-inch diameter.
  - 6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
  - 7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.
- D. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder or truss type with single pair of side rods.
- E. Masonry-Joint Reinforcement for Multiwythe Masonry:
  - 1. Ladder type with one side rod at each face shell of hollow masonry units more than 4 inches wide, plus one side rod at each wythe of masonry 4 inches wide or less.
  - 2. Tab type, either ladder or truss design, with one side rod at each face shell of backing wythe and with rectangular tabs sized to extend at least halfway through facing wythe, but with at least 5/8-inch cover on outside face.
  - 3. Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum horizontal play of 1/16 inch and maximum vertical adjustment of 1-1/4 inches. Size ties to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face. Ties have hooks or clips to engage a continuous horizontal wire in the facing wythe.

2.9 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

## Construction Documents

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.
  2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
  3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Corrugated-Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from 0.060-inch-thick steel sheet, galvanized after fabrication.
- D. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.
1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long may be used for masonry constructed from solid units.
  2. Where wythes do not align or are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.
  3. Wire: Fabricate from 3/16-inch- diameter, hot-dip galvanized steel wire.
- E. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, hot-dip galvanized steel wire.
  2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- diameter, hot-dip galvanized steel wire.
- F. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.105-inch-thick steel sheet, galvanized after fabrication.
    - a. 0.064-inch- thick, galvanized-steel sheet may be used at interior walls unless otherwise indicated.
  2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- diameter, hot-dip galvanized steel wire.
  3. Corrugated-Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from 0.060-inch-thick steel sheet, galvanized after fabrication with dovetail tabs for inserting into dovetail slots in concrete.
    - a. 0.064-inch- thick galvanized sheet may be used at interior walls unless otherwise indicated.
- G. Partition Top Anchors: 0.105-inch-thick metal plate with a 3/8-inch-diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

## Construction Documents

- H. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.
1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.
- I. Adjustable Masonry-Veneer Anchors:
1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
  2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.075-inch-thick steel sheet, galvanized after fabrication.
  3. Fabricate wire ties from 0.187-inch-diameter, hot-dip galvanized-steel wire unless otherwise indicated.
  4. Contractor's Option: Unless otherwise indicated, provide any of the adjustable masonry-veneer anchors specified.
  5. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with a projecting vertical tab having a slotted hole for inserting wire tie.
  6. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with projecting tabs having holes for inserting vertical legs of wire tie formed to fit anchor section.
  7. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a sheet metal anchor section, 1-1/4 inches wide by 9 inches long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch wide by 5-1/2 inches long, stamped into center to provide a slot between strap and base for inserting wire tie.
  8. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a sheet metal anchor section, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch wide by 3-5/8 inches long, stamped into center to provide a slot between strap and base for inserting wire tie.
  9. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a gasketed sheet metal anchor section, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation or sheathing; and raised rib-stiffened strap, 5/8 inch wide by 6 inches long, stamped into center to provide a slot between strap and base for inserting wire tie. Self-adhering, modified bituminous gasket fits behind anchor plate and extends beyond pronged legs.
  10. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a corrosion-resistant, self-drilling, eye-screw designed to receive wire tie. Eye-screw has spacer that seats directly against framing and is same thickness as sheathing and has gasketed washer head that covers hole in sheathing.
  11. Seismic Masonry-Veneer Anchors: Connector section and rib-stiffened, sheet metal anchor section with screw holes top and bottom, with projecting tabs having slotted holes for inserting vertical leg of connector section. Connector section consists of a rib-stiffened, sheet metal bent plate with down-turned leg designed to fit in anchor section slot and with integral tabs designed to engage continuous wire.
  12. Seismic Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with projecting tabs having holes for inserting vertical legs of wire tie formed to fit anchor section. Wire tie has sheet metal clip welded to it with integral tabs designed to engage continuous wire.

## Construction Documents

13. Seismic Masonry-Veneer Anchors: Connector section and a gasketed sheet metal anchor section, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation or sheathing; and raised rib-stiffened strap, 5/8 inch wide by 6 inches long, stamped into center to provide a slot between strap and base for inserting connector section. Self-adhering, modified bituminous gasket fits behind anchor plate and extends beyond pronged legs. Connector section consists of a triangular wire tie and rigid PVC extrusion with snap-in grooves for inserting continuous wire. Fabricate wire connector sections from 0.187-inch- diameter, hot-dip galvanized, carbon-steel wire.
14. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours according to ASTM B 117.
15. Stainless-Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads; either made from Type 410 stainless steel or made with a carbon-steel drill point and 300 Series stainless-steel shank.

## 2.10 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with Section 076200 "Sheet Metal Flashing and Trim" and as follows:
  1. Stainless Steel: ASTM A 240/A 240M or ASTM A 666, Type 304, 0.016 inch thick.
  2. Copper: ASTM B 370, Temper H00, cold-rolled copper sheet, 16-oz./sq. ft. weight or 0.0216 inch thick or ASTM B 370, Temper H01, high-yield copper sheet, 12-oz./sq. ft. weight or 0.0162 inch thick.
  3. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
  4. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
  5. Fabricate through-wall flashing with sealant stop where indicated. Fabricate by bending metal back on itself 3/4 inch at exterior face of wall and down into joint 1/4 inch to form a stop for retaining sealant backer rod.
  6. Fabricate metal drip edges from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
  7. Fabricate metal sealant stops from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch and down into joint 1/4 inch to form a stop for retaining sealant backer rod.
  8. Fabricate metal expansion-joint strips from stainless steel or copper to shapes indicated.
  9. Solder metal items at corners.

Construction Documents

- B. Flexible Flashing: Use one of the following unless otherwise indicated:
1. Copper-Laminated Flashing: 5-oz./sq. ft. copper sheet bonded between two layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) Advanced Building Products Inc.; Copper Fabric Flashing or Copper Sealtite 2000.
      - 2) Hohmann & Barnard, Inc; Copper Fabric Flashing.
      - 3) Wire-Bond; Copper Seal Flashing #4140.
      - 4) York Manufacturing, Inc; Multi-Flash 500.
    2. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester-reinforced ethylene interpolymer alloy.
      - a. Products: Subject to compliance with requirements, provide one of the following:
        - 1) Du Pont; Thru-Wall Flashing.
        - 2) Hohmann & Barnard, Inc; Flex-Flash.
        - 3) Hyload, Inc.; Hyload Cloaked Flashing System.
        - 4) Mortar Net Solutions; Total Flash.
        - 5) Wire-Bond; Rhino Bond Flashing #4123.
      - b. Monolithic Sheet: Elastomeric thermoplastic flashing, 0.040 inch thick.
      - c. Self-Adhesive Sheet: Elastomeric thermoplastic flashing, 0.025 inch thick, with a 0.015-inch-thick coating of adhesive.
      - d. Self-Adhesive Sheet with Drip Edge: Elastomeric thermoplastic flashing, 0.025 inch thick, with a 0.015-inch-thick coating of rubberized-asphalt adhesive. Where flashing extends to face of masonry, rubberized-asphalt coating is held back approximately 1-1/2 inches from edge.
        - 1) Color: As selected by the Architect.
      - e. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
  - C. Application: Unless otherwise indicated, use the following:
    1. Where flashing is indicated to receive counterflashing, use metal flashing.
    2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
    3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing with a drip edge or flexible flashing with a metal drip edge.
    4. Where flashing is fully concealed, use metal flashing or flexible flashing.
  - D. Single-Wythe CMU Flashing System: System of CMU cell flashing pans and interlocking CMU web covers made from UV-resistant, high-density polyethylene. Cell flashing pans have integral weep spouts designed to be built into mortar bed joints and that extend into the cell to prevent clogging with mortar.

Construction Documents

- E. Solder and Sealants for Sheet Metal Flashings: As specified in Section 076200 "Sheet Metal Flashing and Trim."
- F. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.
- G. Termination Bars for Flexible Flashing:
  - 1. Aluminum or stainless steel bars 0.075 inch by 1 inch.
  - 2. Stainless-steel sheet 0.019 inch by 1-1/2 inches with a 3/8 inch sealant flange at top.
  - 3. Aluminum sheet 0.064 inch by 1-1/2 inches with a 3/8-inch sealant flange at top.

2.11 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane, or PVC.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D 226/D 226M, Type I (No. 15 asphalt felt).
- D. Weep/Cavity Vent Products: Use the following unless otherwise indicated:
  - 1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) Advanced Building Products Inc.; Mortar Maze Cell Vent.
      - 2) Heckmann Building Products, Inc.; No. 85 Cell Vent.
      - 3) Hohmann & Barnard, Inc; QV Quadro-Vent.
      - 4) Wire-Bond; Cell Vent (#3601).
- E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Advanced Building Products Inc.; Mortar Break or Mortar Break II.
    - b. CavClear/Archovations, Inc.; CavClear Masonry Mat.
    - c. Heckmann Building Products, Inc.; Weep-Thru Mortar Deflector.
    - d. Hohmann & Barnard, Inc; Mortar Trap.



Construction Documents

- e. Mortar Net Solutions; Mortar Net.
  - f. Wire-Bond; Cavity Net or Cavity Net II.
2. Configuration: Provide one of the following:
- a. Strips, full depth of cavity and 10 inches high, with dovetail-shaped notches 7 inches deep that prevent clogging with mortar droppings.
  - b. Strips, not less than 3/4 inch thick and 10 inches high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.
  - c. Sheets or strips, full depth of cavity and installed to full height of cavity.
  - d. Sheets or strips not less than 3/4 inch thick and installed to full height of cavity, with additional strips 4 inches high at weep holes and thick enough to fill entire depth of cavity and prevent weep holes from clogging with mortar.

2.12 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
1. Products: Subject to compliance with requirements, provide one of the following:
- a. Diedrich Technologies, Inc.; a division of Sandell Construction Solutions.
  - b. EaCo Chem, Inc.
  - c. PROSOCO, Inc; Sure Klean® 600.

2.13 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
- 1. Do not use calcium chloride in mortar or grout.
  - 2. Use portland cement-lime mortar unless otherwise indicated.
  - 3. For exterior masonry, use portland cement-lime mortar.
  - 4. For reinforced masonry, use portland cement-lime mortar.
  - 5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.

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1. For masonry below grade or in contact with earth, use Type M.
  2. For reinforced masonry, use Type S.
  3. For mortar parge coats, use Type S or Type N.
  4. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
  5. For interior nonload-bearing partitions, Type O may be used instead of Type N.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
1. Pigments shall not exceed 10 percent of portland cement by weight.
  2. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
  3. Mix to match Architect's sample.
  4. Application: Use pigmented mortar for exposed mortar joints with the following units:
    - a. Clay face brick.
    - b. Cast-stone trim units.
- E. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
  2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
  3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
  2. Verify that foundations are within tolerances specified.
  3. Verify that reinforcing dowels are properly placed.
  4. Verify that substrates are free of substances that impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

## Construction Documents

## 3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- F. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

## 3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
  - 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
  - 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
  - 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.
- B. Lines and Levels:
  - 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
  - 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
  - 3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
  - 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
  - 5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
  - 6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet or 1/2-inch maximum.

Construction Documents

7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in bond pattern indicated on Drawings; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

Construction Documents

- I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
  1. Install compressible filler in joint between top of partition and underside of structure above.
  2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c. unless otherwise indicated.
  3. Wedge nonload-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
  4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078443 "Joint Firestopping."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow brick and CMUs as follows:
  1. Bed face shells in mortar and make head joints of depth equal to bed joints.
  2. Bed webs in mortar in all courses of piers, columns, and pilasters.
  3. Bed webs in mortar in grouted masonry, including starting course on footings.
  4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
  5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.
- B. Lay solid masonry units and hollow brick with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
  1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
  2. Allow cleaned surfaces to dry before setting.
  3. Wet joint surfaces thoroughly before applying mortar.
  4. Rake out mortar joints for pointing with sealant.
- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
  1. For glazed masonry units, use a nonmetallic jointer 3/4 inch or more in width.
- E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

Construction Documents

- F. Cut joints flush where indicated to receive waterproofing, cavity wall insulation, and air barriers unless otherwise indicated.

3.6 CAVITY WALLS

- A. Bond wythes of cavity walls together using one of the following methods:

- 1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 1.77 sq. ft. of wall area spaced not to exceed 16 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.
  - a. Where bed joints of wythes do not align, use adjustable-type (two-piece-type) ties.
  - b. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable-type (two-piece-type) ties to allow for differential movement regardless of whether bed joints align.
- 2. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.
  - a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
  - b. Where bed joints of wythes do not align, use adjustable-type (two-piece-type) reinforcement with continuous horizontal wire in facing wythe attached to ties.
  - c. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable-type (two-piece-type) reinforcement with continuous horizontal wire in facing wythe attached to ties to allow for differential movement regardless of whether bed joints align.
- 3. Header Bonding: Provide masonry unit headers extending not less than 3 inches into each wythe. Space headers not more than 8 inches clear horizontally and 16 inches clear vertically.
- 4. Masonry-Veneer Anchors: Comply with requirements for anchoring masonry veneers.

- B. Bond wythes of cavity walls together using bonding system indicated on Drawings.

- C. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

- D. Parge cavity face of backup wythe in a single coat approximately 3/8 inch thick. Trowel face of parge coat smooth.

- E. Installing Cavity Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.

Construction Documents

1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.7 ANCHORED MASONRY VENEERS

- A. Anchor masonry veneers to wall framing and concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:
  1. Fasten screw-attached and seismic anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
  2. Embed tie sections, connector sections, and continuous wire in masonry joints.
  3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
  4. Space anchors as indicated, but not more than 16 inches o.c. vertically and horizontally. Install additional anchors within 12 inches of openings and at intervals, not exceeding 24 inches, around perimeter.
- B. Provide not less than 2 inches of airspace between back of masonry veneer and face of sheathing and insulation, unless otherwise indicated on the Drawings.
  1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

3.8 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
  1. Space reinforcement not more than 16 inches o.c.
  2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
  3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

Construction Documents

3.9 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:
  - 1. Provide an open space not less than 1 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
  - 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
  - 3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.10 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry using one of the following methods:
  - 1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.
  - 2. Install preformed control-joint gaskets designed to fit standard sash block.
  - 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.
  - 4. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.
- C. Form expansion joints in brick as follows:
  - 1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
  - 2. Build flanges of factory-fabricated, expansion-joint units into masonry.
  - 3. Build in compressible joint fillers where indicated.
  - 4. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Section 079200 "Joint Sealants."
- D. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "Joint Sealants," but not less than 3/8 inch.
  - 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.



Construction Documents

3.11 LINTELS

- A. Install steel lintels where indicated.
- B. Provide concrete or masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
- C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.12 FLASHING, WEEP HOLES, AND CAVITY VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install cavity vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
  - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
  - 2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and through inner wythe to within 1/2 inch of the interior face of wall in exposed masonry. Where interior face of wall is to receive furring or framing, carry flashing completely through inner wythe and turn flashing up approximately 2 inches on interior face.
  - 3. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under water-resistive barrier or air barrier, lapping at least 4 inches. Fasten upper edge of flexible flashing to sheathing through termination bar.
  - 4. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
  - 5. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
  - 6. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
  - 7. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
- C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges

Construction Documents

located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

- D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- E. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.
  - 1. Use specified weep/cavity vent products to form weep holes.
  - 2. Space weep holes 24 inches o.c. unless otherwise indicated.
  - 3. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.
- F. Place pea gravel in cavities as soon as practical to a height equal to height of first course above top of flashing, but not less than 2 inches, to maintain drainage.
  - 1. Fill cavities full height by placing pea gravel in cavities as masonry is laid, so that at any point, masonry does not extend more than 24 inches above top of pea gravel.
- G. Place cavity drainage material in cavities or airspace behind veneers to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.
- H. Install cavity vents in head joints in exterior wythes at spacing indicated. Use specified weep/cavity vent products to form cavity vents.
  - 1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.13 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
  - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
  - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

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Construction Documents

1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches.

3.14 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.
  1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
  2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
  3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.
- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- G. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.15 PARGING

- A. Parge exterior faces of below-grade masonry walls, where indicated, in two uniform coats to a total thickness of 3/4 inch. Dampen wall before applying first coat, and scarify first coat to ensure full bond to subsequent coat.
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot. Form a wash at top of parging and a cove at bottom.
- C. Damp-cure parging for at least 24 hours and protect parging until cured.

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Construction Documents

3.16 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
  - 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
  - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
  - 5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
  - 6. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.
  - 7. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.17 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
  - 1. Crush masonry waste to less than 4 inches in each dimension.
  - 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste.
  - 3. Do not dispose of masonry waste as fill within 18 inches of finished grade.

Construction Documents

- C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000



Construction Documents

SECTION 047200 - CAST STONE MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Cast stone trim.

B. Related Requirements:

- 1. Section 042000 "Unit Masonry" for installing cast-stone units in unit masonry.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

- 1. For cast stone units, include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.

- 1. Include building elevations showing layout of units and locations of joints and anchors.

C. Samples for Initial Selection: For colored mortar.

D. Samples for Verification:

- 1. For each color and texture of cast stone required, 4 inches square in size.
- 2. For each trim shape required, 4 inches in length.
- 3. For colored mortar, make Samples using same sand and mortar ingredients to be used on Project.

E. Full-Size Samples: For each color, texture, and shape of cast stone unit required.

- 1. Make available for Architect's review at Project site or at manufacturing plant, if acceptable to Architect.
- 2. Make Samples from materials to be used for units used on Project.

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Construction Documents

3. Approved Samples may be installed in the Work.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and testing agency.
  1. Include copies of material test reports, indicating compliance of cast stone with ASTM C1364.
- B. Material Test Reports: For each mix required to produce cast stone, based on testing according to ASTM C1364.
  1. Provide test reports based on testing within previous six months.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by the Cast Stone Institute, the Architectural Precast Association, or the Precast/Prestressed Concrete Institute for Group A, Category AT.
- B. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated. Retain one of two paragraphs below if mockups are required. First paragraph is for supplying trim units for installation within a masonry wall. Second is for larger or standalone installations.
- C. Furnish cast stone for installation in mockups specified in Section 042000 "Unit Masonry."
- D. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for materials and execution.
  1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery of cast stone with unit masonry work to avoid delaying the Work.
- B. Pack, handle, and ship cast stone units in suitable packs or pallets.
  1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units if required, using dollies with wood supports.
  2. Store cast stone units on wood skids or pallets with nonstaining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.



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Construction Documents

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Cast Stone: Obtain cast stone units from single source from single manufacturer.

2.2 CAST STONE MATERIALS

- A. General: Comply with ASTM C1364.
- B. Portland Cement: ASTM C150/C150M, Type I or Type III, containing not more than 0.60 percent total alkali when tested according to ASTM C114. Provide natural color or white cement as required to produce cast stone color indicated.
- C. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C33/C33M; gradation and colors as needed to produce required cast stone textures and colors.
- D. Fine Aggregates: Natural sand or crushed stone complying with ASTM C33/C33M, gradation and colors as needed to produce required cast stone textures and colors.
- E. Color Pigment: ASTM C979/C979M, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
- F. Admixtures: Use only admixtures specified or approved in writing by Architect.
  - 1. Do not use admixtures that contain more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use admixtures containing calcium chloride.
  - 2. Use only admixtures that are certified by manufacturer to be compatible with cement and other admixtures used.
  - 3. Air-Entraining Admixture: ASTM C260/C260M. Add to mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 4 to 6 percent, except do not add to zero-slump concrete mixes.
  - 4. Water-Reducing Admixture: ASTM C494/C494M, Type A.
  - 5. Water-Reducing, Retarding Admixture: ASTM C494/C494M, Type D.
  - 6. Water-Reducing, Accelerating Admixture: ASTM C494/C494M, Type E.
- G. Reinforcement:
  - 1. Deformed steel bars complying with ASTM A615/A615M, Grade 40. Use galvanized or epoxy-coated reinforcement when covered with less than 1-1/2 inches of cast stone material.
    - a. Epoxy Coating: ASTM A775/A775M.
    - b. Galvanized Coating: ASTM A767/A767M.

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2. Plain-Steel, Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.
  3. Galvanized-Steel, Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from galvanized-steel wire into flat sheets.
  4. Fiber Reinforcement: ASTM C1116/C1116M.
- H. Embedded Anchors and Other Inserts: Fabricated from stainless steel complying with ASTM A240/A240M, ASTM A276/A276M, or ASTM A666, Type 304 or steel complying with ASTM A36/A36M and hot-dip galvanized to comply with ASTM A123/A123M.

2.3 CAST STONE UNITS

- A. Cast Stone Type: As indicated on the Drawings.
1. Style: As selected by the Architect from the manufacturer's full range.
  2. Texture: As selected by the Architect from the manufacturer's full range.
  3. Color: As selected by the Architect from the manufacturer's full range.
  4. Size: As indicated on the Drawings.
- B. Cast Stone Units: Comply with ASTM C1364.
1. Units shall be manufactured using the wet-cast method.
- C. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.
1. Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.
  2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
  3. Provide drips on projecting elements unless otherwise indicated.
- D. Fabrication Tolerances:
1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.
  2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.
  3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.
  4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces.
- E. Cure Units as Follows:
1. Cure units in enclosed, moist curing room at 95 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.
  2. Keep units damp and continue curing to comply with one of the following:
    - a. No fewer than five days at mean daily temperature of 70 deg F or above.

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Construction Documents

b. No fewer than seven days at mean daily temperature of 50 deg F or above.

F. Acid etch units after curing to remove cement film from surfaces to be exposed to view.

2.4 MORTAR MATERIALS

A. Provide mortar materials that comply with Section 042000 "Unit Masonry."

B. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

C. Hydrated Lime: ASTM C207, Type S.

D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

E. Colored Cement Products: Packaged blend made from portland cement and hydrated lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.

1. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.

2. Pigments shall not exceed 10 percent of portland cement by weight.

F. Preblended Dry Mortar Mix: Packaged blend made from portland cement and hydrated lime, sand, mortar pigments, water repellents, and admixtures and complying with ASTM C1714/C1714M.

G. Aggregate for Mortar: ASTM C144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

3. White-Mortar Aggregates: Natural white sand or crushed white stone.

4. Colored Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

H. Water: Potable.

2.5 ACCESSORIES

A. Anchors: Type and size indicated, fabricated from Type 304 stainless steel complying with ASTM A240/A240M, ASTM A276/A276M, or ASTM A666 or steel complying with ASTM A36/A36M and hot-dip galvanized to comply with ASTM A123/A123M.

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Construction Documents

- B. Dowels: 1/2-inch-diameter round bars, fabricated from Type 304 stainless steel complying with ASTM A240/A240M, ASTM A276/A276M, or ASTM A666 or steel complying with ASTM A36/A36M and hot-dip galvanized to comply with ASTM A123/A123M.

2.6 MORTAR MIXES

- A. Comply with requirements in Section 042000 "Unit Masonry" for mortar mixes.
- B. Comply with ASTM C270, Proportion Specification.
  - 1. For setting mortar, use Type N.
  - 2. For pointing mortar, use Type N.
- C. Preblended dry mortar mix complying with ASTM C1714/C1714M and capable of producing mortar strength as indicated in ASTM C270.
  - 1. For setting mortar, use Type N.
  - 2. For pointing mortar, use Type N.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
  - 1. Pigments shall not exceed 10 percent of portland cement by weight.
  - 2. Mix to match Architect's sample.
  - 3. Application: Use pigmented mortar for exposed mortar joints.
- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
  - 1. Mix to match Architect's sample.
  - 2. Application: Use colored-aggregate mortar for exposed mortar joints.

2.7 SOURCE QUALITY CONTROL

- A. Engage a qualified independent testing agency to sample and test cast stone units according to ASTM C1364.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

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Construction Documents

3.2 SETTING CAST STONE IN MORTAR

- A. Set cast stone as indicated in TMS 604.
- B. Install cast stone units to comply with requirements in Section 042000 "Unit Masonry."
- C. Set cast stone as indicated on Drawings. Set units accurately in locations indicated, with edges and faces aligned according to established relationships and indicated tolerances.
  - 1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
  - 2. Coordinate installation of cast stone with installation of flashing specified in other Sections.
- D. Wet joint surfaces thoroughly before applying mortar or setting in mortar.
- E. Set units in full bed of mortar with full head joints unless otherwise indicated.
  - 1. Set units with joints 1/4 to 3/8 inch wide unless otherwise indicated.
  - 2. Build anchors and ties into mortar joints as units are set.
  - 3. Fill dowel holes and anchor slots with mortar.
  - 4. Fill collar joints solid as units are set.
  - 5. Build concealed flashing into mortar joints as units are set.
  - 6. Keep head joints in copings and between other units with exposed horizontal surfaces open to receive sealant.
  - 7. Keep joints at shelf angles open to receive sealant.
- F. Rake out joints for pointing with mortar to depths of not less than 3/4 inch. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.
- G. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
- H. Tool exposed joints slightly concave when thumbprint hard. Use a smooth plastic jointer larger than joint thickness.
- I. Rake out joints for pointing with sealant to depths of not less than 3/4 inch. Scrub faces of units to remove excess mortar as joints are raked.
- J. Point joints with sealant to comply with applicable requirements in Section 079200 "Joint Sealants."
  - 1. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
- K. Provide sealant joints at head joints of copings and other horizontal surfaces; at expansion, control, and pressure-relieving joints; and at locations indicated.

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1. Keep joints free of mortar and other rigid materials.
2. Build in compressible foam-plastic joint fillers where indicated.
3. Form joint of width indicated, but not less than 3/8 inch <Insert dimension>.
4. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
5. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Section 079200 "Joint Sealants."

3.3 SETTING ANCHORED CAST STONE WITH SEALANT-FILLED JOINTS

- A. Set cast stone as indicated in TMS 604.
- B. Set cast stone as indicated on Drawings. Set units accurately in locations indicated, with edges and faces aligned according to established relationships and indicated tolerances.
  1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
  2. Shim and adjust anchors, supports, and accessories to set cast stone in locations indicated with uniform joints.
- C. Keep cavities open where unfilled space is indicated between back of cast stone units and backup wall; do not fill cavities with mortar or grout.
- D. Fill anchor holes with sealant.
  1. Where dowel holes occur at pressure-relieving joints, provide compressible material at ends of dowels.
- E. Set cast stone supported on clip or continuous angles on resilient setting shims. Use material of thickness required to maintain uniform joint widths. Hold shims back from face of cast stone a distance at least equal to width of joint.
- F. Keep joints free of mortar and other rigid materials. Remove temporary shims and spacers from joints after anchors and supports are secured in place and cast stone units are anchored. Do not begin sealant installation until temporary shims and spacers are removed.
  1. Form open joint of width indicated, but not less than 3/8 inch.
- G. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
- H. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Section 079200 "Joint Sealants."

3.4 INSTALLATION TOLERANCES

- A. Variation from Plumb: Do not exceed 1/8 inch in 10 ft., or 1/2 inch maximum.

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Construction Documents

- B. Variation from Level: Do not exceed 1/8 inch in 10 ft., or 1/2 inch maximum.
- C. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches or one-fourth of nominal joint width, whichever is less.
- D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch, except where variation is due to warpage of units within tolerances specified.

3.5 ADJUSTING AND CLEANING

- A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.
- B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean cast stone as work progresses.
  - 1. Remove mortar fins and smears before tooling joints.
  - 2. Remove excess sealant immediately, including spills, smears, and spatter.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of cast stone.
  - 3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
  - 4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
  - 5. Clean cast stone by methods described in Cast Stone Institute Technical Bulletin #39.
  - 6. Clean cast stone with proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 047200





Construction Documents

**SECTION 05 12 00  
STRUCTURAL STEEL FRAMING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

A. Section Includes:

1. Structural steel shapes, plates, and bars.
2. Structural pipe.
3. Bolts, nuts, and washers.

**1.2 RELATED REQUIREMENTS**

- A. Materials Testing And Inspection During Construction: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Steel Joist: Section 05 21 00, STEEL JOIST FRAMING.
- C. Steel Decking: Section 05 31 00, STEEL DECKING.
- D. Steel Framing: Section 05 55 00, METAL FABRICATIONS.
- E. Steel Finishes: Section 09 06 00, SCHEDULE FOR FINISHES.
- F. Painting: Section 09 91 00, PAINTING.

**1.3 APPLICABLE PUBLICATIONS**

- A. Comply with references to extent specified in this section.
- B. American Institute of Steel Construction (AISC):
  1. AISC Manual - Steel Construction Manual, 14th Ed.
  2. 303-10 - Code of Structural Steel Buildings and Bridges.
  3. 360-10: Specification for Structural Steel Buildings.
- C. The American Society of Mechanical Engineers (ASME):
  1. B18.22.1-09 - Washers: Helical Spring-Lock, Tooth Lock, and Plain Washers.
- D. American Welding Society (AWS):
  1. D1.1/D1.1M-15 - Structural Welding Code - Steel.
- E. ASTM International (ASTM):
  1. A6/A6M-14 - General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
  2. A36/A36M-14 - Carbon Structural Steel.
  3. A53/A53M-12 - Pipe, Steel, Black and Hot-Dip, Zinc-Coated, Welded and Seamless.
  4. A123/A123M-15 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

**Construction Documents**

5. A242/A242M-13 - High-Strength Low-Alloy Structural Steel.
  6. A283/A283M-13 - Low and Intermediate Tensile Strength Carbon Steel Plates.
  7. A307-14 - Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.
  8. A325-14 - Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
  9. A490-14a - Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
  10. A500/A500M-13 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing and Rounds and Shapes.
  11. A501/A501M-14 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing and Rounds and Shapes.
  12. A572/A572M-15 - High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
  13. A992/A992M-15 - Structural Shapes.
  14. F2329/F2329M-15 - Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy steel Bolts, Screws, washers, Nuts, and Special Threaded Fasteners.
- F. Master Painters Institute (MPI):
1. No. 18 - Primer, Zinc Rich, Organic.
- G. Military Specifications (Mil. Spec.):
1. MIL-P-21035 - Paint, High Zinc Dust Content, Galvanizing, Repair.
- H. Occupational Safety and Health Administration (OSHA):
1. 29 CFR 1926.752(e) - Guidelines For Establishing The Components Of A Site-Specific Erection Plan.
  2. 29 CFR 1926-2001 - Safety Standards for Steel Erection.
- I. Research Council on Structural Connections (RCSC) of The Engineering Foundation:
1. Specification for Structural Joints Using ASTM A325 or A490 Bolts.

**1.4 SUBMITTALS**

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submittal Drawings:
  1. Show size, configuration, and fabrication and installation details.
- C. Sustainable Construction Submittals:

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**Construction Documents**

1. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.
- D. Test Reports: Certify products comply with specifications.
  1. Welders' qualifying tests.
- E. Certificates: Certify each product complies with specifications.
  1. Structural steel.
  2. Steel connections.
  3. Welding materials.
  4. Shop coat primer paint.
- F. Qualifications: Substantiate qualifications comply with specifications.
  1. Fabricator .
  2. Installer.
  3. Welders and welding procedures.
- G. Delegated Design Drawings and Calculations: Signed and sealed by responsible Architect/Engineer.
  1. Connection calculations.
- H. Record Surveys: Signed and sealed by responsible surveyor or engineer.

**1.5 QUALITY ASSURANCE**

- A. Fabricator Qualifications: AISC Quality Certification participant designated as AISC Certified Plant, Category STD.
  1. Regularly fabricates specified products.
  2. Fabricated specified products with satisfactory service on five similar installations for minimum five years.
- B. Installer Qualifications: AISC Quality Certification Program participant designated as AISC-Certified Erector, Category ACSE.
  1. Regularly installs specified products.
  2. Installed specified products with satisfactory service on five similar installations for minimum five years.
- C. Before commencement of Work, ensure steel erector provides written notification required by OSHA 29 CFR 1926.752(e). Submit a copy of the notification to Contracting Officer's Representative.
- D. Welders and Welding Procedures Qualifications: AWS D1.1/D1.1M.

**1.6 WARRANTY**

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

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Construction Documents

**PART 2 - PRODUCTS**

**2.1 SYSTEM PERFORMANCE**

- A. Delegated Design: Prepare submittal documents including design calculations and drawings signed and sealed by registered design professional, licensed in state where project is located.
- B. Design structural steel framing connections complying with specified performance:
  - 1. Load Capacity: Resist loads indicated on drawings. Account for connection and member loads and eccentricities.
    - a. Request additional design criteria when necessary to complete connection design.
  - 2. Configuration: Design and detail all connections for each member size, steel grade and connection type to resist the loads and reactions indicated on the drawings or specified herein. Use details consistent with details shown on drawings, supplementing where necessary. The details shown on drawings are conceptual and do not indicate the required weld sizes or number of bolts unless specifically noted. Use rational engineering design and standard practice in detailing, accounting for all loads and eccentricities in both the connection and the members. Promptly notify the Contracting Officer Representative of any location where the connection design criteria is not clearly indicated. The design of all connections is subject to the review and acceptance of the Contracting Officer's Representative. Submit structural calculations prepared and sealed by a qualified engineer registered in the state where the project is located. Submit calculations for review before preparation of detail drawings.

**2.2 MATERIALS**

- A. W-Shapes:
  - 1. ASTM A992/A992M.
  - 2. ASTM A572/A572M; Grade 50.
  - 3. ASTM A529; Grade 50.
- B. S-Shapes:
  - 1. ASTM A36/A36M.
  - 2. ASTM A572/A572M; Grade 50.
  - 3. ASTM A529; Grade 50.

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**Construction Documents**

- C. Channel and Angles:
  - 1. ASTM A36/A36M.
  - 2. ASTM A572/A572M; Grade 50.
  - 3. ASTM A529; Grade 50.
- D. Plates and Bars:
  - 1. ASTM A36/A36M.
  - 2. ASTM A572/A572M; Grade 50.
  - 3. ASTM A529; Grade 50.
- E. Hollow Structural Sections:
  - 1. ASTM A500/A500M.
  - 2. ASTM A501/A501M.
- F. Structural Pipe: ASTM A53/A53M, Grade B.
- G. Bolts, Nuts and Washers: Galvanized for galvanized framing and plain finish for other framing.
  - 1. High-strength bolts, including nuts and washers: ASTM A325.
  - 2. Bolts and nuts, other than high-strength: ASTM A307, Grade A.
  - 3. Plain washers, other than those in contact with high-strength bolt heads and nuts: ASME B18.22.1.
- H. Welding Materials: AWS D1.1, type to suit application.

**2.3 PRODUCTS - GENERAL**

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Sustainable Construction Requirements:
  - 1. Steel Recycled Content: 30 percent total recycled content, minimum.
  - 2. Low Pollutant-Emitting Materials: Comply with VOC limits specified in Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS for the following products:
    - a. Paints and coatings.

**2.4 FABRICATION**

- A. Fabricate structural steel according to Chapter M, AISC 360.
- B. Shop and Field Connections:
  - 1. Weld connections according to AWS D1.1/D1.1M. Welds shall be made only by welders and welding operators who have been previously qualified by tests as prescribed in AWS D1.1 to perform type of work required.
  - 2. High-Strength Bolts: High-strength bolts tightened to a bolt tension minimum 70 percent of their minimum tensile strength. Tightening

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done with properly calibrated wrenches, by turn-of-nut method or by use of direct tension indicators (bolts or washers). Tighten bolts in connections identified as slip-critical using Direct Tension Indicators. Twist-off torque bolts are not an acceptable alternate fastener for slip critical connections.

**2.5 FINISHES**

- A. Shop Priming:
  - 1. Prime paint structural steel according to AISC 303, Section 6.
    - a. Interstitial Space Structural Steel: Prime paint, unless indicated to receive sprayed on fireproofing.
- B. Shop Finish Painting: Apply primer and finish paint as specified in Section 09 91 00, PAINTING.
- C. Do not paint:
  - 1. Surfaces within 50 mm (2 inches) of field welded joints.
  - 2. Surfaces indicated to be encased in concrete.
  - 3. Surfaces receiving sprayed on fireproofing.
  - 4. Beam top flanges receiving shear connector studs applied.
- D. Structural Steel Galvanizing: ASTM A123/A123M, hot dipped, after fabrication. Touch-up after erection: Clean and wire brush any abraded and other spots worn through zinc coating, including threaded portions of bolts and welds and touch-up with galvanizing repair paint.
  - 1. Galvanize structural steel framing installed at exterior locations.
- E. Bolts, Nuts, and Washers Galvanizing: ASTM F2329, hot-dipped.

**2.6 ACCESSORIES**

- A. General: Shop paint steel according to AISC 303, Section 6.
- B. Finish Paint System: Primer and finish as specified in Section 09 91 00, PAINTING.
- C. Galvanizing Repair Paint: MPI No. 18.

**PART 3 - EXECUTION**

**3.1 ERECTION**

- A. Erect structural steel according to AISC 303 and AISC 360.
- B. Set structural steel accurately at locations and elevations indicated on drawings.
- C. Maintain erection tolerances of structural steel within AISC 303 requirements.

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1. Pour Stop Elevation Tolerance: 6 mm (1/4 inch), maximum, before concrete placement.

D. Weld and bolt connections as specified for shop connections.

**3.2 FIELD PAINTING**

A. After welding, clean and prime weld areas to match adjacent finish.

B. Touch-up primer damaged by construction operations.

C. Apply galvanizing repair paint to galvanized coatings damaged by construction operations.

D. Finish Painting: As specified in Section 09 91 00, PAINTING.

**3.3 FIELD QUALITY CONTROL**

A. Record Survey:

1. Engage registered land surveyor or registered civil engineer as specified in Section 01 00 00, GENERAL REQUIREMENTS to perform survey.

2. Measure and record structural steel framing plumbness, level, and alignment after completing bolting and welding and before installation of work supported by structural steel.

3. Identify deviations from allowable tolerances specified in AISC Manual.

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**SECTION 05 21 00**  
**STEEL JOIST FRAMING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

This section specifies open web, longspan, and deep longspan steel joists and joist girders.

**1.2 RELATED WORK:**

- A. Structural Steel: Section 05 12 00, STRUCTURAL STEEL FRAMING.
- B. Finish Painting: Section 09 91 00, PAINTING.

**1.3 DESIGN REQUIREMENTS:**

Design all elements with the latest published version of applicable Codes.

**1.3 TOLERANCES:**

Deviation from a straight line between ends of any installed joist shall not exceed 10 mm in 3 m (3/8 inch in 10 feet).

**1.4 REGULATORY REQUIREMENTS:**

STEEL JOIST INSTITUTE: Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders, (Latest Edition).

**1.5 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop and Erection Drawings: Complete.
  - 1. Fabrication drawings including details and schedules for the fabrication and assembly of each joist.
  - 2. Erection drawings showing the size and location of each joist, bridging, cross bracing, bearing details, connections, welds, bolts and bearing plates.
- C. Certificates: STEEL JOIST INSTITUTE compliance.
- D. Design Calculations: If requested by the Resident Engineer, submit complete calculations covering the design of all members and connections. Calculations must be specifically applicable to the joists supplied.

**1.6 QUALITY ASSURANCE:**

Provide documentation that the joist manufacturer is a member of the Steel Joist Institute and has satisfactorily completed work of a similar scope and nature.

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**1.7 APPLICABLE PUBLICATIONS:**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Institute of Steel Construction (AISC):
  - 1. Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design (Latest Edition).
  - 2. Load and Resistance Factor Design Specification for Structural Steel Buildings (Latest Edition).
- C. American Society for Testing and Materials (ASTM):
  - A307-07.....Carbon Steel Bolts and Studs, 400 MPa (60,000 psi) Tensile Strength
  - F3125/F3125M-15.....Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions
- D. American Welding Society (AWS):
  - D1.1-15.....Structural Welding Code - Steel
- E. SSPC: The Society for Protective Coatings:
  - Steel Structures Painting Manual, Volumes 1 and 2
- F. Steel Joist Institute (STEEL JOIST INSTITUTE):
  - Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders (Latest Edition).

**PART 2 - PRODUCTS**

**2.1 OPEN WEB STEEL JOISTS:**

K-Series conforming to STEEL JOIST INSTITUTE standard specifications.

**2.2 LONGSPAN STEEL JOISTS AND DEEP LONGSPAN STEEL JOISTS:**

LH-Series and DLH-Series conforming to STEEL JOIST INSTITUTE standard specifications.

**2.3 ACCESSORIES - FITTINGS:**

- A. Accessories and fittings, including end supports and bridging, in accordance with standard STEEL JOIST INSTITUTE specification under which joists were designed.
- B. Unfinished Threaded Fasteners: ASTM A307, Grade A, regular hexagon type, low carbon steel.

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- C. High-strength bolts, including nuts and washers: ASTM F3125 heavy hexagon structural bolts.

SPEC WRITER NOTE: Select bedding mortar type to suit project standards, or retain all as contractor's option.

**2.4 BEDDING MORTAR:**

- A. For joist ends bearing on concrete or masonry, provide bedding mortar as follows:
1. Portland cement and sand, mixed at a ratio of 1 part cement to 3 parts sand, by volume, with enough water for placement and hydration.
  2. Non-metallic, shrinkage-resistant mortar; premixed, non-corrosive, non-staining product containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with CRD-C-621.

**PART 3 - EXECUTION**

**3.1 FABRICATION:**

- A. Fabrication and assembly in accordance with applicable standard STEEL JOIST INSTITUTE specification:
1. Make chord splices with full penetration welds capable of developing the ultimate strength in tension of the parent material. Make no allowance for the strength of back-up bars or other material incidental to welding.
  2. Provide shop-welded connection plates at panel points to receive supplemental framing.
  3. Holes in Chord Members: Provide holes in chord members where shown for securing other work to steel joists; however, deduct area of holes from the area of chord when calculating strength of member.
  4. Extended Ends: Provide extended ends on joists where shown, complying with manufacturer's standards and requirements of applicable STEEL JOIST INSTITUTE specifications.
  5. Ceiling Extensions: Provide ceiling extension in areas having ceilings attached directly to joist bottom chord. Provide either an extended bottom chord element or a separate unit, to suit manufacturer's standards, of sufficient strength to support ceiling construction. Extend ends to within 12 mm (1/2 inch) of finished wall surface unless otherwise indicated.

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6. Bridging: Provide horizontal or diagonal type bridging for joists and joist girders, complying with STEEL JOIST INSTITUTE specifications. Provide bridging anchors for ends of bridging lines terminating at walls or beams. Provide bridging adequate to resist the loads indicated on the Contract Documents.
7. End Anchorage: Provide end anchorages, including bearing plates, to secure joists to adjacent construction, complying with STEEL JOIST INSTITUTE specifications, unless otherwise indicated. Design all end anchorages to resist a minimum net uplift of 1.6 kPa (35 pounds per square foot) of supported area.
8. Header Units: Provide header units to support all joists at openings in floor or roof system not framed with steel shapes.
9. Provide supplemental steel support framing for metal deck where normal deck bearing is precluded by other framing members and minor openings.

**3.2 SHOP PAINTING:**

- A. Shop painting in accordance with applicable STEEL JOIST INSTITUTE standard specification.
- B. Shop paint joists and accessories with a rust-inhibiting primer paint. For joists which will be finish painted, limit paint to a primer which is compatible with specified finish paint. In high humidity areas, shop paint joists with a zinc-rich primer to receive top coats per the paint system manufacturer's recommendations.

**3.3 ERECTION:**

- A. Installation of joists in accordance with applicable STEEL JOIST INSTITUTE standard specification.
- B. Handle joists in a manner to avoid damaging of joists. Remove damaged joists from site, except when field repair is approved and such repairs are satisfactorily made in accordance with manufacturer's recommendations.
- C. Accurately set joists and end anchorage in accordance with the applicable STEEL JOIST INSTITUTE standard specification. Secure joists resting on masonry or concrete bearing surfaces by welding or bolting to the steel bearing plates as indicated on the Contract Documents. Secure bridging and anchoring in place prior to application of any construction loads. Distribute any temporary loads so that carrying capacity of any joist is not exceeded. Loads shall not be applied to bridging where joist lengths are 12 m (40 feet) and longer. Where joist

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lengths are 12 m (40 feet) and longer, install a center row of bolted diagonal bridging to provide lateral stability before slackening of hoisting lines.

**3.4 FIELD PAINTING:**

- A. Clean abraded, corroded, and field welded areas and touch up with same type of paint used in shop painting.
- B. Finish painting of steel surfaces is specified in Section 09 91 00, PAINTING.

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**SECTION 05 31 00**  
**STEEL DECKING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

A. Section Includes:

1. Single pan fluted metal form deck supporting concrete fill as roof substrate.
2. Corrugated metal form deck supporting concrete fill as roof substrate.
3. Single pan fluted metal roof deck as roof substrate.
4. Acoustic metal roof deck as roof substrate.

**1.2 RELATED REQUIREMENTS**

- A. Structural Steel Shapes: Section 05 21 00, STRUCTURAL STEEL FRAMING.
- B. Color: Section 09 06 00, SCHEDULE FOR FINISHES.
- C. Finish Painting: Section 09 91 00, PAINTING.

**1.3 APPLICABLE PUBLICATIONS**

- A. Comply with references to extent specified in this section.
- B. AISI - American Iron and Steel Institute.
  1. S100-12 - Specification for the Design of Cold-formed Steel Structural Members.
- C. American Welding Society (AWS):
  1. D1.1/D1.1M-15 - Structural Welding Code - Steel.
  2. D1.3/D1.3M-08 - Structural Welding Code - Sheet Steel.
- D. ASTM International (ASTM):
  1. A36/A36M-14 - Carbon Structural Steel.
  2. A653/A653M-15 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  3. A1008/A1008M-15 - Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Baked Hardenable.
  4. C423-09a - Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
  5. E119-15 - Fire Tests of Building Construction and Materials.
- E. FM Global (FM):
  1. 1-28-15 - Wind Design.

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- 2. Factory Mutual Research Approval Guide.
- F. Master Painters Institute (MPI):
  - 1. No. 18 - Primer, Zinc Rich, Organic.
- G. Military Specifications (Mil. Spec.):
  - 1. MIL-P-21035B - Paint, High Zinc Dust Content, Galvanizing Repair.
- H. Steel Deck Institute (SDI):
  - 1. No. 31-07 - Design Manual for Composite Deck, Form Decks, and Roof Decks.
- I. UL LLC (UL):
  - 1. Listed - Online Certifications Directory.
  - 2. 580-13 - Tests for Uplift Resistance of Roof Assemblies.

**1.4 SUBMITTALS**

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submittal Drawings:
  - 1. Show layout, connections to supporting members, anchorage, sump pans, accessories, deck openings and reinforcements.
  - 2. Show similar information necessary for completing installation as shown and specified, including supplementary framing, ridge and valley plates, cant strips, cut openings, special jointing or other accessories.
  - 3. Show welding, side lap, closure, deck reinforcing and closure reinforcing details.
  - 4. Show openings required for work of other trades, including openings not shown on structural drawings. Indicate where temporary shoring is required to satisfy design criteria.
- C. Manufacturer's Literature and Data:
  - 1. Description of each product.
  - 2. Show steel decking section properties and structural characteristics.
- D. Sustainable Construction Submittals:
  - 1. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.
- E. Certificates: Certify each product complies with specifications.
  - 1. Fire Resistance Product Listing: For each metal deck type and thickness supporting concrete slab or fill.



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- F. Qualifications: Substantiate qualifications comply with specifications.
  - 1. Welders and welding procedures.

**1.5 QUALITY ASSURANCE**

- A. Welders and Welding Procedures Qualifications: AWS D1.3/D1.3M.

**1.6 WARRANTY**

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

**PART 2 - PRODUCTS**

**2.1 SYSTEM PERFORMANCE**

- A. Design steel decking and accessories according to AISI S100.
  - 1. Wind Uplift Resistance and Corner Conditions:
    - a. Eave Overhang: 2.1 kPa (45 psf), minimum.
    - b. Other Roof Areas: 1.4 kPa (30 psf), minimum.
  - 2. Wind Uplift Resistance and Corner Conditions: UL 580, Class 90.
  - 3. Wind Uplift Resistance and Corner Conditions: FM 1-28; Class 1-90.
  - 4. Fire Resistance: ASTM E119; as component of 1 hour rated roof assembly.
  - 5. Noise Reduction Coefficient (NRC): Minimum 0.90 when tested according to ASTM C423.
  - 6. Design side and end closures and attachment to supporting steel to safely support wet weight of concrete and construction loads.
    - a. Cantilever Closure Deflection: 3 mm (1/8 inch), maximum.

**2.2 MATERIALS**

- A. Galvanized Steel Sheet: ASTM A653/A653M; G90 coating.
- B. Painted Steel Sheet: ASTM A1008/A1008M, Grade C or D, shop primed.
- C. Primer for Shop Painted Sheets: Manufacturer's standard primer (2 coats). When finish painting of steel decking is specified in Section 09 91 00, PAINTING primer coating shall be compatible with specified finish painting.
- D. Steel Shapes: ASTM A36/A36M.

**2.3 PRODUCTS - GENERAL**

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Sustainable Construction Requirements:
  - 1. Steel Recycled Content: 30 percent total recycled content, minimum.

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**2.4 METAL ROOF DECK**

- A. Metal Roof Deck: UL Listed as metal roof deck panels.
  - 1. Steel decking of the type, depth, thickness, and section properties as shown.
- B. Metal Form Deck - Type 1: Single pan fluted units as permanent form for reinforced concrete slabs.
  - 1. Depth and Thickness: As indicated on drawings.
  - 2. Material: Painted sheet steel.
- C. Metal Form Deck - Type 2: Corrugated deck units as permanent form for reinforced concrete slabs.
  - 1. Depth and Thickness: As indicated on drawings.
  - 2. Material: Painted sheet steel.
- D. Metal Roof Deck: Single pan fluted units with flat horizontal top surfaces as permanent support for superimposed loads.
  - 1. Deck Style:
    - a. Wide Rib (Type B) deck.
  - 2. Depth and Thickness: As indicated on drawings.
  - 3. Material: Galvanized sheet steel.
- E. Acoustic Metal Roof Deck Units: Single-pan fluted units with perforated vertical webs.
  - 1. Depth and Thickness: As indicated on drawings.
  - 2. Material: Galvanized sheet steel.
  - 3. Provide acoustical insulation to fill roof deck flutes.
- F. Do not use steel deck for hanging supports of building components including suspended ceilings, electrical light fixtures, plumbing, heating, or air conditioning pipes or ducts or electrical conduits.
- G. Include integral system for steel decking units used for interstitial levels.
  - 1. Provide system suitable for simple point of attachment for light duty hanger devices.
  - 2. Provide system suitable to allow for flexibility for attaching hangers for support of suspended ceilings, electrical, plumbing, heating, or air conditioning items, weight not to exceed 50 kg/m<sup>2</sup> (10 psf).
  - 3. Provide a minimum spacing pattern of 300 mm (12 inches) on centers longitudinally and 600 mm (24 inches) on centers transversely.
  - 4. Maximum allowable load suspended from any hanger: 23 kg (50 pounds).

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5. System consisting of fold-down type hanger tabs or lip hanger is acceptable.

**2.5 FABRICATION**

- A. Fabricate steel decking in sufficient lengths to extend over 3 or more supports, except for interstitial levels.
  1. Cut metal deck units to proper length in shop.
- B. Fabricate accessories required to complete installation of steel decking.
  1. Exposed to View: Fabricate from sheet steel matching metal decking.
  2. Concealed from View: Fabricate from galvanized sheet steel.
- C. Sheet Metal Accessories:
  1. Metal Cover Plates: For end-abutting decking, to close gaps at changes in deck direction, columns, walls and openings.
    - a. Sheet Steel: Minimum 1.0 mm (0.04 inch) thick.
  2. Continuous Sheet Metal Edging: At openings, concrete slab edges and roof deck edges.
    - a. Sheet Steel: Minimum 1.0 mm (0.04 inch) thick.
  3. Metal Closure Strips: For openings between decking and other construction. Form to configurations required to provide tight-fitting closures at open ends of flutes and sides of decking.
    - a. Sheet Steel: Minimum 1.0 mm (0.04 inch) thick.
  4. Ridge and Valley Plates: Minimum 100 mm (4 inch) wide ridge and valley plates where roof slope exceeds 1/24 (1/2 inch per foot).
    - a. Sheet Steel: Minimum 1.0 mm (0.04 inch) thick.
  5. Cant Strips: Provide bent metal 45 degree leg cant strips where indicated on the drawings. Fabricate cant strips with minimum 125 mm (5 inch) face width.
    - a. Sheet Steel: Minimum 0.8 mm (0.03 inch) thick.
  6. Seat Angles for Deck: Provide where beam does not frame into column.
  7. Sump Pans for Roof Drains: Fabricated from single piece galvanized sheet steel with level bottoms and sloping sides to direct water flow to drain. Provide sump pans of adequate size to receive roof drains and with bearing flanges minimum 75 mm (3 inches) wide. Recess pans minimum 38 mm (1-1/2 inches) below roof deck surface, unless otherwise shown or required by deck configuration. Drain holes will be field cut.

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- a. Sheet Steel: Minimum 1.7 mm (0.06 inch) thick.

**2.6 FINISHES**

- A. Shop prime painted sheet steel with two coats of primer.

**2.7 ACCESSORIES**

- A. Primer: Manufacturer's standard primer compatible with finish painting specified in Section 09 91 00, PAINTING.
- B. Welding Materials: AWS D1.1, type to suit application.
- C. Galvanizing Repair Paint: MPI No. 18.
- D. Touch-Up Paint: Match shop finish.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.
- C. Remove contaminates from structural steel surfaces where steel decking will be welded.
- D. Verify structural steel framing installation is completed, plumbed, and aligned with temporary bracing installed where required.
- E. Coordinate with structural steel erector to prevent overloading of structural members when placing steel decking for installation.

**3.2 ERECTION**

- A. Do not use floor deck units for storage or working platforms until permanently secured. Do not overload deck units once placed. Replace deck units that become damaged after erection and before casting concrete at no cost additional to the Government.
- B. Place steel decking at right angles to supporting members with ends located over supports.
- C. Lap end joints 50 mm (2 inches), minimum.
- D. Fluted Form Deck Fastening:
  - 1. Fasten form deck to steel supporting members by welding.
    - a. Welds: 16 mm (5/8 inch) diameter puddle welds or elongated welds of equal strength.
    - b. Weld Spacing: Maximum 300 mm (12 inches) on center with minimum two welds per unit at each support.

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- c. Where two units abut, fasten each unit individually to supporting steel framework.
  - 2. End Closure Fastening: Tack weld or self-tapping No. 8 or larger machine screws at 900 mm (3 feet) on center.
    - a. Longitudinal End Closure Fastening: Tack weld only.
  - 3. Weld side laps of adjacent decking units.
    - a. Fastener Locations: Mid-span and maximum 900 mm (3 feet) on center.
- E. Corrugated Form Deck Fastening:
  - 1. Weld end laps of corrugated form deck units in valley of side lap and at middle of sheet.
    - a. Weld Spacing: Maximum 380 mm (15 inches) on center.
  - 2. Weld corrugated deck to intermediate supports in X-pattern. Weld in valley of side laps on every other support and in valley of center corrugation on remaining support.
    - a. Weld Spacing: Maximum 760 mm (30 inches) on center.
- F. Roof Deck Fastening:
  - 1. Fasten decking to steel supporting members by welding.
    - a. Welds: 16 mm (5/8 inch) diameter puddle welds or elongated welds of equal strength.
    - b. Weld Spacing: Maximum 300 mm (12 inches) on center at every support. Use closer spacing where required for lateral force resistance by diaphragm action.
  - 2. Fasten split or partial decking panels to structure in every valley.
  - 3. Fasten decking to each supporting member at ribs where side laps occur.
    - a. Power driven fasteners are acceptable in lieu of welding if strength equivalent to welding specified above is provided. Submit test data and design calculations verifying equivalent design strength.
  - 4. Mechanically fasten decking side laps with self-tapping No. 8 or larger machine screws.
    - a. Fastener Locations: Mid-span and maximum 900 mm (3 feet) on center.
  - 5. Provide additional fastening necessary to comply with UL Listing for specified performance.
- G. Cutting and Fitting:

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1. Field cut steel decking to accommodate columns and other penetrating items.
  2. Cut openings located and dimensioned on Structural Drawings.
  3. Coordinate openings for other penetrations shown on approved submittal drawings but not shown on Structural Drawings.
    - a. Cut and reinforce required opening.
  4. Make cuts neat and trim using metal saw, drill or punch-out device. Cutting with torches is prohibited.
  5. Do not make cuts in the metal deck that are not shown on the approved metal decking submittal drawings.
    - a. When additional openings are required, submit scaled drawing, locating required opening and other openings and supports in immediate area.
    - b. Do not cut the opening until drawing is approved by Contracting Officer's Representative.
    - c. Provide additional reinforcing and framing required for opening.
    - d. Failure to comply with these requirements is cause for rejection of the work and removal and replacement of the affected steel decking.
  6. Opening Reinforcement: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking, and support of other work.
- H. Touch up damaged factory finishes.
1. Apply galvanizing repair paint to damaged galvanized surfaces.
  2. Apply touch up paint to damaged shop painted surfaces.

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**SECTION 05 40 00**  
**COLD-FORMED METAL FRAMING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

A. This section specifies materials and services required for installation of cold-formed steel, including tracks and required accessories as shown and specified. This Section includes the following:

1. Exterior load-bearing steel stud walls.
2. Interior load-bearing steel stud walls.
3. Exterior non-load-bearing steel stud curtain wall.
4. Steel joists.
5. Steel trusses.

**1.2 RELATED WORK:**

- A. Structural steel framing: Section 05 12 00, STRUCTURAL STEEL FRAMING.
- B. Open web steel joists: Section 05 21 00, STEEL JOIST FRAMING.
- C. Non-load-bearing metal stud framing assemblies: Section 09 22 16, NON-STRUCTURAL METAL FRAMING.
- D. Gypsum board assemblies: Section 09 29 00, GYPSUM BOARD.

**1.3 DESIGN REQUIREMENTS:**

- A. Design steel in accordance with American Iron and Steel Institute Publication "Specification for the Design of Cold-Formed Steel Structural Members", except as otherwise shown or specified.
- B. Structural Performance: Engineer, fabricate and erect cold-formed metal framing with the minimum physical and structural properties indicated.
- C. Structural Performance: Engineer, fabricate, and erect cold-formed metal framing to withstand design loads within limits and under conditions required.
  1. Design Loads: As indicated.
  2. Design framing systems to withstand design loads without deflections greater than the following:

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- a. Exterior Load-Bearing Walls: Lateral deflection of  $1/360$  of the wall height.
  - b. Interior Load-Bearing Walls: Lateral deflection of  $1/360$  of wall height.
  - c. Exterior Non-load-Bearing Curtain wall: Lateral deflection of  $1/360$  of the wall height.
  - d. Floor Joists: Vertical deflection of  $1/360$  of the span.
  - e. Roof Trusses: Vertical deflection of  $1/240$  of the span.
3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change (range) of 67 degrees C (120 degrees F).
  4. Design framing system to accommodate deflection of primary building structure and construction tolerances, and to maintain clearances at openings.
  5. Design exterior non-load-bearing curtain wall framing to accommodate lateral deflection without regard to contribution of sheathing materials.
  6. Engineering Responsibility: Engage a fabricator who assumes undivided responsibility for engineering cold-formed metal framing by employing a qualified professional engineer to prepare design calculations, shop drawings, and other structural data.

**1.4 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: Shop and erection drawings showing steel unit layout, connections to supporting members, and information necessary to complete installation as shown and specified.
- C. Manufacturer's Literature and Data: Showing steel component sections and specifying structural characteristics.



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- D. For cold-formed metal framing indicated to comply with certain design loadings, include structural analysis data sealed and signed by the qualified professional engineer who was responsible for its preparation.

**1.5 APPLICABLE PUBLICATIONS:**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

- B. American Iron and Steel Institute (AISI):

Specification and Commentary for the Design of Cold-Formed Steel Structural Members (1996)

- C. American Society of Testing and Materials (ASTM):

A36/A36M-08.....Standard Specifications for Carbon Structural Steel

A123/A123M-09.....Standard Specifications for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

A153/A153M-09.....Standard Specifications for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

A307-10.....Standard Specifications for Carbon Steel Bolts and Studs

A653/A653M-10.....Standard Specifications for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

C1107/C1107M-08.....Standard Specifications for Packaged Dry, Hydraulic-Cement Grout (Non-shrink)

E488-96 (R2003).....Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements

E1190-95 (R2007).....Standard Test Methods for Strength of Power-Actuated Fasteners Installed in Structural Members

- D. American Welding Society (AWS):

D1.3/D1.3M-08.....Structural Welding Code-Sheet Steel

Construction Documents

E. Military Specifications (Mil. Spec.):

MIL-P-21035B.....Paint, High Zinc Dust Content, Galvanizing  
Repair

**PART 2 - PRODUCTS**

**2.1 MATERIALS:**

- A. Sheet Steel for joists, studs and accessories 16 gage and heavier: ASTM A653, structural steel, zinc coated G60, with a yield of 340 MPa (50 ksi) minimum.
- B. Sheet Steel for joists, studs and accessories 18 gage and lighter: ASTM A653, structural steel, zinc coated G60, with a yield of 230 MPa (33 ksi) minimum.
- C. Galvanizing Repair Paint: MIL-P-21035B.
- D. Nonmetallic, Non-shrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, Portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C1107, with fluid consistency and a 30 minute working time.

**2.2 WALL FRAMING:**

- A. Steel Studs: Manufacturer's standard C-shaped steel studs of web depth indicated, with lipped flanges, and complying with the following minimum:
  - 1. Design Uncoated-Steel Thickness:  
0.91 mm (0.0358 inch)
  - 2. Flange Width:  
1-3/8 inches
  - 3. Web: Punched.
- B. Steel Track: Manufacturer's standard U-shaped steel track, unpunched, of web depths indicated, with straight flanges, and complying with the following minimum:
  - 1. Design Uncoated-Steel Thickness: Matching steel studs.
  - 2. Flange Width: Manufacturer's standard deep flange where indicated, standard flange elsewhere.

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Construction Documents

**2.3 JOIST FRAMING:**

- A. Steel Joists: Manufacturer's standard C-shaped steel joists, unpunched, of web depths indicated, with lipped flanges, and complying with the following:
  - 1. Design Uncoated-Steel Thickness: 0.91 mm (0.0358 inch).
  - 2. Flange Width: 41 mm (1 5/8 inches) minimum.
- B. Steel Joist Track: Manufacturer's standard U-shaped steel joist track, unpunched, of web depths indicated, with straight flanges, and complying with the following:
  - 1. Design Uncoated-Steel Thickness: Matching steel joists.
  - 2. Flange Width: 41 mm (1 5/8-inches) minimum.

**2.4 FRAMING ACCESSORIES:**

- A. Fabricate steel framing accessories of the same material and finish used for framing members, with a minimum yield strength of 230 MPa (33 ksi).
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
  - 1. Supplementary framing.
  - 2. Bracing, bridging, and solid blocking.
  - 3. Web stiffeners.
  - 4. Gusset plates.
  - 5. Deflection track and vertical slide clips.
  - 6. Stud kickers and girts.
  - 7. Joist hangers and end closures.
  - 8. Reinforcement plates.

**2.5 ANCHORS, CLIPS, AND FASTENERS:**

- A. Steel Shapes and Clips: ASTM A36, zinc coated by the hot-dip process according to ASTM A123.
- B. Cast-in-Place Anchor Bolts and Studs: ASTM A307, Grade A, zinc coated by the hot-dip process according to ASTM A153.

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Construction Documents

- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times the design load, as determined by testing per ASTM E488 conducted by a qualified independent testing agency.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times the design load, as determined by testing per ASTM E1190 conducted by a qualified independent testing agency.
- E. Mechanical Fasteners: Corrosion-resistant coated, self-drilling, self-threading steel drill screws. Low-profile head beneath sheathing, manufacturer's standard elsewhere.

**2.6 REQUIREMENTS:**

- A. Welding in accordance with AWS D1.3
- B. Furnish members and accessories by one manufacturer only.

**PART 3 - EXECUTION**

**3.1 FABRICATION:**

- A. Framing components shall be preassembled into panels. Panels shall be square with components attached.
- B. Cut framing components squarely or as required for attachment. Cut framing members by sawing or shearing; do not torch cut.
- C. Hold members in place until fastened.
- D. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
  - 1. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
  - 2. Locate mechanical fasteners and install according to cold-formed metal framing manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.
- E. Where required, provide specified insulation in double header members and double jamb studs which shall not be accessible after erection.

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Construction Documents

**3.2 ERECTION:**

- A. Handle and lift prefabricated panels in a manner as to not distort any member.
- B. Securely anchor tracks to supports as shown.
- C. At butt joints, securely anchor two pieces of track to same supporting member or butt-weld or splice together.
- D. Plumb, align, and securely attach studs to flanges or webs of both upper and lower tracks.
- E. All axially loaded members shall be aligned vertically to allow for full transfer of the loads down to the foundation. Vertical alignment shall be maintained at floor/wall intersections.
- F. Install jack studs above and below openings and as required to furnish support. Securely attach jack studs to supporting members.
- G. Install headers in all openings that are larger than the stud spacing in that wall.
- H. Attach bridging for studs in a manner to prevent stud rotation. Space bridging rows as shown.
- I. Studs in one piece for their entire length, splices shall not be permitted.
- J. Provide a load distribution member at top track where joist is not located directly over bearing stud.
- K. Provide joist bridging and web stiffeners at reaction points where shown.
- L. Provide end blocking where joist ends are not restrained from rotation.
- M. Provide an additional joist under parallel partitions, unless otherwise shown, when partition length exceeds one-half joist span and when floor and roof openings interrupt one or more spanning members.
- N. Provide temporary bracing and leave in place until framing is permanently stabilized.
- O. Do not bridge building expansion joints with cold-formed metal framing. Independently frame both sides of joints.

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Construction Documents

- P. Fasten reinforcement plate over web penetrations that exceed size of manufacturer's standard punched openings.

**3.3 TOLERANCES:**

- A. Vertical alignment (plumbness) of studs shall be within 1/960th of the span.
- B. Horizontal alignment (levelness) of walls shall be within 1/960th of their respective lengths.
- C. Spacing of studs shall not be more than 3 mm (1/8 inch) +/- from the designed spacing providing that the cumulative error does not exceed the requirements of the finishing materials.
- D. Prefabricated panels shall be not more than 3 mm (1/8 inch) +/- out of square within the length of that panel.

**3.4 FIELD REPAIR:**

- A. Touch-up damaged galvanizing with galvanizing repair paint.

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Construction Documents

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Steel framing and supports for operable partitions.
2. Steel tube reinforcement for low partitions.
3. Steel framing and supports for mechanical and electrical equipment.
4. Steel framing and supports for applications where framing and supports are not specified in other Sections.
5. Shelf angles.
6. Metal ladders.
7. Metal bollards.
8. Metal downspout boots.
9. Loose bearing and leveling plates for applications where they are not specified in other Sections.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

C. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Section 042000 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
3. Section 051200 "Structural Steel Framing."

Construction Documents

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Nonslip aggregates and nonslip-aggregate surface finishes.
  - 2. Prefabricated building columns.
  - 3. Paint products.
  - 4. Grout.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
  - 1. Steel framing and supports for operable partitions.
  - 2. Steel tube reinforcement for low partitions.
  - 3. Steel framing and supports for mechanical and electrical equipment.
  - 4. Steel framing and supports for applications where framing and supports are not specified in other Sections.
  - 5. Shelf angles.
  - 6. Metal ladders.
  - 7. Metal bollards.
  - 8. Metal downspout boots.
  - 9. Loose steel lintels.
- A. Delegated-Design Submittal: For ladders, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer.
- B. Mill Certificates: Signed by stainless-steel manufacturers, certifying that products furnished comply with requirements.
- C. Welding certificates.



Construction Documents

- D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- E. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
  - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
  - 3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design ladders.
- B. Structural Performance of Aluminum Ladders: Aluminum ladders shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304.
- D. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.

Construction Documents

- E. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
- F. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.
- G. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
  - 1. Size of Channels: 1-5/8 by 1-5/8 inches, unless otherwise indicated.
  - 2. Material: Galvanized steel, ASTM A 653/A 653M, structural steel, Grade 33, with G90 coating; 0.108-inch nominal thickness.
- H. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.
- I. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.
- J. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.
- K. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
  - 1. Provide stainless-steel fasteners for fastening aluminum.
  - 2. Provide stainless-steel fasteners for fastening stainless steel.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy Group 1.
- D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
  - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- E. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- F. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
  - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

Construction Documents

2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

- G. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting."
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
  1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- D. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- E. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- G. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- H. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

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Construction Documents

- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
  - 1. Fabricate units from slotted channel framing where indicated.
  - 2. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.
- D. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

Construction Documents

2.7 SHELF ANGLES

- A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.
  - 1. Provide mitered and welded units at corners.
  - 2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches larger than expansion or control joint.
- B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
- C. Galvanize shelf angles located in exterior walls.
- D. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.8 METAL LADDERS

- A. General:
  - 1. Comply with ANSI A14.3.
- B. Aluminum Ladders:
  - 1. Basis-of-Design: Subject to compliance with requirements, provide product indicated below or a comparable product as approved by the Architect:
    - a. ALACO Fixed Wall Ladder Model 560.
  - 2. Space siderails 20-1/4 inches apart.
  - 3. Siderails: Continuous extruded-aluminum channels or tubes, not less than 2-1/2 inches deep, 3/4 inch wide, and 1/8 inch thick.
  - 4. Rungs: Extruded-aluminum tubes, not less than 3/4 inch deep and not less than 1/8 inch thick, with ribbed tread surfaces.
  - 5. Fit rungs in centerline of siderails; fasten by welding or with stainless-steel fasteners or brackets and aluminum rivets.
  - 6. Support each ladder at top and bottom and not more than 72 inches o.c. with welded or bolted aluminum brackets.
  - 7. Provide minimum 72-inch-high, hinged security door with padlock hasp at foot of ladder to prevent unauthorized ladder use.

2.9 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

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Construction Documents

- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
  - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Galvanize miscellaneous steel trim.

2.10 METAL BOLLARDS

- A. Fabricate metal bollards from Schedule 40 steel pipe.
  - 1. Cap bollards with 1/4-inch-thick steel plate.
  - 2. Where bollards are indicated to receive controls for door operators, provide cutouts for controls and holes for wire.
  - 3. Where bollards are indicated to receive light fixtures, provide cutouts for fixtures and holes for wire.
- B. Fabricate bollards with 3/8-inch-thick steel baseplates for bolting to concrete slab. Drill baseplates at all four corners for 3/4-inch anchor bolts.
  - 1. Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.
- C. Fabricate sleeves for bollard anchorage from steel pipe or tubing with 1/4-inch-thick steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches deep and 3/4 inch larger than OD of bollard.
- D. Fabricate internal sleeves for removable bollards from Schedule 40 steel pipe or 1/4-inch wall-thickness steel tubing with an OD approximately 1/16 inch less than ID of bollards. Match drill sleeve and bollard for 3/4-inch steel machine bolt.
- E. Prime bollards with zinc-rich primer.

2.11 METAL DOWNSPOUT BOOTS

- A. Provide downspout boots made from cast iron in heights indicated with inlets of size and shape to suit downspouts. Provide units with flanges and holes for countersunk anchor bolts.
- B. Prime cast-iron downspout boots with zinc-rich primer.

2.12 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates.

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Construction Documents

2.13 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches unless otherwise indicated.
- C. Galvanize loose steel lintels located in exterior walls.

2.14 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.15 FINISHES, GENERAL

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.16 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
  - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
  - 1. Shop prime with universal shop primer unless primers specified in Section 099600 "High-Performance Coatings" are indicated.
- D. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

Construction Documents

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.17 ALUMINUM FINISHES

- A. As-Fabricated Finish: AA-M12.
- B. Clear Anodic Finish: AAMA 611, Class I, AA-M12C22A41.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
  1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  2. Obtain fusion without undercut or overlap.
  3. Remove welding flux immediately.
  4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
  1. Cast Aluminum: Heavy coat of bituminous paint.
  2. Extruded Aluminum: Two coats of clear lacquer.



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Construction Documents

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions securely to, and rigidly brace from, building structure.

3.3 INSTALLING METAL BOLLARDS

- A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.
  - 1. Do not fill removable bollards with concrete.
- B. Anchor bollards to existing construction with expansion anchors, anchor bolts, or through bolts. Provide four 3/4-inch bolts at each bollard unless otherwise indicated.
  - 1. Embed anchor bolts at least 4 inches in concrete.
- C. Anchor bollards in concrete with pipe sleeves preset and anchored into concrete or in formed or core-drilled holes not less than 8 inches deep and 3/4 inch larger than OD of bollard. Fill annular space around bollard solidly with nonshrink grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward bollard.
- D. Anchor bollards located in landscaping or unit pavers in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- E. Place removable bollards over internal sleeves and secure with 3/4-inch machine bolts and nuts. After tightening nuts, drill holes in bolts for inserting padlocks. Owner furnishes padlocks.

3.4 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.5 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

Construction Documents

1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055000

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Construction Documents

SECTION 055800 – FORMED STAINLESS STEEL KITCHEN WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes formed stainless steel wall panels at kitchen and food prep areas.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product, including finishing materials.
- B. Shop Drawings: Show fabrication and installation details for stainless steel kitchen wall panels.
- C. Samples: For each type of exposed finish required, prepared on 6-inch-square Samples of metal of same thickness and material indicated for the Work.

PART 2 - PRODUCTS

2.1 FORMED STAINLESS STEEL KITCHEN WALL PANELS

- A. Performance Requirements: Comply with ASTM A480 Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.
  - 1. Provide antimicrobial wall covering which has been manufactured and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.
- B. Stainless Steel Wall Covering:
  - 1. Basis-of-Design: Subject to compliance with requirements, provide product indicated on the Finish Schedule, or a comparable product as approved by the Architect.
    - a. Provide matching trim moldings and custom angles as selected by the Architect from the manufacturer's full range.
  - 2. Material: Type 304 stainless steel sheet. Consult manufacturer for recommended gauge.
  - 3. Sizes and Configurations: As indicated on the Drawings.
  - 4. Finish: No. 4 Brushed Finish.

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5. Accessories: Provide Type 304 stainless steel inside corners, outside corners, edge bars, and top caps as required.
  - a. Finish to match adjacent panels.
6. Mounting Method: Adhesive or mechanical fasteners as selected by the Architect.
  - a. Adhesive: As recommended by the manufacturer.
  - b. Mechanical Fasteners: Stainless steel.
    - 1) Drilling requirements as recommend by the manufacturer.
    - 2) Fasteners as selected by the Architect.

2.2 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's product data and written installation instructions.

END OF SECTION 055800

Construction Documents

SECTION 057300 - DECORATIVE METAL RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Stainless-steel decorative railings for Café que railing.

1.3 DEFINITIONS

- A. Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor areas and for pedestrian guidance and support, visual separation, or wall protection.

1.4 COORDINATION AND SCHEDULING

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible.
- B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver items to Project site in time for installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Manufacturer's product lines of railings assembled from standard components.
- B. Shop Drawings: Include plans, elevations, sections, and attachment details.
- C. Samples for Initial Selection: For products involving selection of color, texture, or design, including mechanical finishes.

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- D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer and testing agency.
- B. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.
- D. Preconstruction test reports.
- E. Evaluation Reports: For post-installed anchors, from ICC-ES.

1.7 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
  - 1. Build mockups for each form and finish of railing consisting of two posts, top rail, infill area, and anchorage system components that are full height and are not less than 24 inches in length.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Stainless-Steel Decorative Railings:
  - 1. Basis-of-Design: Subject to compliance with requirements, provide product indicated below or a comparable product as approved by the Architect:
    - a. Product: Alvarado; Vogue Post Modular Post and Rail.

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- b. Style: 35" Double Rail.
- c. Finish: Stainless steel satin.
- d. Attachment: Reo Anchoring Package.

B. Source Limitations: Obtain each type of railing from single source from single manufacturer.

C. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods, including structural analysis, preconstruction testing, field testing, and in-service performance.

- 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

## 2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design railings, including attachment to building construction.

B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

- 1. Stainless Steel: 60 percent of minimum yield strength.

C. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

- 1. Handrails and Top Rails of Guards:
  - a. Uniform load of 50 lbf/ft. applied in any direction.
  - b. Concentrated load of 200 lbf applied in any direction.
  - c. Uniform and concentrated loads need not be assumed to act concurrently.
- 2. Infill of Guards:
  - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
  - b. Infill load and other loads need not be assumed to act concurrently.

## 2.3 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

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- B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.

2.4 STAINLESS STEEL

- A. Tubing: ASTM A 554, Grade MT 304.
- B. Pipe: ASTM A 312/A 312M, Grade TP 304.
- C. Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20.
- D. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304.
- E. Bars and Shapes: ASTM A 276, Type 304.

2.5 FASTENERS

- A. Fastener Materials: Unless otherwise indicated, provide the following:
  - 1. Stainless-Steel Components: Type 304 stainless-steel fasteners.
  - 2. Dissimilar Metals: Type 304 stainless-steel fasteners.
- B. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work unless otherwise indicated.
- D. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or ICC-ES AC308.
  - 1. Material for Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.6 MISCELLANEOUS MATERIALS

2.7 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly



## Construction Documents

mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

- C. Make up wire-rope assemblies in the shop to field-measured dimensions with fittings machine swaged. Minimize amount of turnbuckle take-up used for dimensional adjustment so maximum amount is available for tensioning wire ropes. Tag wire-rope assemblies and fittings to identify installation locations and orientations for coordinated installation.
- D. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- E. Form work true to line and level with accurate angles and surfaces.
- F. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.
- G. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- H. Connections: Fabricate railings with nonwelded connections unless otherwise indicated.
- I. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
  - 1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.
- J. Form changes in direction as follows:
  - 1. As detailed.
  - 2. By bending or by inserting prefabricated elbow fittings.
- K. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- L. Close exposed ends of hollow railing members with prefabricated end fittings.
- M. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- N. For removable railing posts, fabricate slip-fit sockets from stainless-steel tube or pipe whose ID is sized for a close fit with posts; limit movement of post without lateral load, measured at top, to not more than one-fortieth of post height. Provide socket covers designed and fabricated to resist being dislodged.
  - 1. Provide chain with eye, snap hook, and staple across gaps formed by removable railing sections at locations indicated. Fabricate from same metal as railings.

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2.8 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.9 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
  - 1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
  - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
  - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

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- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.
- B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.4 ANCHORING POSTS

- A. Anchor posts to metal surfaces with flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
  - 1. For stainless-steel railings, weld flanges to posts and bolt to metal-supporting surfaces.
- B. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and to prepare test reports. Payment for these services will be made by Owner.
- B. Extent and Testing Methodology: Testing agency will randomly select completed railing assemblies for testing that are representative of different railing designs and conditions in the completed Work. Test railings according to ASTM E 894 and ASTM E 935 for compliance with performance requirements.
- C. Remove and replace railings where test results indicate that they do not comply with specified requirements unless they can be repaired in a manner satisfactory to Architect and comply with specified requirements.
- D. Perform additional testing and inspecting, at Contractor's expense, to determine compliance of replaced or additional work with specified requirements.

Construction Documents

3.6 CLEANING

- A. Clean stainless steel by washing thoroughly with clean water and soap, rinsing with clean water, and wiping dry.

3.7 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 057300

Construction Documents

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Rooftop equipment bases and support curbs.
3. Wood blocking, cants, and nailers.
4. Wood furring and grounds.
5. Utility shelving.
6. Plywood backing panels.

B. Related Requirements:

1. Section 061600 "Sheathing" for sheathing, subflooring, and underlayment.

1.3 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.

- B. Dimension Lumber: Lumber of 2 inches nominal or greater size but less than 5 inches nominal size in least dimension.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.

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2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.5 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:

1. Preservative-treated wood.
2. Fire-retardant-treated wood.
3. Power-driven fasteners.
4. Post-installed anchors.
5. Metal framing anchors.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.

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2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
  3. Dress lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
  2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.
- D. Application: Treat items indicated on Drawings, and the following:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  2. Wood sills, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
  3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
  4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
  5. Wood floor plates that are installed over concrete slabs-on-grade.

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Construction Documents

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
  
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
  - 1. Treatment shall not promote corrosion of metal fasteners.
  - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
  - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
  - 4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664, and design value adjustment factors shall be calculated according to ASTM D 6841. For enclosed roof framing, framing in attic spaces, and where high-temperature fire-retardant treatment is indicated, provide material with adjustment factors of not less than 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.
  
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
  
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
  - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.
  
- E. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.
  
- F. Application: Treat items indicated on Drawings, and the following:
  - 1. Framing for raised platforms.
  - 2. Concealed blocking.
  - 3. Roof framing and blocking.



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4. Wood cants, nailers, curbs, equipment support bases, blocking, and similar members in connection with roofing.
5. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

- A. Non-Load-Bearing Interior Partitions: Construction or No. 2 grade of any of the following species:

1. Hem-fir (north); NLGA.
2. Mixed southern pine or southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.
5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

- B. Other Framing: Construction or No. 2 grade of any of the following species:

1. Hem-fir (north); NLGA.
2. Douglas fir-larch; WCLIB or WWPA.
3. Southern pine or mixed southern pine; SPIB.
4. Spruce-pine-fir; NLGA.
5. Douglas fir-south; WWPA.
6. Hem-fir; WCLIB or WWPA.
7. Douglas fir-larch (north); NLGA.
8. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

2.5 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.
6. Grounds.
7. Utility shelving.

- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:

1. Hem-fir (north); NLGA.
2. Mixed southern pine or southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.

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5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
  6. Northern species; NLGA.
- C. Utility Shelving: Lumber with 15 percent maximum moisture content of any of the following species and grades:
1. Eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; Premium or No. 2 Common (Sterling) grade; NeLMA, NLGA, WCLIB, or WWPA.
  2. Mixed southern pine or southern pine No. 1 grade; SPIB.
  3. Hem-fir or hem-fir (north), Select Merchantable or No. 1 Common grade; NLGA, WCLIB, or WWPA.
  4. Spruce-pine-fir (south) or spruce-pine-fir, Select Merchantable or No. 1 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
- D. Concealed Boards: 15 percent maximum moisture content of any of the following species and grades:
1. Mixed southern pine or southern pine, No. 2 grade; SPIB.
  2. Hem-fir or hem-fir (north), Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
  3. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
- E. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- F. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- G. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.6 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

2.7 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or of Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F 1667.

Construction Documents

- C. Screws for Fastening to Metal Framing: ASTM C 1002, length as recommended by screw manufacturer for material being fastened.
- D. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC58, ICC-ES AC193, or ICC-ES AC308 as appropriate for the substrate.
  - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
  - 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.8 METAL FRAMING ANCHORS

- A. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.
  - 1. Use for interior locations unless otherwise indicated.
- B. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.
  - 1. Use for wood-preserved-treated lumber and where indicated.
- C. Stainless-Steel Sheet: ASTM A 666, Type 304.
  - 1. Use for exterior locations and where indicated.

2.9 MISCELLANEOUS MATERIALS

- A. Adhesives for Gluing Furring to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
- B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

Construction Documents

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- E. Do not splice structural members between supports unless otherwise indicated.
- F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
  - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
  - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
  - 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.
  - 3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
  - 4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.
- H. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

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**Construction Documents**

- I. Comply with AWPAC M4 for applying field treatment to cut surfaces of preservative-treated lumber.
  - 1. Use inorganic boron for items that are continuously protected from liquid water.
  - 2. Use copper naphthenate for items not continuously protected from liquid water.
- J. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- K. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
  - 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
  - 3. ICC-ES evaluation report for fastener.
- L. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

**3.2 WOOD BLOCKING AND NAILER INSTALLATION**

- A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
- C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

**3.3 WOOD FURRING INSTALLATION**

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
- B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal-size furring horizontally and vertically at 24 inches o.c.
- C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal-size furring vertically at 16 inches o.c.

Construction Documents

3.4 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
  
- B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061053

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Construction Documents

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Wall sheathing.
2. Parapet sheathing.
3. Composite nail base insulated roof sheathing.
4. Sheathing joint and penetration treatment.

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for plywood backing panels.
2. Section 072500 "Weather Barriers" for water-resistive barrier applied over wall sheathing.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:

Construction Documents

1. Wood-preservative-treated plywood.
2. Fire-retardant-treated plywood.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 WOOD PANEL PRODUCTS

- A. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- B. Factory mark panels to indicate compliance with applicable standard.

2.3 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
  1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.



Construction Documents

- C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.4 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
  - 1. Use treatment that does not promote corrosion of metal fasteners.
  - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
  - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201/D 3201M at 92 percent relative humidity. Use where exterior type is not indicated.
  - 4. Design Value Adjustment Factors: Treated lumber plywood shall be tested according to ASTM D 5516 and design value adjustment factors shall be calculated according to ASTM D 6305. Span ratings after treatment shall be not less than span ratings specified. For roof sheathing and where high-temperature fire-retardant treatment is indicated, span ratings for temperatures up to 170 deg F shall be not less than span ratings specified.
- C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
- E. Application: Treat plywood indicated on Drawings, and the following:
  - 1. Roof and wall sheathing within 48 inches of fire and party walls.
  - 2. Roof sheathing.
  - 3. Subflooring and underlayment for raised platforms.

2.5 WALL SHEATHING

- A. Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M.
  - 1. Type: Regular, unless Type X is indicated.
  - 2. Thickness: 5/8-inch, unless otherwise indicated.

Construction Documents

2.6 PARAPET SHEATHING

- A. Plywood Sheathing: DOC PS 1, Exterior, Structural I sheathing.
  - 1. Span Rating: Not less than 16/0, unless otherwise required for structural performance`.
  - 2. Nominal Thickness: Not less than 15/32 inch, unless otherwise required for structural performance.
  
- B. Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M.
  - 1. Type: Regular, unless Type X is indicated.
  - 2. Thickness: 5/8-inch, unless otherwise indicated.

2.7 COMPOSITE NAIL BASE INSULATED ROOF SHEATHING

- A. Vented, Oriented-Strand-Board-Surfaced, Polyisocyanurate-Foam Sheathing: ASTM C 1289, Type II, Class 1, with DOC PS 2, Exposure 1 oriented strand board adhered to spacers on one face.
  - 1. Basis-of-Design: Subject to compliance with requirements, provide product indicated below by Atlas Roofing Corporation, or a comparable product as approved by the Architect:
    - a. Product: ACFoam Nail Base.
    - b. Style: Nailable Roof Insulation.
    - c. Polyisocyanurate-Foam Thickness: As required to meet R-25.
    - d. Fire-Treated CDX Plywood Nominal Thickness: 9/16 inch.
    - e. Overall Composite Thickness: As required to meet R-25. Provide multiple layers if necessary in thicknesses as approved by the Architect.
    - f. Long Term Thermal Resistance Value: R-25 minimum.

2.8 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. For roof, parapet, and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or of Type 304 stainless steel.
  
- B. Nails, Brads, and Staples: ASTM F 1667.
  
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
  
- D. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

Construction Documents

- E. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.
  - 1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C 1002.
  - 2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.

2.9 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

- A. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.
  - 1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
  - 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
  - 2. ICC-ES evaluation report for fastener.
- D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.
- E. Coordinate wall and parapet sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

Construction Documents

- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
  - 1. Parapet Sheathing:
    - a. Screw to cold-formed metal framing.
    - b. Space panels 1/8 inch apart at edges and ends.

3.3 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
  - 1. Fasten gypsum sheathing to wood framing with nails or screws.
  - 2. Fasten gypsum sheathing to cold-formed metal framing with screws.
  - 3. Install panels with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
  - 4. Install panels with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.
  - 1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.
  - 2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
- D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.
  - 1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.
  - 2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

Construction Documents

- E. Seal sheathing joints according to sheathing manufacturer's written instructions.
  - 1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
  - 2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

END OF SECTION 061600



Construction Documents

SECTION 062023 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Interior trim, including interior door frames.

B. Related Requirements:

- 1. Section 061053 "Miscellaneous Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view and for framing exposed to view.
- 2. Section 099123 "Interior Painting" for priming and backpriming of interior finish carpentry.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.

- 1. Include data for wood-preservative treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include chemical-treatment manufacturer's written instructions for finishing treated material.
- 2. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- 3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced before shipment to Project site to levels specified.

- B. Samples for Initial Selection: For each type of product involving selection of colors, profiles, or textures.

Construction Documents

C. Samples for Verification:

1. For each species and cut of lumber and panel products with nonfactory-applied finish, with half of exposed surface finished, 50 sq. in. for lumber and 8 by 10 inches for panels.
2. For each finish system and color of lumber and panel products with factory-applied finish, 50 sq. in. for lumber and 8 by 10 inches for panels.

1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For fire-retardant-treated wood, from ICC-ES.
- B. Sample Warranty: For manufacturer's warranty.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.
- B. Deliver interior finish carpentry materials only when environmental conditions comply with requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions comply with requirements specified for installation areas.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
  1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.



Construction Documents

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's Board of Review. Grade lumber by an agency certified by the American Lumber Standard Committee's Board of Review to inspect and grade lumber under the rules indicated.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by grading agency.
  
- B. MDF: ANSI A208.2, Grade 130.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWWPA U1; Use Category UC2.
  - 1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 18 percent, respectively.
  - 2. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
  - 3. For exposed items indicated to receive transparent finish, do not use chemical formulations that contain colorants or that bleed through or otherwise adversely affect finishes.
  - 4. Do not use material that is warped or does not comply with requirements for untreated material.
  - 5. Mark lumber with treatment-quality mark of an inspection agency approved by the American Lumber Standard Committee's Board of Review.
    - a. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.
  - 6. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
    - a. For exposed plywood indicated to receive a stained or natural finish, mark back of each piece.
  - 7. Application: Where indicated.

Construction Documents

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: For applications indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and comply with testing requirements; testing will be conducted by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
  - 1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
- C. For exposed items indicated to receive a stained or natural finish, use organic resin chemical formulations that do not contain colorants, and provide materials that do not have marks from spacer sticks on exposed face.
- D. Do not use material that does not comply with requirements for untreated material or is warped or discolored.
- E. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.
  - 2. For exposed plywood indicated to receive a stained or natural finish, mark back of each piece.
- F. Application: Where indicated.

2.4 INTERIOR TRIM

- A. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish):
  - 1. Species: As selected by the Architect.
  - 2. Grade: Clear; NHLA.
  - 3. Maximum Moisture Content: 13 percent.
  - 4. Finger Jointing: Not allowed.
  - 5. Gluing for Width: Not allowed.
  - 6. Veneered Material: Not allowed, unless otherwise indicated.
  - 7. Face Surface: Surfaced (smooth).
  - 8. Matching: Selected for compatible grain and color.

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Construction Documents

- B. Lumber Trim for Opaque Finish (Painted Finish):
  - 1. Species and Grade: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine, D Select (Quality); NeLMA, NLGA, or WWPA.
  - 2. Maximum Moisture Content: 15 percent.
  - 3. Finger Jointing: Allowed.
  - 4. Face Surface: Surfaced (smooth).
  - 5. Optional Material: Primed MDF of same actual dimensions as lumber indicated may be used in lieu of lumber.
  
- C. Hardwood Moldings for Transparent Finish (Stain or Clear Finish): MMPA HWM 4, N-grade wood moldings made to patterns included in MMPA's "HWM/Series Hardwood Moulding Patterns."
  - 1. Species: As selected by the Architect.
  - 2. Maximum Moisture Content: 9 percent.
  - 3. Finger Jointing: Not allowed.
  - 4. Matching: Selected for compatible grain and color.
  
- D. Moldings for Opaque Finish (Painted Finish): Made to patterns included in MMPA's "WM/Series Wood Moulding Patterns."
  - 1. Softwood Moldings: MMPA WM 4, P grade.
    - a. Species: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine.
    - b. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
  
  - 2. Hardwood Moldings: MMPA HWM 4, P-grade.
    - a. Species: Aspen, basswood, cottonwood, gum, magnolia, soft maple, tupelo, or yellow poplar.
    - b. Maximum Moisture Content: 9 percent.
  
  - 3. Optional Material: Primed MDF.
  - 4. Finger Jointing: Allowed.

2.5 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.

Construction Documents

2.6 FABRICATION

- A. Back out or kerf backs of the following members, except those with ends exposed in finished work:
  - 1. Interior standing and running trim, except shoe and crown molds.
- B. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound; warped; improperly treated or finished; inadequately seasoned; too small to fabricate with proper jointing arrangements; or with defective surfaces, sizes, or patterns.
- B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
  - 1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
  - 2. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
  - 3. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.

Construction Documents

4. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.4 STANDING AND RUNNING TRIM INSTALLATION

- A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long, except where necessary. Stagger joints in adjacent and related standing and running trim. Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
  1. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.
  2. Install trim after gypsum-board joint finishing operations are completed.
  3. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads on exposed carpentry work and fill holes.

3.5 ADJUSTING

- A. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.6 CLEANING

- A. Clean interior finish carpentry on exposed and semiexposed surfaces. Restore damaged or soiled areas and touch up factory-applied finishes if any.

3.7 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
  1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 062023



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Construction Documents

SECTION 064116 - PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Plastic-laminate-faced architectural cabinets.
- 2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets that are not concealed within other construction.

B. Related Requirements:

- 1. Section 061053 "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.

1.3 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

- 1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Shop Drawings: For plastic-laminate-faced architectural cabinets.

- 1. Include plans, elevations, sections, and attachment details.
- 2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
- 3. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.
- 4. Apply AWI Quality Certification Program label to Shop Drawings.

Construction Documents

- C. Samples: For each exposed product and for each color and texture specified, in manufacturer's or fabricator's standard size.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator.
- B. Product Certificates: For the following:
  - 1. Composite wood and agrifiber products.
  - 2. Thermoset decorative panels.
  - 3. High-pressure decorative laminate.
  - 4. Adhesives.
- C. Quality Standard Compliance Certificates: AWI Quality Certification Program.
- D. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
  - 1. Shop Certification: AWI's Quality Certification Program accredited participant.
- B. Installer Qualifications: Fabricator of products or AWI's Quality Certification Program accredited participant.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  - 1. Build mockups of typical architectural cabinets as directed by the Architect.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.



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Construction Documents

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.
- C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of cabinets indicated for construction, finishes, installation, and other requirements.
  - 1. Provide inspections of fabrication and installation together with labels and certificates from AWI certification program indicating that woodwork complies with requirements of grades specified.
  - 2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.
- B. Grade: Custom.
- C. Type of Construction: Frameless.
- D. Door and Drawer-Front Style: Flush overlay.
- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
  - 1. Basis-of-Design: Subject to compliance with requirements, provide products indicated on the Finish Schedule, or comparable products as approved by the Architect.

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Construction Documents

- F. Laminate Cladding for Exposed Surfaces:
  - 1. Horizontal Surfaces: Grade HGS.
  - 2. Vertical Surfaces: Grade VGS.
  - 3. Edges: Grade VGS.
  - 4. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels, unless otherwise indicated.
  
- G. Materials for Semiexposed Surfaces:
  - 1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
    - a. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.
  - 2. Drawer Sides and Backs: Solid-hardwood lumber.
  - 3. Drawer Bottoms: Hardwood plywood.
  
- H. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
  
- I. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
  - 1. Join subfronts, backs, and sides with glued dovetail joints.
  
- J. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
  - 1. As indicated on the Finish Schedule.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
  - 1. Wood Moisture Content: 8 to 13 percent.
  
- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
  - 1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.
  - 2. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
  - 3. Softwood Plywood: DOC PS 1, medium-density overlay.
  - 4. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

Construction Documents

2.3 CABINET HARDWARE AND ACCESSORIES

- A. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 170 degrees of opening, self-closing.
- B. Decorative Pulls: As selected by the Architect.
- C. Catches: Push-in magnetic catches, BHMA A156.9, B03131.
- D. Shelf Rests: BHMA A156.9, B04013; metal.
- E. Drawer Slides: BHMA A156.9.
  - 1. Grade 1 and Grade 2: Side mounted and extending under bottom edge of drawer.
    - a. Type: Full extension.
    - b. Material: Epoxy-coated steel with polymer rollers.
  - 2. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
  - 3. For drawers not more than 3 inches high and not more than 24 inches wide, provide Grade 1.
  - 4. For drawers more than 3 inches high, but not more than 6 inches high and not more than 24 inches wide, provide Grade 1HD-100.
  - 5. For drawers more than 6 inches high or more than 24 inches wide, provide Grade 1HD-200.
- F. Door Locks: BHMA A156.11, E07121.
- G. Drawer Locks: BHMA A156.11, E07041.
- H. Door and Drawer Silencers: BHMA A156.16, L03011.
- I. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
  - 1. Hardware Finish: As selected by the Architect from the manufacturer's full range.
- J. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.4 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

Construction Documents

- C. Adhesive for Bonding Plastic Laminate: Contact cement.

2.5 FABRICATION

- A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.
- B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
  - 1. Notify Architect seven days in advance of the dates and times architectural cabinet fabrication will be complete.
  - 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.
- C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

- A. Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.
  - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

Construction Documents

2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips or No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION 064116



Construction Documents

SECTION 066400 - PLASTIC PANELING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Plastic sheet paneling.

B. Related Requirements:

- 1. Section 061053 " Miscellaneous Rough Carpentry" for wood furring for installing plastic paneling.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Samples: For plastic paneling and trim accessories, in manufacturer's standard sizes.

1.4 QUALITY ASSURANCE

- A. Testing Agency: Acceptable to authorities having jurisdiction.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install plastic paneling until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain plastic paneling and trim accessories from single manufacturer.

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Construction Documents

2.2 PLASTIC SHEET PANELING

- A. Glass-Fiber-Reinforced Plastic Paneling: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D 5319. Panels shall be USDA accepted for incidental food contact.
  - 1. Basis-of-Design: Subject to compliance with requirements, provide product indicated on the Finish Schedule, or a comparable product as approved by the Architect.
  - 2. Surface-Burning Characteristics: As follows when tested by a qualified testing agency according to ASTM E 84. Identify products with appropriate markings of applicable testing agency.
    - a. Flame-Spread Index: 25 or less.
    - b. Smoke-Developed Index: 450 or less.
  - 3. Nominal Thickness: Not less than 0.09 inch.
  - 4. Surface Finish: As indicated on the Finish Schedule.
  - 5. Color: As indicated on the Finish Schedule.

2.3 ACCESSORIES

- A. Trim Accessories: Manufacturer's standard two-piece, snap-on vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.
  - 1. Color: As selected by Architect from manufacturer's full range.
- B. Exposed Fasteners: Nylon drive rivets recommended by panel manufacturer.
- C. Concealed Mounting Splines: Continuous, H-shaped aluminum extrusions designed to fit into grooves routed in edges of factory-laminated panels and to be fastened to substrate.
- D. Adhesive: As recommended by plastic paneling manufacturer.
- E. Sealant: Mildew-resistant, single-component, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.



Construction Documents

3.2 PREPARATION

- A. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.
- B. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- C. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels and so that trimmed panels at corners are not less than 12 inches wide.
  - 1. Mark plumb lines on substrate at trim accessory and panel joint locations for accurate installation.
  - 2. Locate trim accessories and panel joints to allow clearance at panel edges according to manufacturer's written instructions.

3.3 INSTALLATION

- A. Install plastic paneling according to manufacturer's written instructions.
- B. Install panels with fasteners. Layout fastener locations and mark on face of panels so that fasteners are accurately aligned.
  - 1. Drill oversized fastener holes in panels and center fasteners in holes.
  - 2. Apply sealant to fastener holes before installing fasteners.
- C. Install trim accessories with adhesive and nails or staples. Do not fasten through panels.
- D. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.
- E. Maintain uniform space between panels and wall fixtures. Fill space with sealant.
- F. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

END OF SECTION 066400



Construction Documents

SECTION 071113 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Cold-applied, cut-back-asphalt dampproofing.
- B. Related Requirements:
  - 1. Section 033000 "Cast-in-Place Concrete" for bituminous vapor retarders.
  - 2. Section 042000 "Unit Masonry" for mortar parge coat on masonry surfaces.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 FIELD CONDITIONS

- A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Source Limitations: Obtain primary dampproofing materials and primers from single source from single manufacturer. Provide protection course, molded-sheet drainage panels, and auxiliary materials recommended in writing by manufacturer of primary materials.
- B. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction unless otherwise required.

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Construction Documents

2.2 COLD-APPLIED, CUT-BACK-ASPHALT DAMPPROOFING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. APOC, Inc; a division of Gardner Industries.
  - 2. Brewer Company (The).
  - 3. ChemMasters, Inc.
  - 4. Henry Company.
  - 5. Karnak Corporation.
  - 6. W. R. Meadows, Inc.
- B. Trowel Coats: ASTM D 4586, Type I, Class 1, fibered.
- C. Brush and Spray Coats: ASTM D 4479, Type I, fibered or nonfibered.

2.3 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.
- B. Cut-Back-Asphalt Primer: ASTM D 41.
- C. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.
- D. Patching Compound: Epoxy or latex-modified repair mortar or asbestos-free fibered mastic of type recommended in writing by dampproofing manufacturer.
- E. Protection Course: Smooth-surfaced roll roofing complying with ASTM D 6380, Class S, Type III.

2.4 MOLDED-SHEET DRAINAGE PANELS

- A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Composite subsurface drainage panel consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to one side of the core; and with a vertical flow rate of 9 to 15 gpm per ft..
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Hydrotech, Inc.
    - b. Carlisle Coatings & Waterproofing Inc.
    - c. GCP Applied Technologies (formerly Grace Construction Products).
    - d. Protecto Wrap Company.

Construction Documents

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions with Applicator present, for compliance with requirements for surface smoothness, surface moisture, and other conditions affecting performance of bituminous dampproofing work.
- B. Proceed with application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- B. Clean substrates of projections and substances detrimental to the dampproofing work; fill voids, seal joints, and remove bond breakers if any, as recommended in writing by prime material manufacturer.
- C. Apply patching compound to patch and fill tie holes, honeycombs, reveals, and other imperfections; cover with asphalt-coated glass fabric.

3.3 APPLICATION, GENERAL

- A. Comply with manufacturer's written instructions for dampproofing application, cure time between coats, and drying time before backfilling unless more stringent requirements are indicated.
  - 1. Apply dampproofing to provide continuous plane of protection.
  - 2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.
- B. Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches over outside face of footing.
  - 1. Extend dampproofing 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
  - 2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where shown as "reinforced," by embedding an 8-inch-wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.

Construction Documents

- C. Where dampproofing exterior face of inner wythe of exterior masonry cavity walls, lap dampproofing at least 1/4 inch onto flashing, masonry reinforcement, veneer ties, and other items that penetrate inner wythe.
  - 1. Extend dampproofing over outer face of structural members and concrete slabs that interrupt inner wythe.
  - 2. Lap dampproofing at least 1/4 inch onto shelf angles supporting veneer.
- D. Where dampproofing interior face of above-grade, exterior concrete and masonry walls, continue dampproofing through intersecting walls by keeping vertical mortar joints at intersection temporarily open or by dampproofing wall before constructing intersecting walls.

3.4 COLD-APPLIED, CUT-BACK-ASPHALT DAMPPROOFING

- A. Concrete Foundations and Parged Masonry Foundation Walls: Apply two brush or spray coats at not less than 1.25 gal./100 sq. ft. for first coat and 1 gal./100 sq. ft. for second coat or one trowel coat at not less than 4 gal./100 sq. ft.
- B. Unparged Masonry Foundation Walls: Apply primer and two brush or spray coats at not less than 1.25 gal./100 sq. ft. for first coat and 1 gal./100 sq. ft. for second coat or primer and one trowel coat at not less than 4 gal./100 sq. ft.
- C. Unexposed Face of Masonry Retaining Walls: Apply primer and one brush or spray coat at not less than 1.25 gal./100 sq. ft.
- D. Masonry Backup for Brick Veneer Assemblies: Apply primer and one brush or spray coat at not less than 1 gal./100 sq. ft..
- E. Exterior Face of Inner Wythe of Cavity Walls: Apply primer and one brush or spray coat at not less than 1 gal./100 sq. ft..

3.5 INSTALLATION OF PROTECTION COURSE

- A. Where indicated, install protection course over completed-and-cured dampproofing. Comply with dampproofing-material and protection-course manufacturers' written instructions for attaching protection course.
  - 1. Support protection course over cured coating with spot application of adhesive type recommended in writing by protection-board manufacturer.
  - 2. Install protection course on same day or within 24 hours of installation of dampproofing (while coating is tacky) to ensure adhesion.

Construction Documents

3.6 INSTALLATION OF MOLDED-SHEET DRAINAGE PANELS

- A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall substrate, according to manufacturer's written instructions. Use adhesives or other methods that do not penetrate dampproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.
  - 1. Install protection course before installing drainage panels.

3.7 CLEANING

- A. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 071113





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Construction Documents

SECTION 071614 – ACRYLIC MODIFIED (FLEXIBLE) CEMENTITIOUS WATERPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes acrylic-modified flexible cementitious waterproofing used at Fountain.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 SUBMITTALS

- A. Product Data:
  - 1. Submit manufacturer's literature and installation instructions for each product.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in marketing or manufacturing acrylic-modified flexible cementitious waterproofing with a minimum of 10 years documented experience.
- B. Installer Qualifications: Acceptable to manufacturer with documented experience on at least 5 projects of similar nature in past 5 years and/or training provided by the product manufacturer.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  - 1. Build mockup of typical vertical and horizontal surfaces 10 sq. ft. in size.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

Construction Documents

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store in a dry area between 40°F and 90°F. Handle and protect from freezing and direct sun light in accordance with manufacturer's instructions.
- B. Deliver materials in manufacturer's unopened containers, fully identified with brand, type, grade, class, and all other qualifying information.
- C. Provide Material Safety Data Sheets for each product.
- D. Take necessary precautions to keep products clean, dry and free of damage.

1.7 SYSTEM REQUIREMENTS

- A. Coordinate waterproofing installation with other trades.
- B. Provide materials and accessories in timely manner so as not to delay Work.

1.8 PROJECT CONDITIONS

- A. Maintain surfaces to be waterproofed and surrounding air temperature at not less than 40°F.
- B. Apply only when temperatures are steady or rising.
- C. Do not apply materials to frozen or frost-filled surfaces.
- D. Exercise caution when temperatures exceed 90°F.

1.9 WARRANTY

- A. Manufacturer's Warranty: Manufacturer shall provide standard product warranty executed by authorized company official.
  - 1. Term of Warranty: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 BASIS-OF-DESIGN MANUFACTURER

- A. Basis-of-Design: Subject to compliance with requirements, provide product indicated below by Aquafin, or a comparable product as approved by the Architect:
  - 1. Product: AQUAFIN-2K/M.
  - 2. Finish: As selected by the Architect from the manufacturer's full range.
  - 3. Color: As selected by the Architect from the manufacturer's full range.

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Construction Documents

2.2 MATERIALS

- A. Waterproofing Material - Acrylic Modified Cement Waterproofing: Cementitious, two-component, acrylic emulsion based, highly flexible, crack bridging waterproof membrane barrier against positive water pressure, with the following characteristics:
1. Dry Component-A: Precise blend of cementitious material.
  2. Liquid Component-B: White acrylic emulsion and admixtures.
  3. Working Time: Approximately 45 minutes.
  4. Shore A Hardness: (ASTM D-2240) ~ 85.
  5. VOC: 0 g/L.
  6. Flammability: (ASTM E-108) Class A – Spread of Flame – Passed.
  7. Bond/Adhesion: (ASTM C-321) 215 psi (1.5 MPa) @ 28 days.
  8. Tensile Strength: (ASTM C-412) 600 psi (4.1 MPa) @ 28 days @ 80 mils.
  9. Elongation: 70 percent (gray); 40 percent (white) at 68°f.
  10. Static crack bridging capacity: 1/16-inch (gray).
  11. Vapor Permeability: (ASTM E-96) 1.4 perms at 3/32” thickness.
  12. Waterproofing: (CRD C 48-92) Withstands 200 psi = 460 feet hydrostatic pressure (positive side) at 3/32” thickness.

2.3 ACCESSORY MATERIALS

- A. Patching Compound: Pre-blended, cementitious structural waterproofing and repair mortar recommended or approved by waterproofing manufacturer for patching honeycombs, installing coves, etc.
1. Basis-of-Design Product: AQUAFIN MORTAR-LN or MORTAR-40.
  2. Color: Gray.
  3. Aggregate: Powder.
  4. Compressive Strength: (ASTM C-109) 6000 psi @ 28 days.
  5. Flexural Strength: (ASTM C-348) 1160 psi @ 28 days.
- B. Crack and static joint sealing tape: Elastomeric, tear resistant, breathable waterproofing tape.
1. Basis-of-Design Product: AQUAFIN JOINT SEALING TAPE-2000.
  2. Thickness: approx. 14 mils.
  3. Width: 4.75" or 8".
  4. Elongation: 60%.
  5. Tear Strength: 725 psi.
- C. Expansion joint sealing tape: Elastomeric, tear resistant, breathable waterproofing tape.
1. Basis-of-Design Product: AQUAFIN JOINT SEALING TAPE-2000-S.
  2. Thickness: approx. 16 mils.
  3. Width: 4.75" or 8".
  4. Elongation: 600%.
  5. Tear resistance: 2,175 psi.

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Construction Documents

- D. Sealing Gasket for PVC pipe and other penetrations: Elastomeric, tear resistant, breathable waterproofing sealing gasket.
  - 1. Basis-of-Design Product: AQUAFIN-GASKET 18/18.
  - 2. Thickness: approx. 1/64".
  - 3. Color: White.
  - 4. Size: Approx. 18" x 18".
  
- E. One-component Waterproofing Material for negative side water pressure in combination with two-component Waterproofing Material with the following characteristics:
  - 1. Basis-of-Design Product: AQUAFIN-1K.
  - 2. Color: Gray.
  - 3. Aggregate: Powder
  - 4. Compressive Strength: (ASTM C-109) 4000 psi @ 28 days.
  - 5. Flexural Strength: (ASTM C-348) 440 psi @ 28 days.
  - 6. Bond/Adhesion: (ASTM C-321) 220 psi @ 28 days.
  - 7. Vapor Permeability: (US Perms) 8 (ASTM E-96) (control = 10).
  
- F. Protective Clear Sealer: V.O.C. compliant, ready-to-use 100% acrylic liquid applied over two-component Waterproofing Material, protecting it from environmental influences.
  - 1. Basis-of-Design Product: AQUAFIN-CS/250.
  - 2. Color: Milky.
  - 3. Aggregate: Liquid.
  - 4. Solids Content: 25%.
  - 5. Bond/Adhesion: Cohesive film failure.
  - 6. Abrasion Resistance: (ASTM D-658-44) 225 to 350 g/mil on glass.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine all construction substrates and conditions under which waterproofing materials are to be installed. Do not proceed with the waterproofing application until unsatisfactory conditions are corrected.

**3.2 PREPARATION**

- A. Protect adjacent surfaces not designated to receive waterproofing.
- B. Substrate preparation:
  - 1. Remove oil, grease, dirt, loose particles, remains of form oils, water repellents, rust or other coatings by high-pressure water blasting (>3000 psi), wet or dry sand blasting, or other mechanical means to produce surface profile ICRI CSP 3 to 5 for application of waterproofing.

Construction Documents

2. Follow manufacturer's instructions to clean and prepare surfaces and seal cracks and joints.
  3. Voids in concrete substrates: 1/4-inch diameter and larger, pre-treat with patching compound. Less than 1/4-inch diameter can be filled with a scratch coat of one-component waterproofing material.
- C. Rinse surfaces to be waterproofed (excluding drywall or similar) with clean water to saturated surface dry (SSD) condition, with no standing water on horizontal surfaces.

3.3 INSTALLATION

- A. Mix two-component waterproofing material in proportions recommended by manufacturer.
- B. Cavity Fill, Honeycombs and Form-Tie holes:
1. Fill voids at cleaned and prepared faulty construction joints, cracks, formtie holes, etc. with patching compound in mortar consistency flush to surface.
  2. Laminate patching compound in 2 to 3 layers as per manufacturer's instructions for larger spalled or honeycombed areas.
- C. Taping Horizontal and Vertical Construction Joints and Cracks (Positive Side Waterproofing Only): Install joint and crack sealing tape, embedded in waterproofing material as follows:
1. Apply two-component waterproofing material by brush in a six to seven inch wide strip coat centered over all joints, cracks, penetrations and changes of plane to be taped.
  2. While this coat is still wet, unroll joint sealing tape into the coating and apply a coat of two-component waterproofing material over the tape, smoothing out wrinkles and fish mouths.
- D. Sealing around PVC pipe penetrations:
1. Abrade (sand) PVC pipes and degrease with isopropanol or acetone.
  2. Place sealing gasket over pipe and mark size of penetration, then cut out necessary opening (penetration).
  3. Apply one prime coat two-component waterproofing material over concrete and exposed PVC pipe.
  4. While this coat is still wet, immediately place and firmly press sealing gasket into the coating and cover it with a top coat of two-component waterproofing material, after prime coat has set-up and sufficiently hardened.
- E. Negative Side Waterproofing:
1. Follow manufacturer's specifications and instructions for below grade structures (i.e. water and waste water tanks, swimming pools and gutters, basement and retaining walls) where infiltration from ground water is expected:
    - a. Apply first (base) coat one-component waterproofing material at 60 mils thickness.
    - b. After 24 hrs waiting period, apply seconde (top) coat two-component waterproofing material at 60 mils as soon as base coat has reached initial set.

Construction Documents

- F. Surface Finish: Provide one of the following as selected by the Architect.
1. Surface finish shall be standard (regular) two-component waterproofing material finish.
  2. Surface finish shall be "fine" by applying a top coating of 10 – 20 mils special fine powder mix of two-component waterproofing material.
  3. Surface finish shall be "smooth" by applying a top coating of 10 – 20 mils special smooth powder mix of two-component waterproofing material.
- G. Application considerations:
1. Apply, using stainless steel trowel, tampico brush, short nap roller, or appropriate compressed-air spray equipment.
  2. Apply only when surface and ambient temperatures are 40°F and rising. At high temperatures (i.e. 86°F and above) protect application from direct sun and wind to prevent premature surface drying and shrinkage cracks. Apply material in two coats minimum.
  3. Application thickness should not exceed 1/8-inch (120 mils).
  4. If needed, such as in zones posed to movement or cracking, plaza decks, etc., the waterproofing material can be additionally reinforced with a reinforcing mesh (supplied by waterproofing manufacturer), embedded between two waterproofing layers.
  5. Do not bridge cracks greater than 1/16-inch.
  6. Bridge dynamic cracks or joints with elastomeric joint sealing tape, as supplied by waterproofing manufacturer.
  7. Do not overcoat waterproofing material with solvent-based materials.
  8. Where a uniform color is desired (i.e. balconies, walkways, etc.), application of an elastomeric paint or water based acrylic stain is recommended.
  9. Prime and protect alkali sensitive metals such as copper, aluminum, galvanized or zinc treated metal first with a primer, before over-coating with waterproofing material. Follow manufacturer's recommendations for primer material.

3.4 CURING

- A. Follow manufacturer's general instructions for curing and hardening of waterproofing material. Do not use water for curing. Waterproofing material is self-curing.
- B. Protect surfaces from rain, frost and premature dehydration.

3.5 TESTING OF WATER INCLUDING STRUCTURES

Following application and completion of related work, as required, but well prior to completion of entire project, fill tanks to capacity and allow to stand not less than 3 days. Fill larger structures at a uniform rate not greater than 6.5 feet in 24 hours. The temperature of the fill water shall be plus or minus 10°F of the ambient air and/or the tank structure at the time of filling. Extreme caution is urged if the temperature is greater than 10°F. Should leakage occur after this period, drain tanks to perform repairs. Notify Owner prior to draining tanks.

Construction Documents

3.6 ACCEPTANCE

- A. Remove left over materials and any foreign material resulting from the work from the site.
- B. Clean adjacent surfaces and materials.

END OF SECTION 071614





Construction Documents

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Extruded polystyrene foam-plastic board.
- 2. Glass-fiber blanket.

B. Related Requirements:

- 1. Section 042000 "Unit Masonry" for insulation installed in masonry cells.
- 2. Section 061600 "Sheathing" for foam-plastic board sheathing installed directly over framing and composite nail base insulated roof sheathing installed under standing-seam metal roof panels.
- 3. Section 075423 "Thermoplastic Polyolefin (TPO) Roofing" for insulation specified as part of roofing construction.
- 4. Section 092900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- B. Evaluation Reports: For foam-plastic insulation, from ICC-ES.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

Construction Documents

- B. Protect foam-plastic board insulation as follows:
  - 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
  - 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
  - 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and minimum compressive strength indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
  - 1. Basis-of-Design: Subject to compliance with requirements, provide STYROFOAM™ by the Dow Chemical Company or a comparable product by one of the following:
    - a. DiversiFoam Products.
    - b. Owens Corning.
    - c. Pactiv Building Products.
  - 2. Type and Compression Rating: As recommended by the manufacturer for the specific application.
  - 3. Thickness: As required to meet the indicated R-Value.
  - 4. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.2 GLASS-FIBER BLANKET

- A. Glass-Fiber Blanket, Unfaced: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
- B. Glass-Fiber Blanket, Kraft Faced: ASTM C 665, Type II (nonreflective faced), Class C (faced surface not rated for flame propagation); Category 1 (membrane is a vapor barrier).
- C. Glass-Fiber Blanket, Reinforced-Foil Faced <Insert drawing designation>: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.
  - 1. Basis-of-Design: Subject to compliance with requirements, provide product indicated below or a comparable product as approved by the Architect:

Construction Documents

a. JohnsManville; FSK-25 Faced.

1) Location: Provide in above ceiling exposed conditions as indicated on the Drawings.

2.3 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.

1. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation.

B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.

1. Angle: Formed from 0.030-inch-thick, perforated, galvanized carbon-steel sheet with each leg 2 inches square.
2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation.

C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.

1. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
  - a. Ceiling plenums.
  - b. Attic spaces.

D. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of 1 inch minimum between face of insulation and substrate to which anchor is attached.

E. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.

2.4 ACCESSORIES

A. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

Construction Documents

- B. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF CAVITY-WALL INSULATION

- A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.
  - 1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 042000 "Unit Masonry."

3.4 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
  - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.

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Construction Documents

2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
  4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
  5. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
  6. For wood-framed construction, install blankets according to ASTM C 1320 and as follows:
    - a. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.
  7. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.
    - a. Exterior Walls: Set units with facing placed toward exterior of construction.
    - b. Interior Walls: Set units with facing placed toward areas of high humidity.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..
  2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.5 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100



Construction Documents

SECTION 072413 - POLYMER-BASED EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. EIFS-clad barrier-wall assemblies that are field applied over substrate.

B. Related Requirements:

- 1. Section 079200 "Joint Sealants" for sealing joints in EIFS with elastomeric joint sealants and for perimeter joints between EIFS and other materials.

1.3 DEFINITIONS

- A. Definitions in ASTM E 2110 apply to Work of this Section.

- B. EIFS: Exterior insulation and finish system(s).

- C. IBC: International Building Code.

- D. Polymer-Based Exterior Insulation and Finish System: Class PB EIFS, as defined in ASTM E 2568.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each EIFS component, trim, and accessory.

- B. Samples: For each exposed product and for each color and texture specified, 8 inches square in size.

Construction Documents

1.6 INFORMATIONAL SUBMITTALS

- A. Manufacturer Certificates: Signed by EIFS manufacturer certifying the following:
  - 1. EIFS substrate is acceptable to EIFS manufacturer.
  - 2. Accessory products installed with EIFS, including joint sealants, flashing, water-resistant barriers, and trim, whether or not furnished by EIFS manufacturer and whether or not specified in this Section, are acceptable to EIFS manufacturer.
- B. Product Certificates: For cementitious materials and aggregates and for insulation.
- C. Product Test Reports: For each EIFS assembly and component, for tests performed by a qualified testing agency.
- D. Field quality-control reports and special inspection reports.
- E. Evaluation Reports: For EIFS, including insulation fasteners, and flexible membrane flashing, from ICC-ES.
- F. Sample Warranty: For manufacturer's special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For EIFS to include in maintenance manuals.

1.8 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, to set quality standards for materials and execution, and to set quality standards for fabrication and installation.
  - 1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original, unopened packages with manufacturers' labels intact and clearly identifying products.
- B. Store materials inside and under cover; keep them dry and protected from weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, construction traffic, and other causes.
  - 1. Stack insulation board flat and off the ground.
  - 2. Protect plastic insulation against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.



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Construction Documents

3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.10 FIELD CONDITIONS

- A. Weather Limitations: Maintain ambient temperatures above 40 deg F for a minimum of 24 hours before, during, and after adhesives or coatings are applied. Do not apply EIFS adhesives or coatings during rainfall. Proceed with installation only when existing and forecasted weather conditions and ambient outdoor air, humidity, and substrate temperatures permit EIFS to be applied, dried, and cured according to manufacturers' written instructions and warranty requirements.

1.11 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace EIFS that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Bond integrity and weathertightness.
    - b. Deterioration of EIFS finishes and other EIFS materials beyond normal weathering.
  2. Warranty coverage includes the following EIFS components:
    - a. EIFS finish, including base and finish coats and reinforcing mesh.
    - b. Insulation installed as part of EIFS including build-outs.
    - c. Insulation adhesive and mechanical fasteners.
    - d. EIFS accessories, including trim components and flashing.
  3. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain EIFS from single source from single EIFS manufacturer and from sources approved by EIFS manufacturer as tested and compatible with EIFS components.
- B. Basis-of-Design: Subject to compliance with requirements, provide products indicated below by Sto Corp., or comparable products as approved by the Architect:
  1. Product: StoTherm ci Classic.
    - a. Finish: Sto Limestone.
    - b. Color: As selected by the Architect from the manufacturer's full range.

Construction Documents

2.2 PERFORMANCE REQUIREMENTS

A. EIFS Performance: Comply with ASTM E 2568 and with the following:

1. Weathertightness: Resistant to water penetration from exterior.
2. Insulation Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
3. System Fire Performance: Fire-resistance rating of wall assembly.
4. Structural Performance: EIFS assembly and components shall comply with ICC-ES AC219 when tested according to ASTM E 2568.
  - a. Wind Loads: Uniform pressure as indicated on Structural Drawings.
5. Impact Performance: ASTM E 2568, Standard impact resistance unless otherwise indicated.
6. Bond Integrity: Free from bond failure within EIFS components or between EIFS and substrates, resulting from exposure to fire, wind loads, weather, or other in-service conditions.
7. Abrasion Resistance of Finish Coat: Sample consisting of 1-inch-thick EIFS mounted on 1/2-inch-thick gypsum board; cured for a minimum of 28 days and shows no cracking, checking, or loss of film integrity after exposure to 528 quarts of sand when tested according to ASTM D 968, Method A.
8. Mildew Resistance of Finish Coat: Sample applied to 2-by-2-inch clean glass substrate; cured for 28 days and shows no growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274.

2.3 EIFS MATERIALS

- A. Primer/Sealer: EIFS manufacturer's standard substrate conditioner designed to protect substrates from moisture penetration and to improve the bond between substrate and insulation adhesive.
- B. Flexible-Membrane Flashing: Cold-applied, self-adhering, self-healing, rubberized-asphalt and polyethylene-film composite sheet or tape and primer; EIFS manufacturer's standard or product recommended in writing by EIFS manufacturer.
- C. Insulation Adhesive: EIFS manufacturer's standard formulation designed for indicated use; compatible with substrate and complying with one of the following:
  1. Job-mixed formulation of portland cement complying with ASTM C 150/C 150M, Type I, and polymer-based adhesive specified for base coat.
  2. Factory-blended dry formulation of portland cement, dry polymer admixture, and fillers specified for base coat.
  3. Factory-mixed noncementitious formulation designed for adhesive attachment of insulation to substrates of type indicated, as recommended by EIFS manufacturer.
- D. Molded, (Expanded) Rigid Cellular Polystyrene Board Insulation (EPS): Comply with ASTM C 578, Type I; and with EIFS manufacturer's requirements for most stringent requirements for material performance and qualities of insulation, including dimensions and permissible variations, and the following:

Construction Documents

1. Aging: Before cutting and shipping, age insulation in block form by air drying for not less than six weeks.
  2. Flame-Spread and Smoke-Developed Indexes: 25 and 450 or less, respectively, according to ASTM E 84.
  3. Dimensions: Provide insulation boards of not more than 24 by 48 inches and in thickness indicated, but not more than 4 inches thick or less than the thickness allowed by ASTM C 1397.
  4. Foam Build-Outs: Provide with profiles and dimensions indicated on Drawings.
- E. Reinforcing Mesh: Balanced, alkali-resistant, open-weave, glass-fiber mesh treated for compatibility with other EIFS materials, made from continuous multiend strands with retained mesh tensile strength of not less than 120 lbf/in. according to ASTM E 2098 and the following:
1. Reinforcing Mesh for EIFS, General: Not less than weight required to meet impact-performance level specified in "Performance Requirements" Article.
  2. Strip Reinforcing Mesh: As recommended by EIFS manufacturer.
  3. Detail Reinforcing Mesh: As recommended by EIFS manufacturer.
  4. Corner Reinforcing Mesh: As recommended by EIFS manufacturer.
- F. Base-Coat Materials: EIFS manufacturer's standard mixture complying with one of the following:
1. Job-mixed formulation of portland cement complying with ASTM C 150/C 150M, Type I, white or natural color; and manufacturer's standard polymer-emulsion adhesive designed for use with portland cement.
  2. Job-combined formulation of manufacturer's standard polymer-emulsion adhesive and manufacturer's standard dry mix containing portland cement.
  3. Factory-blended dry formulation of portland cement, dry polymer admixture, and inert fillers to which only water is added at Project site.
  4. Factory-mixed noncementitious formulation of polymer-emulsion adhesive and inert fillers that is ready to use without adding other materials.
- G. Waterproof Adhesive/Base-Coat Materials: EIFS manufacturer's standard waterproof formulation and complying with one of the following:
1. Job-mixed formulation of portland cement complying with ASTM C 150/C 150M, Type I, white or natural color; and manufacturer's standard polymer-emulsion adhesive designed for use with portland cement.
  2. Job-combined formulation of manufacturer's standard polymer-emulsion adhesive and manufacturer's standard dry mix containing portland cement.
- H. Mechanical Fasteners: EIFS manufacturer's standard corrosion-resistant fasteners consisting of thermal cap, standard washer and shaft attachments, and fastener indicated below; designed to resist Project's design loads; capable of pulling fastener head below surface of insulation board; and complying with the following:
1. For attachment to steel studs from 0.033 to 0.112 inch in thickness, provide steel drill screws complying with ASTM C 954.
  2. For attachment to light-gage steel framing members not less than 0.0179 inch in thickness, provide steel drill screws complying with ASTM C 1002.

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3. For attachment to wood framing members and plywood sheathing, provide steel drill screws complying with ASTM C 1002, Type W.
  4. For attachment to masonry and concrete substrates, provide sheathing dowel in form of a plastic wing-tipped fastener with thermal cap, sized to fit insulation thickness indicated and to penetrate substrate to depth required to secure anchorage.
  5. For attachment to other indicated substrates, provide manufacturer's standard fasteners suitable for substrate.
- I. Primer: EIFS manufacturer's standard factory-mixed, elastomeric-polymer primer for preparing base-coat surface for application of finish coat.
- J. Finish-Coat Materials: EIFS manufacturer's standard acrylic-based coating with enhanced mildew resistance complying with the following:
1. Factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, sound stone particles, and fillers.
  2. Colors: As selected by Architect from manufacturer's full range.
  3. Textures: As selected by Architect from manufacturer's full range.
- K. Sealer: Manufacturer's waterproof, clear acrylic-based sealer for protecting finish coat.
- L. Water: Potable.
- M. Trim Accessories: Type as designated or required to suit conditions indicated and to comply with EIFS manufacturer's written instructions; manufactured from UV-stabilized PVC; and complying with ASTM D 1784 and ASTM C 1063.
1. Casing Bead: Prefabricated, one-piece type for attachment behind insulation, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg.
  2. Drip Screed/Track: Prefabricated, one-piece type for attachment behind insulation with face leg extended to form a drip, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg.
  3. Expansion Joint: Prefabricated, one-piece V profile; designed to relieve stress of movement.
  4. Windowsill Flashing: Prefabricated type for both flashing and sloping sill over framing beneath windows; with end and back dams; designed to direct water to exterior.
  5. Parapet Cap Flashing: Type for both flashing and covering parapet top with design complying with ASTM C 1397.

2.4 MIXING

- A. Comply with EIFS manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water, or other materials except as recommended by EIFS manufacturer. Mix materials in clean containers. Use materials within time period specified by EIFS manufacturer or discard.

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Construction Documents

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roof edges, wall framing, flashings, openings, substrates, and junctures at other construction for suitable conditions where EIFS will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 1. Begin coating application only after surfaces are dry.
  - 2. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Protect contiguous work from moisture deterioration and soiling caused by application of EIFS. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.
- B. Protect EIFS, substrates, and wall construction behind them from inclement weather during installation. Prevent penetration of moisture behind EIFS and deterioration of substrates.
- C. Prepare and clean substrates to comply with EIFS manufacturer's written instructions to obtain optimum bond between substrate and adhesive for insulation.
  - 1. Concrete Substrates: Provide clean, dry, neutral-pH substrate for insulation installation. Verify suitability of substrate by performing bond and moisture tests recommended by EIFS manufacturer.

3.3 EIFS INSTALLATION, GENERAL

- A. Comply with ASTM C 1397, ASTM E 2511, and EIFS manufacturer's written instructions for installation of EIFS as applicable to each type of substrate.

3.4 SUBSTRATE PROTECTION APPLICATION

- A. Primer/Sealer: Apply over gypsum sheathing substrates and where required by EIFS manufacturer for improving adhesion of insulation to substrate.
- B. Flexible-Membrane Flashing: Apply and lap to shed water; seal at openings, penetrations, terminations, and where required by EIFS manufacturer. Prime substrates if required and install flashing to comply with EIFS manufacturer's written instructions and details.

Construction Documents

3.5 TRIM INSTALLATION

- A. Trim: Apply trim accessories at perimeter of EIFS, at expansion joints, at windowsills, and elsewhere as indicated. Coordinate with installation of insulation.
  - 1. Drip Screed/Track: Use at bottom edges of EIFS unless otherwise indicated.
  - 2. Windowsill Flashing: Use at windows unless otherwise indicated.
  - 3. Expansion Joint: Use where indicated on Drawings.
  - 4. Casing Bead: Use at other locations.
  - 5. Parapet Cap Flashing: Use where indicated on Drawings.

3.6 INSULATION INSTALLATION

- A. Board Insulation: Adhesively attach insulation to substrate in compliance with ASTM C 1397 and the following:
  - 1. Sheathing: Apply adhesive to insulation by notched-trowel method in a manner that results in coating the entire surface of sheathing with adhesive once insulation is adhered to substrate. Apply adhesive to a thickness of not less than 1/4 inch for factory mixed and not less than 3/8 inch for field mixed, measured from surface of insulation before placement.
  - 2. Concrete or Masonry: Apply adhesive by ribbon-and-dab method.
  - 3. Press and slide insulation into place. Apply pressure over the entire surface of insulation to accomplish uniform contact, high initial grab, and overall level surface.
  - 4. Allow adhered insulation to remain undisturbed for not less than 24 hours, before beginning rasping and sanding insulation or before applying base coat and reinforcing mesh.
  - 5. Apply insulation over dry substrates in courses with long edges of boards oriented horizontally.
  - 6. Begin first course of insulation from screed/track and work upward. Work from perimeter casing beads toward interior of panels if possible.
  - 7. Stagger vertical joints of insulation boards in successive courses to produce running bond pattern. Locate joints so no piece of insulation is less than 12 inches wide or 6 inches high. Offset joints not less than 6 inches from corners of window and door openings and not less than 4 inches from aesthetic reveals.
    - a. Adhesive Attachment: Offset joints of insulation not less than 6 inches from horizontal and 4 inches from vertical joints in sheathing.
  - 8. Interlock ends at internal and external corners.
  - 9. Abut insulation tightly at joints within and between each course to produce flush, continuously even surfaces without gaps or raised edges between boards. If gaps greater than 1/16 inch occur, fill with insulation cut to fit gaps exactly; insert insulation without using adhesive or other material.
  - 10. Cut insulation to fit openings, corners, and projections precisely and to produce edges and shapes complying with details indicated.
  - 11. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/32 inch from surface of insulation and to remove yellowed areas due to sun

## Construction Documents

- exposure; do not create depressions deeper than 1/16 inch. Prevent airborne dispersal and immediately collect insulation raspings or sandings.
12. Cut aesthetic reveals in outside face of insulation with high-speed router and bit configured to produce grooves, rabbets, and other features that comply with profiles and locations indicated. Do not reduce insulation thickness at aesthetic reveals to less than 3/4 inch.
  13. Install foam build-outs and attach to sheathing or structure.
  14. Interrupt insulation for expansion joints where indicated.
  15. Form joints for sealant application by leaving gaps between adjoining insulation edges and between insulation edges and dissimilar adjoining surfaces. Make gaps wide enough to produce joint widths indicated after encapsulating joint substrates with base coat and reinforcing mesh.
  16. Form joints for sealant application with back-to-back casing beads for joints within EIFS and with perimeter casing beads at dissimilar adjoining surfaces. Make gaps between casing beads and between perimeter casing beads and adjoining surfaces of width indicated.
  17. Fully wrap board edges with strip reinforcing mesh.
  18. Treat exposed edges of insulation as follows:
    - a. Except for edges forming substrates of sealant joints, encapsulate with base coat, reinforcing mesh, and finish coat.
    - b. Encapsulate edges forming substrates of sealant joints within EIFS or between EIFS and other work with base coat and reinforcing mesh.
    - c. At edges trimmed by accessories, extend base coat, reinforcing mesh, and finish coat over face leg of accessories.
  19. Coordinate installation of flashing and insulation to produce wall assembly that does not allow water to penetrate behind flashing and EIFS lamina.
- B. Expansion Joints: Install at locations indicated, where required by EIFS manufacturer, and as follows:
1. At expansion joints in substrates behind EIFS.
  2. Where EIFS adjoin dissimilar substrates, materials, and construction, including other EIFS.
  3. At floor lines in multilevel wood-framed construction.
  4. Where wall height or building shape changes.
  5. Where EIFS manufacturer requires joints in long continuous elevations.
- 3.7 BASE-COAT INSTALLATION
- A. Waterproof Adhesive/Base Coat: To exposed surfaces of insulation, apply in minimum thickness recommended in writing by EIFS manufacturer over sloped surfaces, windowsills, parapets, foam build-outs, and where indicated on Drawings.
  - B. Base Coat: Apply to exposed surfaces of insulation and foam build-outs in minimum thickness recommended in writing by EIFS manufacturer, but not less than 1/16-inch dry-coat thickness.

Construction Documents

- C. Reinforcing Mesh: Embed reinforcing mesh in wet base coat to produce wrinkle-free installation with mesh continuous at corners, overlapped not less than 2-1/2 inches or otherwise treated at joints to comply with ASTM C 1397 and EIFS manufacturer's written instructions. Do not lap reinforcing mesh within 8 inches of corners. Completely embed mesh, applying additional base-coat material if necessary, so reinforcing-mesh color and pattern are invisible.
- D. Double-Layer Reinforcing-Mesh Application: Where indicated or required, apply second base coat and second layer of reinforcing mesh, overlapped not less than 2-1/2 inches or otherwise treated at joints to comply with ASTM C 1397 and EIFS manufacturer's written instructions in same manner as first application. Do not apply until first base coat has cured.
- E. Additional Reinforcing Mesh: Apply strip reinforcing mesh around openings, extending 4 inches beyond perimeter. Apply additional 9-by-12-inch strip reinforcing mesh diagonally at corners of openings (re-entrant corners). Apply 8-inch-wide, strip reinforcing mesh at both inside and outside corners unless base layer of mesh is lapped not less than 4 inches on each side of corners.
  - 1. At aesthetic reveals, apply strip reinforcing mesh not less than 8 inches wide.
  - 2. Embed strip reinforcing mesh in base coat before applying first layer of reinforcing mesh.
- F. Foam Build-Outs: Fully embed reinforcing mesh in base coat.
- G. Double Base-Coat Application: Where indicated, apply second base coat in same manner and thickness as first application, except without reinforcing mesh. Do not apply until first base coat has cured.

3.8 FINISH-COAT INSTALLATION

- A. Primer: Apply over dry base coat according to EIFS manufacturer's written instructions.
- B. Finish Coat: Apply over dry primed base coat, maintaining a wet edge at all times for uniform appearance, in thickness required by EIFS manufacturer to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.
- C. Sealer Coat: Apply over dry finish coat, in number of coats and thickness required by EIFS manufacturer.

3.9 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
  - 1. As stipulated in Ch. 17 of the IBC and as required by the local authorities having jurisdiction.
  - 2. According to ICC-ES AC24.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.



Construction Documents

- C. EIFS Tests and Inspections: According to ASTM E 2568 and ICC-ES AC24.
- D. EIFS will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

3.10 CLEANING AND PROTECTION

- A. Remove temporary covering and protection of other work. Promptly remove coating materials from window and door frames and other surfaces outside areas indicated to receive EIFS coatings.

END OF SECTION 072413



Construction Documents

SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Building wrap.
  - 2. Flexible flashing.
  - 3. Drainage material.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. For building wrap, include data on air and water-vapor permeance based on testing according to referenced standards.
- B. Shop Drawings: Show details of building wrap at terminations, openings, and penetrations. Show details of flexible flashing applications.

1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For water-resistive barrier and flexible flashing, from ICC-ES.

PART 2 - PRODUCTS

2.1 WATER-RESISTIVE BARRIER

- A. Building Wrap: ASTM E 1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Construction Documents

- a. Dow Chemical Company (The).
  - b. DuPont Building Innovations: E. I. du Pont de Nemours and Company.
  - c. Kingspan Insulation.
  - d. Ludlow Coated Products.
  - e. Raven Industries, Inc.
  - f. Reemay, Inc.
2. Water-Vapor Permeance: Not less than 75 perms per ASTM E 96/E 96M, Desiccant Method (Procedure A).
  3. Allowable UV Exposure Time: Not less than three months.
  4. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.
- B. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

2.2 FLEXIBLE FLASHING

- A. Rubberized-Asphalt Flashing: Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.
1. Basis-of-Design: Subject to compliance with requirements, provide Vycor Plus Self-Adhered Flashing or Vycor V40 Self-Adhered Flashing by GCP Applied Technologies (formerly Grace Construction Products), or a comparable product as approved by the Architect.
  2. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.
- B. Primer for Flexible Flashing: Product recommended in writing by flexible flashing manufacturer for substrate.
- C. Nails and Staples: Product recommended in writing by flexible flashing manufacturer and complying with ASTM F 1667.

2.3 DRAINAGE MATERIAL

- A. Drainage Material: Product shall maintain a continuous open space between water-resistive barrier and exterior cladding to create a drainage plane and shall be used under siding .
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. CavClear/Archovations, Inc.; CavClear Rainscreen Mat.
    - b. DuPont Building Innovations: E. I. du Pont de Nemours and Company; Tyvek Stucco Wrap.
    - c. Keene Building Products; 10 mm or 20-1.
    - d. Stuc-O-Flex International, Inc.; 11 mm, 3 mm, or 7 mm.

Construction Documents

2. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.
- B. Prefabricated Self-Adhered Flashing Corners: Provide at all windows and door openings.
  1. Basis-of-Design: Subject to compliance with requirements, provide VYCORner by GCP Applied Technologies (formerly Grace Construction Products), or a comparable product as approved by the Architect.
- C. Primer for Flexible Flashing: Product recommended in writing by flexible flashing manufacturer for substrate.
- D. Nails and Staples: Product recommended in writing by flexible flashing manufacturer and complying with ASTM F 1667.

PART 3 - EXECUTION

3.1 WATER-RESISTIVE BARRIER INSTALLATION

- A. Cover exposed exterior surface of sheathing with water-resistive barrier securely fastened to framing immediately after sheathing is installed.
- B. Cover sheathing with water-resistive barrier as follows:
  1. Cut back barrier 1/2 inch on each side of the break in supporting members at expansion- or control-joint locations.
  2. Apply barrier to cover vertical flashing with a minimum 4-inch overlap unless otherwise indicated.
- C. Building Wrap: Comply with manufacturer's written instructions and warranty requirements.
  1. Seal seams, edges, fasteners, and penetrations with tape.
  2. Extend into jambs of openings and seal corners with tape.

3.2 FLEXIBLE FLASHING INSTALLATION

- A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.
  1. Prime substrates as recommended by flashing manufacturer.
  2. Lap seams and junctures with other materials at least 4 inches except that at flashing flanges of other construction, laps need not exceed flange width.
  3. Lap flashing over water-resistive barrier at bottom and sides of openings.
  4. Lap water-resistive barrier over flashing at heads of openings.
  5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

Construction Documents

3.3 DRAINAGE MATERIAL INSTALLATION

- A. Install drainage material over building wrap and flashing to comply with manufacturer's written instructions.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections of windows and related adjacent construction for water intrusion as specified in Section 084113 "Aluminum-Framed Entrances and Storefronts."

END OF SECTION 072500

Construction Documents

SECTION 072600 - VAPOR RETARDERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Underslab vapor retarders.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

PART 2 - PRODUCTS

2.1 UNDERSLAB VAPOR RETARDERS

- A. Underslab Vapor Retarders: ASTM F1249 and ASTM D1709, with maximum permeance rating of 0.1 perm.
  - 1. Basis-of-Design: Subject to compliance with requirements, provide Stego Wrap by Stego Industries, or a comparable product as approved by the Architect.
    - a. Thickness: 10 mils minimum, unless otherwise indicated.

2.2 ACCESSORIES

- A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
- B. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and has demonstrated capability to bond vapor retarders securely to substrates indicated.

Construction Documents

- C. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to vapor retarders, including removing projections capable of puncturing vapor retarders.

3.2 INSTALLATION OF UNDERSLAB VAPOR RETARDERS

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
  - 1. Lap joints 6 inches and seal with manufacturer's recommended tape.
- B. Provide vapor barriers as indicated on the Drawings.

3.3 PROTECTION

- A. Protect vapor retarders from damage until concealed by permanent construction.

END OF SECTION 072600



Construction Documents

SECTION 074113.16 - STANDING-SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes standing-seam metal roof panels.
- B. Related Sections:
  - 1. Section 061600 "Sheathing" for composite nail base insulated roof sheathing installed under standing-seam metal roof panels.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **[Project site]** <Insert location>.
  - 1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of roof accessories and roof-mounted equipment.
  - 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
  - 4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
  - 5. Review structural loading limitations of **[deck]** **[purlins and rafters]** during and after roofing.
  - 6. Review flashings, special details, drainage, penetrations, equipment curbs, and condition of other construction that affect metal panels.
  - 7. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
  - 8. Review temporary protection requirements for metal panel systems during and after installation.
  - 9. Review procedures for repair of metal panels damaged after installation.
  - 10. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

Construction Documents

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:
  - 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
  - 2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.
- C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes.
  - 1. Include similar Samples of trim and accessories involving color selection.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- C. Field quality-control reports.
- D. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal panels to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Build mockups for typical roof area only, including accessories.

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Construction Documents

- a. Size: 12 feet long by 6 feet.
  - b. Each type of exposed seam and seam termination.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.

1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.10 COORDINATION

- A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.
- B. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:

Construction Documents

- a. Structural failures including rupturing, cracking, or puncturing.
  - b. Deterioration of metals and other materials beyond normal weathering.
2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
1. Wind Loads: As indicated on Structural Drawings.
  2. Other Design Loads: As indicated on Structural Drawings.
  3. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 1680 or ASTM E 283 at the following test-pressure difference:
1. Test-Pressure Difference: 6.24 lbf/sq. ft.
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 1646 or ASTM E 331 at the following test-pressure difference:
1. Test-Pressure Difference: 6.24 lbf/sq. ft.
- D. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E 2140.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

Construction Documents

2.2 STANDING-SEAM METAL ROOF PANELS

- A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.
  - 1. Aluminum Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1637.
  
- B. Vertical-Rib, Seamed-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and mechanically seaming panels together.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Advanced Architectural Products.
    - b. Advanced Building Products Inc.
    - c. AEP Span; A BlueScope Steel Company.
    - d. Architectural Building Components.
    - e. Architectural Metal Systems.
    - f. ATAS International, Inc.
    - g. Berridge Manufacturing Company.
    - h. CENTRIA Architectural Systems.
    - i. Dimensional Metals, Inc.
    - j. Drexel Metals.
    - k. Englert, Inc.
    - l. Fabral.
    - m. Firestone Building Products.
    - n. Firestone Metal Products, LLC.
    - o. Flexospan Steel Buildings, Inc.
    - p. Garland Company, Inc. (The).
    - q. IMETCO.
    - r. MBCI; a division of NCI Group, Inc.
    - s. McElroy Metal, Inc.
    - t. Merchant & Evans Inc.
    - u. Metal Sales Manufacturing Corporation.
    - v. Morin - A Kingspan Group Company.
    - w. Petersen Aluminum Corporation.
    - x. Ryerson Tull, Inc.
    - y. Ultra Seam Incorporated.
    - z. Union Corrugating Company.
  
  - 2. Aluminum Sheet: Coil-coated sheet, ASTM B 209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.

Construction Documents

- a. Thickness: 0.032 inch.
  - b. Surface: Smooth, flat finish.
  - c. Exterior Finish: Clear anodized.
  - d. Color: As selected by Architect from manufacturer's full range.
3. Clips: One-piece fixed to accommodate thermal movement.
- a. Material: 0.028-inch- nominal thickness, zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.
  - b. Material: 0.025-inch- thick, stainless-steel sheet.
4. Joint Type: As standard with manufacturer.
5. Panel Coverage: As selected by the Architect.
6. Panel Height: As selected by the Architect.

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 40 mils thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.
1. Thermal Stability: Stable after testing at 240 deg F; ASTM D 1970.
  2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D 1970.
  3. Basis-of-Design Product: Subject to compliance with requirements, provide GCP Applied Technologies (formerly Grace Construction Products); Grace Ice and Water Shield HT or a comparable product by one of the following:
    - a. Carlisle Residential; a division of Carlisle Construction Materials.
    - b. Drexel Metals.
    - c. Henry Company.
    - d. Kirsch Building Products, LLC.
    - e. Owens Corning.
- B. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

2.4 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645; cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 coating designation or ASTM A 792/A 792M, Class AZ50 coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

Construction Documents

1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
  2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
  3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
  2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
  3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.5 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

Construction Documents

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
  - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.

2.6 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Aluminum Panels and Accessories:
  - 1.
  2. Exposed Anodized Finish:
    - a. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
  1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.



Construction Documents

2. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.
  - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Extend underlayment into gutter trough. Roll laps with roller. Cover underlayment within 14 days.

1. Apply over the entire roof surface.

B. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 076200 "Sheet Metal Flashing and Trim."

3.4 METAL PANEL INSTALLATION

A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal panels.
2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal panel work proceeds.

Construction Documents

6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
  7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
  8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
1. Aluminum Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.
- C. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.
- D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- E. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
1. Install clips to supports with self-tapping fasteners.
  2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
  3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
  4. Watertight Installation:
    - a. Apply a continuous ribbon of sealant or tape to seal joints of metal panels, using sealant or tape as recommend in writing by manufacturer as needed to make panels watertight.
    - b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
    - c. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.
- F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.
- G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

Construction Documents

1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.
  2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- H. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

3.5 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect metal roof panel installation, including accessories. Report results in writing.
- B. Remove and replace applications of metal roof panels where tests and inspections indicate that they do not comply with specified requirements.
- C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

3.7 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074113.16



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Construction Documents

SECTION 074213.13 - FORMED METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Concealed-fastener, lap-seam metal wall panels.
  - 2. Concealed-fastener, lap-seam perforated metal wall panels at mechanical equipment screen.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:
  - 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
  - 2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.
- C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied finishes.
  - 1. Include Samples of trim and accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- C. Field quality-control reports.

Construction Documents

- D. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal panels to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Build mockup of typical metal panel assembly, including corner, supports, attachments, and accessories.
  - 2. Water-Spray Test: Conduct water-spray test of metal panel assembly mockup, testing for water penetration according to AAMA 501.2.
  - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.

Construction Documents

1.8 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.9 COORDINATION

- A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

- 1. Failures include, but are not limited to, the following:

- a. Structural failures including rupturing, cracking, or puncturing.
- b. Deterioration of metals and other materials beyond normal weathering.

- 2. Warranty Period: Two years from date of Substantial Completion.

- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

- 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

- a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
- b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
- c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

- 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:

- 1. Wind Loads: As indicated on Structural Drawings.
- 2. Other Design Loads: As indicated on Structural Drawings.
- 3. Deflection Limits: For wind loads, no greater than 1/180 of the span.

Construction Documents

- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 283 at the following test-pressure difference:
  - 1. Test-Pressure Difference: 6.24 lbf/sq. ft.
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
  - 1. Test-Pressure Difference: 6.24 lbf/sq. ft.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- E. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS

- A. General: Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side laps. Include accessories required for weathertight installation.
- B. Horizontal Creased-Rib-Profile, Concealed-Fastener Metal Wall Panels: Formed with raised, center-creased, trapezoidal major ribs; with reveal joint between panels.
  - 1. Basis-of-Design: Subject to compliance with requirements, provide product indicated below, or a comparable product as approved by the Architect:
    - a. Product: CENTRIA; Concept Series; CS-660.
  - 2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
    - a. Nominal Thickness: As selected by the Architect from the manufacturer's full range.
    - b. Exterior Finish: Metallic fluoropolymer.
    - c. Color: As selected by Architect from manufacturer's full range.



Construction Documents

3. Panel Coverage: 16 inches.
  4. Panel Height: 7/8-inch.
- C. Concealed-Fastener Perforated Horizontal Metal Wall Panels at Mechanical Equipment Screen: Formed with perforated panels; with reveal joint between panels.
1. Basis-of-Design: Subject to compliance with requirements, provide product as approved by the Architect:
    - a. Perforation Pattern: As selected by Architect from manufacturer's full range.
  2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
    - a. Nominal Thickness: As selected by the Architect from the manufacturer's full range.
    - b. Exterior Finish: As selected by Architect from manufacturer's full range.
    - c. Color: As selected by Architect from manufacturer's full range.
  3. Panel Coverage: As selected by Architect from manufacturer's full range.
  4. Panel Height: As selected by Architect from manufacturer's full range.
  5. Fasteners: Concealed.

2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 coating designation or ASTM A 792/A 792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
  2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
  3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

## Construction Documents

- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
  - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
  - 2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
  - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

## 2.4 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
  - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
  - 2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

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Construction Documents

3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
  - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel Panels and Accessories:
  1. Metallic Fluoropolymer: AAMA 621. Three-coat fluoropolymer finish with suspended metallic flakes containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
  1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.

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Construction Documents

2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
  - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

### 3.3 METAL PANEL INSTALLATION

A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal panels.
2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

D. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.

Construction Documents

1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
  2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
  3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
  4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
  5. Flash and seal panels with weather closures at perimeter of all openings.
- E. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.
- F. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.
  2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Water-Spray Test: After installation, test area of assembly as directed by Architect for water penetration according to AAMA 501.2.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal wall panel installation, including accessories.
- D. Remove and replace metal wall panels where tests and inspections indicate that they do not comply with specified requirements.

Construction Documents

- E. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- F. Prepare test and inspection reports.

3.5 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074213.13

Construction Documents

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Adhered thermoplastic polyolefin (TPO) roofing system.
2. Vapor retarder.
3. Roof insulation.

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking; and for wood-based, structural-use roof deck panels.
2. Section 061600 "Sheathing" for wood-based, structural-use roof deck panels.
3. Section 072100 "Thermal Insulation" for insulation beneath the roof deck.
4. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings.
5. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

Construction Documents

4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:
  1. Base flashings and membrane terminations.
  2. Tapered insulation, including slopes.
  3. Roof plan showing orientation of steel roof deck and orientation of roofing, fastening spacings, and patterns for mechanically fastened roofing.
  4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
- C. Samples for Verification: For the following products:
  1. Sheet roofing, of color required.
  2. Walkway pads or rolls, of color required.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For components of roofing system, tests performed by manufacturer and witnessed by a qualified testing agency.
- C. Research/Evaluation Reports: For components of roofing system, from ICC-ES.
- D. Field quality-control reports.
- E. Sample Warranties: For manufacturer's special warranties.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing system to include in maintenance manuals.



Construction Documents

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
  - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.10 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
  - 1. Special warranty includes roofing, base flashings, roof insulation, fasteners, cover boards, roofing accessories, and other components of roofing system.
  - 2. Warranty Period: 15 years from date of Substantial Completion.

Construction Documents

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain components including roof insulation and fasteners for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.
  - 1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
  - 2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- C. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- D. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.3 TPO ROOFING

- A. Fabric-Reinforced TPO Sheet: ASTM D 6878, internally fabric- or scrim-reinforced, uniform, flexible TPO sheet.
  - 1. Basis-of-Design: Subject to compliance with requirements, provide product indicated below by Firestone Building Products, or a comparable product as approved by the Architect:
    - a. Product: UltraPly TPO Membrane.
    - b. Thickness: 60 mils, nominal.
    - c. Exposed Face Color: White.

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Construction Documents

2.4 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.
  - 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 55 mils thick, minimum, of same color as TPO sheet.
- C. Bonding Adhesive: Manufacturer's standard.
- D. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- E. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.
- F. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing to substrate, and acceptable to roofing system manufacturer.
- G. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.5 VAPOR RETARDER

- A. Polyethylene Film: ASTM D 4397, 6 mils thick, minimum, with maximum permeance rating of 0.13 perm.
  - 1. Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
  - 2. Adhesive: Manufacturer's standard lap adhesive, FM Global approved for vapor-retarder application.

2.6 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by TPO roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.

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- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Atlas Roofing Corporation.
    - b. Carlisle SynTec Incorporated.
    - c. Dyplast Products.
    - d. Firestone Building Products.
    - e. GAF Materials Corporation.
    - f. Hunter Panels.
    - g. Insulfoam LLC; a Carlisle company.
    - h. Johns Manville; a Berkshire Hathaway company.
    - i. Rmax, Inc.
- C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches unless otherwise indicated.
- D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.7 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.
- C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
  - 1. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
- D. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch thick.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. CertainTeed Corporation; GlasRoc Roof Board.
    - b. Georgia-Pacific Building Products; Dens Deck or Dens Deck Prime.
    - c. National Gypsum Company; DEXcell FA Glass Mat Roof Board or DEXcell Glass Mat Roof Board.
    - d. United States Gypsum Company; Securock Glass Mat Roof Board or Securock Glass-Fiber Roof Board.

Construction Documents

2.8 ASPHALT MATERIALS

- A. Asphalt Primer: ASTM D 41/D 41M.

2.9 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch thick and acceptable to roofing system manufacturer.

2.10 GREASE GUARD

- A. Grease Guard: Provide grease guard for all kitchen exhaust to protect TPO membrane.
  - 1. Basis-of-Design: Subject to compliance with requirements, provide G2 Grease Guard XD Rooftop Defense Systems by Facilitec, or a comparable product as approved by the Owner.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
  - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
  - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
  - 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 053100 "Steel Decking."
  - 4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
  - 5. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
  - 6. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

Construction Documents

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Install insulation strips according to acoustical roof deck manufacturer's written instructions.

3.3 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.4 VAPOR-RETARDER INSTALLATION

- A. Polyethylene Film: Loosely lay polyethylene-film vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 inches and 6 inches, respectively. Continuously seal side and end laps with tape or adhesive.
- B. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into roofing system.

3.5 INSULATION INSTALLATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

Construction Documents

- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
  - 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- G. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:
  - 1. Prime surface of concrete deck with asphalt primer at rate of 3/4 gal./100 sq. ft., and allow primer to dry.
  - 2. Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.
  - 3. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
- H. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and fasten to roof deck.
  - 1. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.

3.6 ADHERED ROOFING INSTALLATION

- A. Adhere roofing over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing and allow to relax before retaining.
- B. Start installation of roofing in presence of roofing system manufacturer's technical personnel.
- C. Accurately align roofing, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply to substrate and underside of roofing at rate required by manufacturer, and allow to partially dry before installing roofing. Do not apply to splice area of roofing.
- E. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeter of roofing.
- F. Apply roofing with side laps shingled with slope of roof deck where possible.
- G. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roofing and sheet flashings according to manufacturer's written instructions, to ensure a watertight seam installation.
  - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet.
  - 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
  - 3. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.

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- H. Spread sealant bed over deck-drain flange at roof drains, and securely seal roofing in place with clamping ring.

3.7 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.8 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to Architect.
  - 1. Electric Field Vector Mapping (EFVM): Testing agency shall survey entire roof area for potential leaks using electric field vector mapping (EFVM).
- B. Flood Testing: Flood test each roofing area for leaks, according to recommendations in ASTM D 5957, after completing roofing and flashing but before overlying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water.
  - 1. Flood to an average depth of 2-1/2 inches with a minimum depth of 1 inch and not exceeding a depth of 4 inches. Maintain 2 inches of clearance from top of base flashing.
  - 2. Flood each area for 48 hours.
  - 3. After flood testing, repair leaks, repeat flood tests, and make further repairs until roofing and flashing installations are watertight.



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- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- D. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.10 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075423



Construction Documents

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Manufactured through-wall flashing with counterflashing.
2. Manufactured reglets with counterflashing.
3. Formed low-slope roof sheet metal fabrications.
4. Formed steep-slope roof sheet metal fabrications.
5. Formed wall sheet metal fabrications.
6. Formed equipment support flashing.

B. Related Requirements:

1. Section 061053 " Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
2. Section 077200 "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.

1.3 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.

Construction Documents

1. Include plans, elevations, sections, and attachment details.
  2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
  3. Include identification of material, thickness, weight, and finish for each item and location in Project.
  4. Include details for forming, including profiles, shapes, seams, and dimensions.
  5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
  6. Include details of termination points and assemblies.
  7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
  8. Include details of roof-penetration flashing.
  9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
  10. Include details of special conditions.
  11. Include details of connections to adjoining work.
- C. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.
- D. Samples for Verification: For each type of exposed finish.
1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
  2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
  3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.
  4. Anodized Aluminum Samples: Samples to show full range to be expected for each color required.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Product Certificates: For each type of coping and roof edge flashing that is SPRI ES-1 tested.
- C. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- D. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

Construction Documents

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
  - 1. Build mockup of typical roof, approximately 10 feet long, including supporting construction cleats, seams, attachments, underlayment, and accessories.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.9 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

Construction Documents

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
  - 1. Exposed Coil-Coated Finish:
    - a. Three-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - 2. Color: As selected by Architect from manufacturer's full range.
    - 3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.
- C. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, dead soft, fully annealed; with smooth, flat surface.
  - 1. Finish: 2D (dull, cold rolled).

Construction Documents

- D. **Metallic-Coated Steel Sheet:** Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 coating designation or aluminum-zinc alloy-coated steel sheet according to ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; prepainted by coil-coating process to comply with ASTM A 755/A 755M.
  - 1. **Surface:** Smooth, flat.
  - 2. **Exposed Coil-Coated Finish:**
    - a. **Three-Coat Fluoropolymer:** AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 3. **Color:** As selected by Architect from manufacturer's full range.

2.3 UNDERLAYMENT MATERIALS

- A. **Self-Adhering, High-Temperature Sheet:** Minimum 40 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
  - 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
    - a. Carlisle Coatings & Waterproofing Inc.
    - b. Carlisle Residential; a division of Carlisle Construction Materials.
    - c. Drexel Metals.
    - d. GCP Applied Technologies (formerly Grace Construction Products).
    - e. Henry Company.
    - f. Kirsch Building Products, LLC.
    - g. Owens Corning.
    - h. Polyguard Products, Inc.
    - i. Protecto Wrap Company.
    - j. SDP Advanced Polymer Products Inc.
  - 2. **Thermal Stability:** ASTM D 1970; stable after testing at 240 deg F or higher.
  - 3. **Low-Temperature Flexibility:** ASTM D 1970; passes after testing at minus 20 deg F or lower.
- B. **Slip Sheet:** Rosin-sized building paper, 3 lb/100 sq. ft. minimum.

Construction Documents

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
  - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
    - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
    - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
  - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
  - 3. Fasteners for Zinc-Coated (Galvanized) or Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.
- C. Solder:
  - 1. For Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
  - 2. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead with maximum lead content of 0.2 percent.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- E. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.



Construction Documents

- I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 MANUFACTURED SHEET METAL FLASHING AND TRIM

- A. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions and with interlocking counterflashing on exterior face, of same metal as reglet.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Cheney Flashing Company.
- b. Fry Reglet Corporation.
- c. Heckmann Building Products, Inc.
- d. Hickman Company, W. P.
- e. Hohmann & Barnard, Inc.
- f. Keystone Flashing Company, Inc.
- g. National Sheet Metal Systems, Inc.
- h. Sandell Manufacturing Co., Inc.

- 2. Material: Stainless steel, 0.019 inch thick.
- 3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
- 4. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
- 5. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
- 6. Accessories:
  - a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
  - b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing's lower edge.

2.6 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

- 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
- 2. Obtain field measurements for accurate fit before shop fabrication.

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3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
  4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
  2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
- G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- H. Do not use graphite pencils to mark metal surfaces.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Roof and Roof-to-Wall Transition Expansion-Joint Cover: Fabricate from the following materials: Shop fabricate interior and exterior corners.
1. Aluminum: 0.050 inch thick.
  2. Stainless Steel: 0.025 inch thick.
  3. Galvanized Steel: 0.034 inch thick.
  4. Aluminum-Zinc Alloy-Coated Steel: 0.034 inch thick.
- B. Base Flashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
1. Aluminum: 0.040 inch thick.
  2. Stainless Steel: 0.019 inch thick.
  3. Galvanized Steel: 0.028 inch thick.
  4. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

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- C. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
  - 1. Aluminum: 0.032 inch thick.
  - 2. Stainless Steel: 0.019 inch thick.
  - 3. Galvanized Steel: 0.022 inch thick.
  - 4. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.
  
- D. Flashing Receivers: Fabricate from the following materials:
  - 1. Aluminum: 0.032 inch thick.
  - 2. Stainless Steel: 0.016 inch thick.
  - 3. Galvanized Steel: 0.022 inch thick.
  - 4. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.
  
- E. Roof-Penetration Flashing: Fabricate from the following materials:
  - 1. Stainless Steel: 0.019 inch thick.
  - 2. Galvanized Steel: 0.028 inch thick.
  - 3. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.
  
- F. Roof-Drain Flashing: Fabricate from the following materials:
  - 1. Stainless Steel: 0.016 inch thick.
  - 2. Zinc-Tin Alloy-Coated Stainless Steel: 0.015 inch thick.

2.8 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:
  - 1. Aluminum: 0.032 inch thick.
  - 2. Stainless Steel: 0.016 inch thick.
  - 3. Galvanized Steel: 0.022 inch thick.
  - 4. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.
  
- B. Valley Flashing: Fabricate from the following materials:
  - 1. Stainless Steel: 0.019 inch thick.
  - 2. Galvanized Steel: 0.028 inch thick.
  - 3. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.
  
- C. Drip Edges: Fabricate from the following materials:
  - 1. Aluminum: 0.032 inch thick.
  - 2. Stainless Steel: 0.016 inch thick.
  - 3. Galvanized Steel: 0.022 inch thick.
  - 4. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

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Construction Documents

D. Eave, Rake, Ridge, and Hip Flashing: Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.
2. Stainless Steel: 0.016 inch thick.
3. Galvanized Steel: 0.022 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

E. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.
2. Stainless Steel: 0.019 inch thick.
3. Galvanized Steel: 0.022 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

F. Flashing Receivers: Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.
2. Stainless Steel: 0.016 inch thick.
3. Galvanized Steel: 0.022 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

G. Roof-Penetration Flashing: Fabricate from the following materials:

1. Stainless Steel: 0.019 inch thick.
2. Galvanized Steel: 0.028 inch thick.
3. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

## 2.9 WALL SHEET METAL FABRICATIONS

A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch-long, but not exceeding 12-foot-long, sections, under copings, and at shelf angles. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings; and form with 2-inch-high, end dams. Fabricate from the following materials:

1. Stainless Steel: 0.016 inch thick.

B. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.
2. Stainless Steel: 0.016 inch thick.
3. Galvanized Steel: 0.022 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

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Construction Documents

- C. Wall Expansion-Joint Cover: Fabricate from the following materials:
  - 1. Aluminum: 0.040 inch thick.
  - 2. Stainless Steel: 0.019 inch thick.
  - 3. Galvanized Steel: 0.028 inch thick.
  - 4. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
  - 1. Verify compliance with requirements for installation tolerances of substrates.
  - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
  - 3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 UNDERLAYMENT INSTALLATION**

- A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller. Cover underlayment within 14 days.

**3.3 INSTALLATION, GENERAL**

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
  - 1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
  - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
  - 3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.

Construction Documents

4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
  5. Torch cutting of sheet metal flashing and trim is not permitted.
  6. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
  2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
  2. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
  2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work.
1. Do not solder metallic-coated steel and aluminum sheet.
  2. Do not use torches for soldering.
  3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

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Construction Documents

- 4. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

- H. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

3.4 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.
- C. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
- D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints minimum of 4 inches. Secure in waterproof manner by means of snap-in installation and sealant or lead wedges and sealant or interlocking folded seam or blind rivets and sealant unless otherwise indicated.
- E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.5 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Through-Wall Flashing: Installation of through-wall flashing is specified in Section 042000 "Unit Masonry."
- C. Reglets: Installation of reglets is specified in Section 042000 "Unit Masonry."
- D. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

Construction Documents

3.6 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.7 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.
- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200



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Construction Documents

SECTION 077100 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Copings.
- 2. Roof-edge drainage systems.

B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for downspout boots.
- 2. Section 061053 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
- 3. Section 074113.16 "Standing-Seam Metal Roof Panels" for roof-edge drainage-system components provided by metal-roof-panel manufacturer.
- 4. Section 076200 "Sheet Metal Flashing and Trim" for custom- and site-fabricated sheet metal flashing and trim.
- 5. Section 077200 "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
- 6. Section 079200 "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For roof specialties.

- 1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.
- 2. Include details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
- 3. Indicate profile and pattern of seams and layout of fasteners, cleats, clips, and other attachments.

Construction Documents

- 4. Detail termination points and assemblies, including fixed points.
- 5. Include details of special conditions.

C. Samples: For each type of roof specialty and for each color and texture specified.

D. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of roof specialty.

B. Product Test Reports: For copings and roof-edge flashings, for tests performed by a qualified testing agency.

C. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and set quality standards for fabrication and installation.

- 1. Build mockup of typical roof edge, including gutter and downspout, approximately 10 feet long, including supporting construction, seams, attachments, underlayment, and accessories.
- 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
- 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.

B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof-specialty installation.

Construction Documents

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.
- B. Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

Construction Documents

2.2 COPINGS

- A. Metal Copings: Manufactured coping system consisting of metal coping cap in section lengths not exceeding 12 feet, concealed anchorage; with corner units, end cap units, and concealed splice plates with finish matching coping caps.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Architectural Products Company.
    - b. ATAS International, Inc.
    - c. Castle Metal Products.
    - d. Cheney Flashing Company.
    - e. Drexel Metals.
    - f. Firestone.
    - g. Hickman Company, W. P.
    - h. Merchant & Evans Inc.
    - i. Metal-Era, Inc.
    - j. Perimeter Systems; a division of SAF.
    - k. Petersen Aluminum Corporation.
  - 2. Formed Aluminum Sheet Coping Caps: Aluminum sheet, thickness as required to meet performance requirements.
    - a. Surface: Smooth, flat finish.
    - b. Finish: Three-coat fluoropolymer.
    - c. Color: As selected by Architect from manufacturer's full range.
  - 3. Extruded-Aluminum Coping Caps: Extruded aluminum, thickness as required to meet performance requirements.
    - a. Finish: Three-coat fluoropolymer.
    - b. Color: As selected by Architect from manufacturer's full range.
  - 4. Corners: Factory mitered and soldered, continuously welded, or mechanically clinched and sealed watertight.
  - 5. Coping-Cap Attachment Method: Snap-on or face leg hooked to continuous cleat with back leg fastener exposed, fabricated from coping-cap material.
    - a. Snap-on Coping Anchor Plates: Concealed, galvanized-steel sheet, 12 inches wide, with integral cleats.
    - b. Face-Leg Cleats: Concealed, continuous stainless steel.

2.3 ROOF-EDGE DRAINAGE SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Architectural Products Company.

Construction Documents

2. ATAS International, Inc.
  3. Berger Building Products, Inc.
  4. Castle Metal Products.
  5. Cheney Flashing Company.
  6. CopperCraft by FABRAL.
  7. Drexel Metals.
  8. Hickman Company, W. P.
  9. Merchant & Evans Inc.
  10. Metal-Era, Inc.
  11. Perimeter Systems; a division of SAF.
- B. Downspouts: Plain rectangular, unless otherwise indicated, complete with machine-crimped elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.
1. Formed Aluminum: 0.032 inch thick minimum.
- C. Parapet Scuppers: Manufactured with closure flange trim to exterior, 4-inch-wide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof.
1. Formed Aluminum: 0.032 inch thick.
- D. Conductor Heads: Manufactured conductor heads, each with flanged back and stiffened top edge, and of dimensions and shape indicated, complete with outlet tube that nests into upper end of downspout, exterior flange trim, and built-in overflow.
1. Formed Aluminum: 0.032 inch thick.
- E. Splash Pans: Fabricate from the following exposed metal:
1. Formed Aluminum: 0.040 inch thick.
- F. Aluminum Finish: Three-coat fluoropolymer.
1. Color: As selected by Architect from manufacturer's full range.

2.4 MATERIALS

- A. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.

2.5 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

Construction Documents

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Carlisle Coatings & Waterproofing Inc.
    - b. GCP Applied Technologies (formerly Grace Construction Products).
    - c. Henry Company.
    - d. Metal-Fab Manufacturing, a Drexel Metals Company.
    - e. Owens Corning.
  2. Thermal Stability: ASTM D 1970/D 1970M; stable after testing at 240 deg F.
  3. Low-Temperature Flexibility: ASTM D 1970/D 1970M; passes after testing at minus 20 deg F.
- B. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
- C. Slip Sheet: Rosin-sized building paper, 3-lb/100 sq. ft. minimum.

2.6 MISCELLANEOUS MATERIALS

- A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
  2. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
- B. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.
- C. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- D. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.7 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Coil-Coated Aluminum Sheet Finishes:

Construction Documents

1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - a. Three-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - b. Concealed Surface Finish: Apply pretreatment and manufacturer's standard acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.
- C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage where applicable, and securely anchored.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.
  1. Apply continuously under copings and roof-edge specialties.
  2. Coordinate application of self-adhering sheet underlayment under roof specialties with requirements for continuity with adjacent air barrier materials.

3.3 INSTALLATION, GENERAL

- A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.
  1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.

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Construction Documents

2. Provide uniform, neat seams with minimum exposure of solder and sealant.
  3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
  4. Torch cutting of roof specialties is not permitted.
  5. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
1. Coat concealed side of uncoated aluminum and stainless-steel roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
  2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.
- C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
1. Space movement joints at a maximum of 12 feet with no joints within 18 inches of corners or intersections unless otherwise indicated on Drawings.
  2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D. Fastener Sizes: Use fasteners of sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.
- F. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.
- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work. Tin edges of uncoated copper sheets using solder for copper. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
- 3.4 COPING INSTALLATION
- A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.
  - B. Anchor copings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.



Construction Documents

1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's required spacing that meets performance requirements.
2. Interlock face-leg drip edge into continuous cleat anchored to substrate at manufacturer's required spacing that meets performance requirements. Anchor back leg of coping with screw fasteners and elastomeric washers at manufacturer's required spacing that meets performance requirements.

3.5 ROOF-EDGE DRAINAGE-SYSTEM INSTALLATION

- A. General: Install components to produce a complete roof-edge drainage system according to manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage system.
- B. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls and 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c.
  1. Connect downspouts to underground drainage system indicated, unless otherwise indicated.
- C. Splash Pans: Install where downspouts discharge on low-slope roofs. Set in asphalt roofing cement or elastomeric sealant.
- D. Parapet Scuppers: Install scuppers through parapet where indicated. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
  1. Anchor scupper closure trim flange to exterior wall and seal or solder to scupper.
  2. Loosely lock front edge of scupper with conductor head.
  3. Seal or solder exterior wall scupper flanges into back of conductor head.
- E. Conductor Heads: Anchor securely to wall with elevation of conductor top edge 1 inch below scupper discharge.

3.6 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.

Construction Documents

- D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077100

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Construction Documents

SECTION 077200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Equipment supports.
- 2. Roof hatches.

B. Related Sections:

- 1. Section 076200 "Sheet Metal Flashing and Trim" for shop- and field-formed metal flashing, roof-drainage systems, roof expansion-joint covers, and miscellaneous sheet metal trim and accessories.
- 2. Section 077100 "Roof Specialties" for manufactured fasciae, copings, gravel stops, gutters and downspouts, and counterflashing.

1.3 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
- B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of roof accessory.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples: For each exposed product and for each color and texture specified, prepared on Samples of size to adequately show color.

Construction Documents

- C. Delegated-Design Submittal: For equipment supports indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  - 1. Detail mounting, securing, and flashing of roof-mounted items to roof structure. Indicate coordinating requirements with roof membrane system.
  - 2. Wind-Restraint Details: Detail fabrication and attachment of wind restraints. Show anchorage details and indicate quantity, diameter, and depth of penetration of anchors.

1.5 INFORMATIONAL SUBMITTALS

- A. Sample Warranties: For manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

1.7 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design equipment supports to comply with wind performance requirements, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

Construction Documents

2.2 EQUIPMENT SUPPORTS

- A. Equipment Supports: Internally reinforced perimeter metal equipment supports capable of supporting superimposed live and dead loads between structural supports, including equipment loads and other construction indicated on Drawings, spanning between structural supports; capable of meeting performance requirements; with welded or mechanically fastened and sealed corner joints, stepped integral metal cant raised the thickness of roof insulation, and integrally formed structure-mounting flange at bottom.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Adaptable Air Products.
    - b. AES Industries, Inc.
    - c. Air Balance Inc.; a division of MESTEK, Inc.
    - d. Conn-Fab Sales, Inc.
    - e. Curbs Plus, Inc.
    - f. Custom Solution Roof and Metal Products.
    - g. Greenheck Fan Corporation.
    - h. KCC International Inc.
    - i. Lloyd Industries, Inc.
    - j. LMCurbs.
    - k. Louvers & Dampers, Inc.; a division of Mestek, Inc.
    - l. Milcor; Commercial Products Group of Hart & Cooley, Inc.
    - m. Pate Company (The).
    - n. Plenums Incorporated.
    - o. Roof Curb Systems.
    - p. Roof Products and Systems (RPS); a division of Hart & Cooley, Inc.
    - q. Roof Products, Inc.
    - r. Thybar Corporation.
    - s. Vent Products Co., Inc.
- B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.
- C. Supported Load Capacity: As required by supported equipment.
- D. Material: Stainless-steel sheet, 0.078 inch thick.
  - 1. Finish: No. 2D, directional polish finish.
- E. Construction:
  - 1. Curb Profile: Manufacturer's standard compatible with roofing system.
  - 2. Insulation: Factory insulated with 1-1/2-inch- thick glass-fiber board insulation.
  - 3. Liner: Same material as equipment support, of manufacturer's standard thickness and finish.
  - 4. Nailers: Factory-installed continuous wood nailers 3-1/2 inches wide on top flange of equipment supports, continuous around support perimeter.

Construction Documents

5. Platform Cap: Where portion of equipment support is not covered by equipment, provide weathertight platform cap formed from 3/4-inch thick plywood covered with metal sheet of same type, thickness, and finish as required for curb.
6. Metal Counterflashing: Manufacturer's standard, removable, fabricated of same metal and finish as equipment support.
7. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.
8. Fabricate equipment supports to minimum height of 12 inches above roofing surface unless otherwise indicated.
9. Sloping Roofs: Where roof slope exceeds 1:48, fabricate each support with height to accommodate roof slope so that tops of supports are level with each other. Equip supports with water diverters or crickets on sides that obstruct water flow.
10. Security Grille: Provide for all units, unless otherwise indicated.

2.3 ROOF HATCH

- A. Roof Hatches: Metal roof-hatch units with lids and insulated double-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, stepped integral metal cant raised the thickness of roof insulation, and integrally formed deck-mounting flange at perimeter bottom.
  1. Basis-of-Design: Subject to compliance with requirements, provide product indicated below or a comparable product as approved by the Architect:
    - a. Manufacturer: The Bilco Company.
    - b. Style: Thermally Broken Roof Hatch.
    - c. Product: Type S-50TB.
- B. Type and Size: As indicated on the Drawings.
- C. Loads: Minimum 40-lbf/sq. ft. external live load and 20-lbf/sq. ft. internal uplift load.
- D. Hatch Material: Aluminum sheet.
  1. Thickness: Manufacturer's standard thickness for hatch size indicated.
  2. Finish: Two-coat fluoropolymer.
  3. Color: As selected by Architect from manufacturer's full range.
- E. Construction:
  1. Insulation: Manufacturer's standard.
    - a. R-Value: 12.0 according to ASTM C 1363, unless otherwise indicated.
  2. Nailer: Factory-installed wood nailer continuous around hatch perimeter.
  3. Hatch Lid: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.
  4. Curb Liner: Manufacturer's standard, of same material and finish as metal curb.

Construction Documents

5. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
  6. Fabricate curbs to minimum height of 12 inches above roofing surface unless otherwise indicated.
  7. Sloping Roofs: Where slope or roof deck exceeds 1:48, fabricate curb with perimeter curb height that is tapered to accommodate roof slope so that top surfaces of perimeter curb are level. Equip hatch with water diverter or cricket on side that obstructs water flow.
- F. Hardware: Spring operators, hold-open arm, stainless-steel spring latch with turn handles, stainless-steel butt- or pintle-type hinge system, and padlock hasps inside and outside.
1. Provide two-point latch on lids larger than 84 inches.

2.4 METAL MATERIALS

- A. Aluminum Sheet: ASTM B 209, manufacturer's standard alloy for finish required, with temper to suit forming operations and performance required.
1. Exposed Coil-Coated Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - a. Two-Coat Fluoropolymer Finish: AAMA 2605. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
  2. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
  3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil.
- B. Aluminum Extrusions and Tubes: ASTM B 221, manufacturer's standard alloy and temper for type of use, finished to match assembly where used; otherwise mill finished.
- C. Stainless-Steel Sheet and Shapes: ASTM A 240/A 240M or ASTM A 666, Type 304.
- D. Steel Shapes: ASTM A 36/A 36M, hot-dip galvanized according to ASTM A 123/A 123M unless otherwise indicated.
- E. Steel Tube: ASTM A 500/A 500M, round tube.
- F. Galvanized-Steel Tube: ASTM A 500/A 500M, round tube, hot-dip galvanized according to ASTM A 123/A 123M.
- G. Steel Pipe: ASTM A 53/A 53M, galvanized.

Construction Documents

2.5 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Cellulosic-Fiber Board Insulation: ASTM C 208, Type II, Grade 1, thickness as indicated.
- C. Glass-Fiber Board Insulation: ASTM C 726, nominal density of 3 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F, thickness as indicated.
- D. Polyisocyanurate Board Insulation: ASTM C 1289, thickness and thermal resistivity as indicated.
- E. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWPA C2; not less than 1-1/2 inches thick.
- F. Security Grilles: 3/4-inch diameter, ASTM A 1011/A 1011M steel bars spaced 6 inches o.c. in one direction and 12 inches o.c. in the other; factory finished as follows:
  - 1. Surface Preparation: Remove mill scale and rust, if any, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
  - 2. Factory Priming for Field-Painted Finish: Apply shop primer specified below immediately after surface preparation and pretreatment.
  - 3. Shop Primer: Manufacturer's or fabricator's standard, fast-curing, lead- and chromate-free, universal primer; selected for resistance to normal atmospheric corrosion, for compatibility with substrate and field-applied finish paint system indicated, and for capability to provide a sound foundation for field-applied topcoats under prolonged exposure.
- G. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- H. Underlayment:
  - 1. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
  - 2. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
    - 3. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
    - 4. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
- I. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.



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Construction Documents

- J. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.
- K. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.
- L. Asphalt Roofing Cement: ASTM D 4586/D 4586M, asbestos free, of consistency required for application.

2.6 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Verify dimensions of roof openings for roof accessories.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions.
  - 1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
  - 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
  - 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
  - 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

Construction Documents

- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
  - 1. Coat concealed side of uncoated aluminum and stainless-steel roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
  - 2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of underlayment and cover with manufacturer's recommended slip sheet.
  - 3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.
- C. Equipment Support Installation: Install equipment supports so top surfaces are level with each other.
- D. Roof-Hatch Installation:
  - 1. Verify that roof hatch operates properly. Clean, lubricate, and adjust operating mechanism and hardware.
  - 2. Attach safety railing system to roof-hatch curb.
  - 3. Attach ladder-assist post according to manufacturer's written instructions.
- E. Security Grilles: Weld bar intersections and, using tamper-resistant bolts, attach the ends of bars to structural frame or primary curb walls.
- F. Seal joints with elastomeric or butyl sealant as required by roof accessory manufacturer.

3.3 REPAIR AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780/A 780M.
- B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 099113 "Exterior Painting."
- C. Clean exposed surfaces according to manufacturer's written instructions.
- D. Clean off excess sealants.
- E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077200

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Construction Documents

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Penetrations in fire-resistance-rated walls.
- 2. Penetrations in horizontal assemblies.
- 3. Penetrations in smoke barriers.

B. Related Requirements:

- 1. Section 078443 "Joint Firestopping" for joints in or between fire-resistance-rated construction, and in smoke barriers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

- 1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

Construction Documents

1.5 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
  - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
  - 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
    - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
      - 1) UL in its "Fire Resistance Directory."

Construction Documents

2.2 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. 3M Fire Protection Products.
    - b. A/D Fire Protection Systems Inc.
    - c. Construction Solutions.
    - d. Grabber Construction Products.
    - e. Hilti, Inc.
    - f. HOLDRITE.
    - g. NUCO Inc.
    - h. Passive Fire Protection Partners.
    - i. RectorSeal.
    - j. Specified Technologies, Inc.
    - k. STC Architectural Products.
    - l. Tremco, Inc.
- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
  - 1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
  - 1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
  - 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
  - 3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
- D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg.
  - 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at and no more than 50-cfm cumulative total for any 100 sq. ft. at both ambient and elevated temperatures.
- E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.

Construction Documents

- F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
  - 1. Permanent forming/damming/backing materials.
  - 2. Substrate primers.
  - 3. Collars.
  - 4. Steel sleeves.

2.3 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
- E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

Construction Documents

2.4 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
  - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
  - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.

Construction Documents

- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
  - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.
  - 1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.
- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
  - 1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
  - 2. Contractor's name, address, and phone number.
  - 3. Designation of applicable testing and inspecting agency.
  - 4. Date of installation.
  - 5. Manufacturer's name.
  - 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2174.



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Construction Documents

- B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
- C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.
- A. Penetration Firestopping with No Penetrating Items:
  - 1. UL-Classified Systems: C-AJ-0001-0999 and W-L-0001-0999.
  - 2. Type of Fill Materials: As required to achieve rating.
- B. Penetration Firestopping for Metallic Pipes, Conduit, or Tubing:
  - 1. UL-Classified Systems: C-AJ-1001-1999 and W-L-1001-1999.
  - 2. Type of Fill Materials: As required to achieve rating.
- C. Penetration Firestopping for Nonmetallic Pipe, Conduit, or Tubing:
  - 1. UL-Classified Systems: C-AJ-2001-2999 and W-L-2001-2999.
  - 2. Type of Fill Materials: As required to achieve rating.
- D. Penetration Firestopping for Electrical Cables:
  - 1. UL-Classified Systems: C-AJ-3001-3999 and W-L-3001-3999.
- E. Penetration Firestopping for Cable Trays with Electric Cables:
  - 1. UL-Classified Systems: C-AJ-4001-4999 and W-L-4001-4999.
  - 2. Type of Fill Materials: As required to achieve rating.

Construction Documents

- F. Penetration Firestopping for Insulated Pipes:
  - 1. UL-Classified Systems: C-AJ-5001-5999 and W-L-5001-5999.
  - 2. Type of Fill Materials: As required to achieve rating.
  
- G. Penetration Firestopping for Miscellaneous Electrical Penetrants:
  - 1. UL-Classified Systems: C-AJ-6001-6999 and W-L-6001-6999.
  - 2. Type of Fill Materials: As required to achieve rating.
  
- H. Penetration Firestopping for Miscellaneous Mechanical Penetrants:
  - 1. UL-Classified Systems: C-AJ-7001-7999 and W-L-7001-7999.
  - 2. Type of Fill Materials: As required to achieve rating.
  
- I. Penetration Firestopping for Groupings of Penetrants:
  - 1. UL-Classified Systems: C-AJ-8001-8999 and W-L-8001-8999.
  - 2. Type of Fill Materials: As required to achieve rating.

END OF SECTION 078413

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Construction Documents

SECTION 078443 - JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Joints in or between fire-resistance-rated constructions.
- 2. Joints in smoke barriers.

B. Related Requirements:

- 1. Section 078413 "Penetration Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers and for wall identification.
- 2. Section 092216 "Non-Structural Metal Framing" for firestop tracks for metal-framed partition heads.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.

- 1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.

Construction Documents

1.5 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of joints to accommodate joint firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
  - 1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
  - 2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
    - a. Joint firestopping systems shall bear classification marking of a qualified testing agency.
      - 1) UL in its "Fire Resistance Directory."

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Construction Documents

2.2 JOINT FIRESTOPPING SYSTEMS

- A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
  
- B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E 1966 or UL 2079.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. 3M Fire Protection Products.
    - b. A/D Fire Protection Systems Inc.
    - c. BlazeFrame Industries.
    - d. Grabber Construction Products.
    - e. Hilti, Inc.
    - f. Metal-Lite.
    - g. Nelson Firestop; a brand of Emerson Industrial Automation.
    - h. NUCO Inc.
    - i. Passive Fire Protection Partners.
    - j. RectorSeal.
    - k. Roxul Inc.
    - l. Specified Technologies, Inc.
    - m. Thermafiber, Inc.; an Owens Corning company.
    - n. Tremco, Inc.
  
  - 2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.
  
- C. Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079 based on testing at a positive pressure differential of 0.30-inch wg.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. 3M Fire Protection Products.
    - b. A/D Fire Protection Systems Inc.
    - c. Hilti, Inc.
    - d. Nelson Firestop; a brand of Emerson Industrial Automation.
    - e. NUCO Inc.
    - f. Passive Fire Protection Partners.
    - g. RectorSeal.
    - h. Roxul Inc.
    - i. Specified Technologies, Inc.
    - j. Thermafiber, Inc.; an Owens Corning company.
    - k. Tremco, Inc.
  
  - 2. L-Rating: Not exceeding 5.0 cfm/ft. of joint at both ambient and elevated temperatures.

Construction Documents

- D. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- E. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

- A. Surface Cleaning: Before installing fire-resistive joint systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
  - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
  - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

**3.3 INSTALLATION**

- A. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

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- B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
  - 1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
  
- C. Install elastomeric fill materials for fire-resistive joint systems by proven techniques to produce the following results:
  - 1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
  - 2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
  - 3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
  - 1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
  - 2. Contractor's name, address, and phone number.
  - 3. Designation of applicable testing agency.
  - 4. Date of installation.
  - 5. Manufacturer's name.
  - 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2393.
  
- B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.
  
- C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

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Construction Documents

3.6 CLEANING AND PROTECTION

- A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

3.7 JOINT FIRESTOPPING SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHBN.
- A. Floor-to-Floor, Joint Firestopping Systems:
  - 1. UL-Classified Systems: FF-S (D as required)-0000-0999.
- B. Wall-to-Wall, Joint Firestopping Systems:
  - 1. UL-Classified Systems: WW-S (D as required)-0000-0999.
- C. Floor-to-Wall, Joint Firestopping Systems:
  - 1. UL-Classified Systems: FW-S (D as required)-0000-0999.
- D. Head-of-Wall, Joint Firestopping Systems:
  - 1. UL-Classified Systems: HW-S (D as required)-0000-0999.
- E. Bottom-of-Wall, Joint Firestopping Systems:
  - 1. UL-Classified Systems: BW-S (D as required)-0000-0999.
- F. Wall-to-Wall, Joint Firestopping Systems Intended for Use as Corner Guards:
  - 1. UL-Classified Systems: CG-S (D as required)-0000-0999.
- G. Perimeter Joint Firestopping Systems:
  - 1. UL-Classified Perimeter Fire-Containment Systems: CW-S (D as required)-0000-0999.

END OF SECTION 078443



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Construction Documents

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Nonstaining silicone joint sealants.
3. Immersible joint sealants.
4. Silyl-terminated polyether joint sealants.
5. Mildew-resistant joint sealants.
6. Butyl joint sealants.
7. Latex joint sealants.

B. Related Requirements:

1. Section 079100 "Preformed Joint Seals" for preformed compressible foam and precured joint seals.
2. Section 079219 "Acoustical Joint Sealants" for sealing joints in sound-rated construction.

1.3 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

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- B. Product Test Reports: For each kind of joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.
- C. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
- D. Field-Adhesion-Test Reports: For each sealant application tested.
- E. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.
  - 1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.
- C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
  - 1. Adhesion Testing: Use ASTM C 794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
  - 2. Compatibility Testing: Use ASTM C 1087 to determine sealant compatibility when in contact with glazing and gasket materials.
  - 3. Stain Testing: Use ASTM C 1248 to determine stain potential of sealant when in contact with masonry substrates.
  - 4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
  - 5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
  - 6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
  - 7. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

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- B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
  - 1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
  - 2. Conduct field tests for each kind of sealant and joint substrate.
  - 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
  - 4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
    - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
      - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
  - 5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
  - 6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.7 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
  - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
  - 2. When joint substrates are wet.
  - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Two years from date of Substantial Completion.

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- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
  - 1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
  - 2. Disintegration of joint substrates from causes exceeding design specifications.
  - 3. Mechanical damage caused by individuals, tools, or other outside agents.
  - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 100/50, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. GE Construction Sealants; Momentive Performance Materials Inc.; SCS2700 SilPruf LM.
    - b. Sika Corporation; Joint Sealants; Sikasil WS-290 or Sikasil WS-290 FPS.
- B. Silicone, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation; DOW CORNING® NS PARKING STRUCTURE SEALANT.

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- b. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 728 NS.
  - c. Sika Corporation; Joint Sealants; Sikasil 728 NS.
- C. Silicone, S, P, 100/50, T, NT: Single-component, pourable, plus 100 percent and minus 50 percent movement capability traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade P, Class 100/50, Uses T and NT.
- 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 728 SG or Bondaflex Sil 728 SL.
    - b. Sika Corporation; Joint Sealants; Sikasil 728 SL.

2.3 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.
  - B. Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
- 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 290 FPS-NB or Bondaflex Sil 290 NB.
    - b. Pecora Corporation; 890 NST or 890FTS/TXTR.
    - c. Tremco Incorporated; Spectrem 1.

2.4 IMMERSIBLE JOINT SEALANTS

- A. Immersible Joint Sealants. Suitable for immersion in liquids; ASTM C 1247, Class 1; tested in deionized water unless otherwise indicated
  - B. Urethane, Immersible, S, P, 50, T, NT, I: Immersible, single-component, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 50, Uses T, NT, and I.
- 1. Products: Subject to compliance with requirements, provide the following:
    - a. Tremco Incorporated; Vulkem 45 SSL.

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2.5 SILYL-TERMINATED POLYETHER (STPE) JOINT SEALANTS

- A. STPE, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, silyl-terminated polyether joint sealant; ASTM C 920, Type S, Grade NS, Class 100, Uses T and NT.
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. Soudal USA; SoudaSeal 150LM.

2.6 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation; DOW CORNING® 786 SILICONE SEALANT -.
    - b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS1700 Sanitary.
    - c. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 100 WF.
    - d. Soudal USA; RTV GP.
    - e. Tremco Incorporated; Tremsil 200.
- C. STPE, Mildew Resistant, S, NS, 50, NT: Mildew-resistant, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, silyl-terminated polyether joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. BASF Corporation; Construction Systems; MasterSeal NP 150 (Pre-2014: Sonolastic 150VLM).

2.7 BUTYL JOINT SEALANTS

- A. Butyl-Rubber-Based Joint Sealants: ASTM C 1311.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Bostik, Inc.
    - b. Pecora Corporation.

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2.8 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Product by BASF Corporation; Construction Systems.
    - b. Franklin International; Titebond Painter's Plus Caulk or Titebond UA 920 Sealant.
    - c. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex 600 or Bondaflex Sil-A 700.
    - d. Pecora Corporation; AC-20.
    - e. Sherwin-Williams Company (The); 850A Siliconized Acrylic Latex Caulk, 950A Siliconized Acrylic Latex Caulk, White, or PowerHouse Siliconized Acrylic Latex Sealant.
    - f. Tremco Incorporated; Tremflex 834.

2.9 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Alcot Plastics Ltd.; ALCOT Soft Type Backer Rod or ALCOT Standard Backer Rod.
    - b. BASF Corporation; Construction Systems; MasterSeal 920 & 921(Pre-2014: Sonolastic Backer Rod).
    - c. Product by Construction Foam Products; a division of Nomaco, Inc.
- B. Cylindrical Sealant Backings: ASTM C 1330, of the types indicated below, or as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
  - 1. Exterior Joints: Type B (bicellular material with a surface skin.)
  - 2. All Other Locations: Type C (closed cell materials with a surface skin.)
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.10 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

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- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    - a. Concrete.
    - b. Masonry.
    - c. Unglazed surfaces of ceramic tile.
  - 3. Remove laitance and form-release agents from concrete.
  - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    - a. Metal.
    - b. Glass.
    - c. Porcelain enamel.
    - d. Glazed surfaces of ceramic tile.



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- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of sealant backings.
  - 2. Do not stretch, twist, puncture, or tear sealant backings.
  - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses in each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  - 1. Remove excess sealant from surfaces adjacent to joints.
  - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  - 3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
  - 4. Provide flush joint profile at locations indicated on Drawings according to Figure 8B in ASTM C 1193.

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5. Provide recessed joint configuration of recess depth and at locations indicated on Drawings according to Figure 8C in ASTM C 1193.
  - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:
  - a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
  - b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.
2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
  - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
3. Inspect tested joints and report on the following:
  - a. Whether sealants filled joint cavities and are free of voids.
  - b. Whether sealant dimensions and configurations comply with specified requirements.
  - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

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3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
  - 1. Joint Locations:
    - a. Isolation and contraction joints in cast-in-place concrete slabs.
    - b. Tile control and expansion joints.
    - c. Joints between different materials listed above.
    - d. Other joints as indicated on Drawings.
  - 2. Joint Sealant: Silicone, S, NS, 100/50, T.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces subject to water immersion.
  - 1. Joint Locations:
    - a. Joints in pedestrian plazas.
    - b. Other joints as indicated on Drawings.
  - 2. Joint Sealant: Urethane, immersible, S, P, 50, T, NT, I.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Locations:
    - a. Construction joints in cast-in-place concrete.
    - b. Control and expansion joints in unit masonry.
    - c. Joints between metal panels.
    - d. Joints between different materials listed above.

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- e. Perimeter joints between materials listed above and frames of doors, windows, and louvers.
    - f. Control and expansion joints in ceilings and other overhead surfaces.
    - g. Other joints as indicated on Drawings.
  2. Joint Sealant: Silicone, nonstaining, S, NS, 100/50, NT or paintable STPE, S, NS, 100/50, T, NT.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
  1. Joint Locations:
    - a. Isolation joints in cast-in-place concrete slabs.
    - b. Control and expansion joints in tile flooring.
    - c. Other joints as indicated on Drawings.
  2. Joint Sealant: Silicone, S, P, 100/50, T, NT or paintable STPE, S, NS, 100/50, T, NT. .
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
  1. Joint Locations:
    - a. Control and expansion joints on exposed interior surfaces of exterior walls.
    - b. Tile control and expansion joints.
    - c. Vertical joints on exposed surfaces of unit masonry walls and partitions.
    - d. Other joints as indicated on Drawings.
  2. Joint Sealant: Silicone, S, NS, 100/50, NT or paintable STPE, S, NS, 100/50, T, NT.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
  1. Joint Locations:
    - a. Control joints on exposed interior surfaces of exterior walls.
    - b. Perimeter joints between interior wall surfaces and frames of interior doors, windows.
    - c. Other joints as indicated on Drawings.
  2. Joint Sealant: Acrylic latex.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

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- G. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Locations:
    - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    - b. Tile control and expansion joints where indicated.
    - c. Other joints as indicated on Drawings.
  - 2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT or paintable STPE, Mildew Resistant, S, NS, 50, NT.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
  
- H. Joint-Sealant Application: Concealed mastics.
  - 1. Joint Locations:
    - a. Aluminum thresholds.
    - b. Sill plates.
    - c. Other joints as indicated on Drawings.
  - 2. Joint Sealant: Butyl-rubber based.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200



Construction Documents

SECTION 079219 - ACOUSTICAL JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes acoustical joint sealants.
- B. Related Requirements:
  - 1. Section 079200 "Joint Sealants" for elastomeric, latex, and butyl-rubber-based joint sealants for nonacoustical applications.

1.3 ACTION SUBMITTALS

- A. Product Data: For each acoustical joint sealant.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Acoustical-Joint-Sealant Schedule: Include the following information:
  - 1. Joint-sealant application, joint location, and designation.
  - 2. Joint-sealant manufacturer and product name.
  - 3. Joint-sealant formulation.
  - 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each kind of acoustical joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.
- B. Sample Warranties: For special warranties.

Construction Documents

1.5 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace acoustical joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish acoustical joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E 90.

2.2 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant for Exposed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C 834.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Accumetric LLC; BOSS 826 Acoustical Sound Sealant.
    - b. Franklin International; Titebond GREENchoice Professional Acoustical Smoke & Sound Sealant.
    - c. GE Construction Sealants; Momentive Performance Materials Inc.; RCS20 Acoustical.
    - d. Grabber Construction Products; Acoustical Sealant GSC.
    - e. Hilti, Inc.; CP 506 Smoke and Acoustical Sealant.
    - f. OSI Sealants; Henkel Corporation; OSI Pro-Series SC-175 Acoustical Sound Sealant.
    - g. Pecora Corporation; AC-20 FTR or AIS-919.
    - h. Serious Energy Inc.; Quiet Seal Pro.
    - i. Tremco Incorporated; Tremco Acoustical Sealant.
    - j. United States Gypsum Company; SHEETROCK Acoustical Sealant.
  - 2. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors.



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- B. Acoustical Sealant for Concealed Joints: Manufacturer's standard nonsag, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber acoustical sealant.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Pecora Corporation; BA-98.
    - b. Serious Energy Inc.; Quiet Seal 350.

2.3 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by acoustical-joint-sealant manufacturer where required for adhesion of sealant to joint substrates.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive acoustical joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where recommended by acoustical-joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

Construction Documents

3.3 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

- A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C 919, ASTM C 1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.
- C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of acoustical joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect acoustical joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated acoustical joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079219

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Construction Documents

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes hollow-metal work.
- B. Related Requirements:
  - 1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.
- B. Shop Drawings: Include the following:
  - 1. Elevations of each door type.
  - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
  - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
  - 4. Locations of reinforcement and preparations for hardware.
  - 5. Details of each different wall opening condition.
  - 6. Details of anchorages, joints, field splices, and connections.

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Construction Documents

- 7. Details of accessories.
- 8. Details of moldings, removable stops, and glazing.
- 9. Details of conduit and preparations for power, signal, and control systems.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.6 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

- 1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1. Baron Metal Industries Inc.; an Assa Abloy Group company.
- 2. Ceco Door; ASSA ABLOY.
- 3. Curries Company; ASSA ABLOY.
- 4. DKS Steel Door & Frame Systems, Inc.
- 5. Fleming Door Products Ltd.; Assa Abloy Group Company.
- 6. Karpen Steel Custom Doors & Frames.
- 7. Mesker Door Inc.
- 8. Pioneer Industries.
- 9. Republic Doors and Frames.
- 10. Steelcraft; an Allegion brand.

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- B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
  - 1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
- B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 INTERIOR DOORS AND FRAMES

- A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2..
  - 1. Physical Performance: Level B according to SDI A250.4.
  - 2. Doors:
    - a. Type: As indicated in the Door and Frame Schedule.
    - b. Thickness: 1-3/4 inches.
    - c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042 inch.
    - d. Edge Construction: Model 1, Full Flush.
    - e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.
  - 3. Frames:
    - a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch.
    - b. Frames: Fabricated from same thickness material as adjacent door frame.
    - c. Construction: Full profile welded.
  - 4. Exposed Finish: Prime.

Construction Documents

2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

- A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
  
- B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3..
  - 1. Physical Performance: Level A according to SDI A250.4.
  - 2. Doors:
    - a. Type: As indicated in the Door and Frame Schedule.
    - b. Thickness: 1-3/4 inches
    - c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.
    - d. Edge Construction: Model 1, Full Flush.
    - e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.
      - 1) Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than 2.1 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
  - 3. Frames:
    - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.
    - b. Construction: Full profile welded.
  - 4. Exposed Finish: Prime.

2.5 BORROWED LITES

- A. Hollow-metal frames of uncoated or metallic-coated steel sheet to match adjacent door and frame, minimum thickness of 0.053 inch.
  
- B. Construction: Full profile welded.

2.6 FRAME ANCHORS

- A. Jamb Anchors:
  - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
  - 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.

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3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
  4. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
  2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.7 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- C. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
  1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- F. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- G. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- H. Glazing: Comply with requirements in Section 088000 "Glazing."
- I. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

Construction Documents

2.8 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
  
- B. Hollow-Metal Doors:
  - 1. Steel-Stiffened Door Cores: Provide minimum thickness 0.026 inch, steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches apart. Spot weld to face sheets no more than 5 inches o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
  - 2. Fire Door Cores: As required to provide fire-protection ratings indicated.
  - 3. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches.
  - 4. Top Edge Closures: Close top edges of doors with inverted closures, except provide flush closures at exterior doors of same material as face sheets.
  - 5. Bottom Edge Closures: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets.
  - 6. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
  - 7. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
  
- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
  - 1. Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
  - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  - 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
  - 4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
  - 5. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:
      - 1) Two anchors per jamb up to 60 inches high.
      - 2) Three anchors per jamb from 60 to 90 inches high.



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- 3) Four anchors per jamb from 90 to 120 inches high.
      - 4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Three anchors per jamb up to 60 inches high.
      - 2) Four anchors per jamb from 60 to 90 inches high.
      - 3) Five anchors per jamb from 90 to 96 inches high.
      - 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
    - c. Compression Type: Not less than two anchors in each frame.
    - d. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
  6. Head Anchors: Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
  7. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
    - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
  8. Terminated Stops: Terminate stops 6 inches above finish floor with a 45-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.
- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
  2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.
- F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
  2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
  3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

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4. Provide loose stops and moldings on inside of hollow-metal work.
5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.9 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.10 ACCESSORIES

A. Louvers: Provide louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.020-inch-thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame.

1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.

B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

C. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

Construction Documents

3.3 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
  - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. At fire-rated openings, install frames according to NFPA 80.
    - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    - c. Install frames with removable stops located on secure side of opening.
    - d. Install door silencers in frames before grouting.
    - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    - g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
  - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
    - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
  - 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
  - 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
  - 5. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
    - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

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- C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
  - 1. Non-Fire-Rated Steel Doors:
    - a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
    - b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
    - c. At Bottom of Door: 3/4 inch plus or minus 1/32 inch.
    - d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.
  - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
  - 3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.
  - 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow-metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- E. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

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Construction Documents

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Solid-core doors with wood-veneer faces.
2. Solid-core doors with plastic-laminate faces.
3. Factory finishing flush wood doors.
4. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:

1. Section 062023 "Interior Finish Carpentry" for wood door frames.
2. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.

- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:

1. Dimensions and locations of blocking.
2. Dimensions and locations of mortises and holes for hardware.
3. Dimensions and locations of cutouts.
4. Undercuts.
5. Requirements for veneer matching.
6. Doors to be factory finished and finish requirements.
7. Fire-protection ratings for fire-rated doors.

- C. Samples for Initial Selection: For plastic-laminate door faces and factory-finished doors.

- D. Samples for Verification:

Construction Documents

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.
2. Plastic laminate, 6 inches square, for each color, texture, and pattern selected.
3. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.
  - a. Provide Samples for each species of veneer and solid lumber required.
  - b. Provide Samples for each color, texture, and pattern of plastic laminate required.
  - c. Finish veneer-faced door Samples with same materials proposed for factory-finished doors.
4. Louver blade and frame sections, 6 inches long, for each material and finish specified.
5. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
    - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

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Construction Documents

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
3. Warranty Period for Solid-Core Interior Doors: Life of installation.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Basis-of-Design: Subject to compliance with requirements, provide product indicated below or a comparable product as approved by the Architect:
  1. Manufacturer: Mohawk by Masonite Architectural.
  2. Style: Cendura Series Commercial Doors.
  3. Surface Types: Wood veneer and plastic laminate.
- B. Source Limitations: Obtain flush wood doors from single manufacturer.

**2.2 FLUSH WOOD DOORS, GENERAL**

- A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."
  1. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.
- B. WDMA I.S.1-A Performance Grade: Extra Heavy Duty, unless otherwise indicated.
- C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
  1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
  2. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
  3. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
  4. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
- D. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.

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Construction Documents

E. Structural-Composite-Lumber-Core Doors:

1. Structural Composite Lumber: WDMA I.S.10.
  - a. Screw Withdrawal, Face: 700 lbf.
  - b. Screw Withdrawal, Edge: 400 lbf.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Grade: Premium, with Grade AA faces.
2. Species: Birch.
3. Cut: Plain sliced.
4. Match between Veneer Leaves: Book match.
5. Assembly of Veneer Leaves on Door Faces: Balance match.
6. Pair and Set Match: Provide for doors hung in same opening.
7. Transom Match: Continuous match.
8. Exposed Vertical and Top Edges: Same species as faces - edge Type A.
9. Core: Either glued wood stave or structural composite lumber.
10. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.
11. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

2.4 PLASTIC-LAMINATE-FACED DOORS

A. Interior Solid-Core Doors:

1. Grade: Premium.
2. Plastic-Laminate Faces: High-pressure decorative laminates complying with NEMA LD 3, Grade HGS.
3. Colors, Patterns, and Finishes: As indicated on the Finish Schedule.
4. Exposed Vertical and Top Edges: Plastic laminate that matches faces, applied before faces.
5. Core: Either glued wood stave or structural composite lumber.
6. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before faces and crossbands are applied.
7. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

2.5 LIGHT FRAMES AND LOUVERS

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.

1. Wood Species: Same species as door faces.
2. Profile: Flush rectangular beads.



Construction Documents

3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.
- B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.
- C. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch-thick, cold-rolled steel sheet; factory primed for paint or with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating indicated.
- D. Wood Louvers: Door manufacturer's standard solid-wood louvers unless otherwise indicated.
  1. Wood Species: Same species as door faces.
- E. Louvers for Fire-Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire-protection rating of 1-1/2 hours and less.
  1. Metal and Finish: Hot-dip galvanized steel, 0.040 inch thick, factory primed for paint or with baked-enamel- or powder-coated finish.

2.6 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
  1. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
  1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
  2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
  1. Fabricate door and transom panels with full-width, solid-lumber, rabbeted, meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.
- D. Openings: Factory cut and trim openings through doors.
  1. Light Openings: Trim openings with moldings of material and profile indicated.

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Construction Documents

2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
3. Louvers: Factory install louvers in prepared openings.

2.7 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
  1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors that are indicated to receive transparent finish.
- C. Transparent Finish:
  1. Grade: Premium.
  2. Finish: As selected by the Architect from the manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
  1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
  1. Install fire-rated doors according to NFPA 80.
  2. Install smoke- and draft-control doors according to NFPA 105.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.

Construction Documents

1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
    - a. Comply with NFPA 80 for fire-rated doors.
    - b. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
  2. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416



Construction Documents

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes access doors and frames for walls and ceilings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples: For each type of access door and frame and for each finish specified, complete assembly minimum 6 by 6 inches in size.
- C. Product Schedule: For access doors and frames. Use same designations indicated on Drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection and temperature-rise limit ratings indicated, according to NFPA 252 or UL 10B.

2.2 ACCESS DOORS AND FRAMES

- A. Flush Access Doors with Concealed Flanges:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Acudor Products, Inc.
    - b. Babcock-Davis.

Construction Documents

- c. Cendrex Inc.
  - d. Elmdor/Stoneman Manufacturing Company; a division of Acorn Engineering Company.
  - e. JL Industries, Inc.; a division of the Activar Construction Products Group.
  - f. Karp Associates, Inc.
  - g. Lane-Aire Manufacturing Corp.
  - h. Larsens Manufacturing Company.
  - i. Maxam Metal Products Limited.
  - j. Metropolitan Door Industries Corp.
  - k. MIFAB, Inc.
  - l. Milcor; Commercial Products Group of Hart & Cooley, Inc.
  - m. Nystrom, Inc.
  - n. Williams Bros. Corporation of America (The).
2. Description: Face of door flush with frame; with concealed flange for gypsum board installation and concealed hinge.
  3. Locations: Wall and ceiling.
  4. Door Size: As indicated on the Drawings.
  5. Metallic-Coated Steel Sheet for Door: Nominal 0.064 inch, 16 gage factory primed.
  6. Frame Material: Same material and thickness as door.
  7. Latch and Lock: Cam latch, screwdriver operated.

**B. Recessed Access Doors with Concealed Flanges:**

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Acudor Products, Inc.
  - b. Babcock-Davis.
  - c. Cendrex Inc.
  - d. Elmdor/Stoneman Manufacturing Company; a division of Acorn Engineering Company.
  - e. JL Industries, Inc.; a division of the Activar Construction Products Group.
  - f. Karp Associates, Inc.
  - g. Lane-Aire Manufacturing Corp.
  - h. Larsens Manufacturing Company.
  - i. Maxam Metal Products Limited.
  - j. Metropolitan Door Industries Corp.
  - k. MIFAB, Inc.
  - l. Milcor; Commercial Products Group of Hart & Cooley, Inc.
  - m. Nystrom, Inc.
  - n. Williams Bros. Corporation of America (The).
2. Description: Door face recessed 1/2 inch for gypsum board infill; with concealed flange for gypsum board installation and concealed hinge.
3. Locations: Wall and ceiling.
4. Door Size: As indicated on the Drawings.
5. Metallic-Coated Steel Sheet for Door: Nominal 0.064 inch, 16 gage, factory primed.
6. Latch and Lock: Cam latch, screwdriver operated.

Construction Documents

2.3 FIRE-RATED ACCESS DOORS AND FRAMES

A. Fire-Rated, Flush Access Doors with Concealed Flanges:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Acudor Products, Inc.
  - b. Babcock-Davis.
  - c. Cendrex Inc.
  - d. JL Industries, Inc.; a division of the Activar Construction Products Group.
  - e. Karp Associates, Inc.
  - f. Maxam Metal Products Limited.
  - g. Metropolitan Door Industries Corp.
  - h. MIFAB, Inc.
  - i. Nystrom, Inc.
  - j. Williams Bros. Corporation of America (The).
2. Description: Door face flush with frame, with a core of mineral-fiber insulation enclosed in sheet metal; with concealed flange for gypsum board installation, self-closing door, and concealed hinge.
3. Locations: Wall and ceiling.
4. Door Size: As indicated on the Drawings..
5. Fire-Resistance Rating: Not less than that of adjacent construction.
6. Temperature-Rise Rating: 450 deg F at the end of 30 minutes.
7. Metallic-Coated Steel Sheet for Door: Nominal 0.040 inch, 20 gage, factory primed.
8. Frame Material: Same material, thickness, and finish as door.
9. Latch and Lock: Self-closing, self-latching door hardware, operated by knurled-knob.

2.4 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.
- D. Frame Anchors: Same material as door face.
- E. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.5 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

Construction Documents

- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
  - 1. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.
- D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling. Provide access sleeves for each latch operator and install in holes cut through finish.
- E. Latch and Lock Hardware:
  - 1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.

2.6 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
  - 1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.



Construction Documents

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 083113



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Construction Documents

SECTION 083323 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Insulated service doors.

B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for miscellaneous steel supports.
- 2. Section 099113 "Exterior Painting" for finish painting of factory-primed doors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory.

- 1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
- 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- 3. Fire-Rated Doors: Include description of automatic closing device and testing and resetting instructions.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

- 1. Include plans, elevations, sections, and mounting details.
- 2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
- 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
- 4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
- 5. Show locations of controls, locking devices, detectors or replaceable fusible links for fire-rated doors, and other accessories.
- 6. Include diagrams for power, signal, and control wiring.

Construction Documents

- C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.

- 1. Include similar Samples of accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at as close to neutral pressure as possible according to NFPA 252 or UL 10B.

- 1. Temperature-Rise Limit: Where indicated and at exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.
  - 2. Smoke Control: Where indicated and in corridors and smoke barriers, provide doors that are listed and labeled with the letter "S" on the fire-rating label by a qualified testing agency for smoke- and draft-control based on testing according to UL 1784; with maximum air-leakage rate of 3.0 cfm/sq. ft. of door opening at 0.10-inch wg for both ambient and elevated temperature tests.

- C. Sound-Control Doors: Assemblies tested in a laboratory for sound-transmission-loss performance according to ASTM E 90, calculated according to ASTM E 413, and rated for not less than the STC value indicated.

- D. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC A117.1.

Construction Documents

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

- A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.

- 1. Obtain operators and controls from overhead coiling door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.

- 1. Design Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft., acting inward and outward.
  - 2. Testing: According to ASTM E 330.
  - 3. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.

2.3 DOOR ASSEMBLY

- A. Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.

- 1. Basis-of-Design: Subject to compliance with requirements, provide product indicated below or a comparable product as approved by the Architect:
    - a. Product: Model ESD30 by Cookson.

2.4 MATERIALS

- A. Curtain: Air infiltration rate of less than .3 CFM/FT<sup>2</sup>, as tested per ASTM E283 validated by an independent testing agency. Test report required.

- 1. Fabrication:
    - a. Slat Material: No. 6F, (Listed Exterior/Interior):
      - 1) Galvanized Steel/Galvanized Steel: Manufacturer recommended gauge based on performance requirements. Minimum 24/24 gauge,
    - b. Insulation: 7/8 inch (22 mm) foamed-in-place, closed cell urethane
    - c. Total Slat Thickness: 15/16 inch (24 mm)
    - d. Flame Spread Index of 0 and a Smoke Developed Index of 10 as tested per ASTM E84
    - e. R-value: 8.0

Construction Documents

- f. STC Rating: Sound Transmission Class (STC) rating up to 30 for the curtain and up to 22 for the entire assembly. If an STC of 32 is desired, additional options are required. All configurations are evaluated per ASTM E90 and based on testing a complete, operable assembly
- 2. Exterior Slat Finish:
  - a. GalvaNex™ Coating System (Stock Colors):
    - 1) ASTM A 653 galvanized base coating treated with dual process rinsing agents in preparation for chemical bonding baked-on base coat and white baked-on polyester enamel finish coat
- 3. Interior Slat Finish:
  - a. GalvaNex™ Coating System (Stock Colors):
    - 1) ASTM A 653 galvanized base coating treated with dual process rinsing agents in preparation for chemical bonding baked-on base coat and white baked-on polyester finish coat
- B. Endlocks: Fabricate interlocking sections with high strength galvanized cast iron endlocks on alternate slats each secured with two ¼” (6.35 mm) rivets. Provide windlocks as required to meet specified wind load.
  - 1. Galvanized cast iron: Required if above 21’-5” width (DBG - Distance Between Guides)
- C. Bottom Bar:
  - 1. Configuration:
    - a. Insulated Bottom Bar: Reinforced extruded aluminum interior face with full depth insulation and exterior skin slat to match curtain material and gauge. Minimum 4” tall x 1-1/16” thickness.
  - 2. Finish:
    - a. Exterior: Match slats
  - 3. Air Infiltration Certification Label: Must be affixed to bottom bar
- D. Guides:
  - 1. Fabrication:
    - a. Thermal break required. Minimum 3/16 inch (4.76 mm) structural steel angles. Provide windlock bars of same material when windlocks are required to meet specified wind load. Top of inner and outer guide angles to be flared outwards to form bellmouth for smooth entry of curtain into guides. Provide removable guide stoppers to prevent over travel of curtain and bottom bar.

Construction Documents

- b. Top 16 ½” (419.10 mm) of coil side guide angles to be removable for ease of curtain installation and as needed for future curtain service
- 2. Finish:
  - a. Powder Coat (Stock Colors): Zirconium treatment followed by a white baked-on polyester powder coat; minimum 2.5 mils (0.065 mm) cured film thickness
- E. Counterbalance Shaft Assembly:
  - 1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot (2.5 mm per meter) of width
  - 2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 lbs (110 N). Provide wheel for applying and adjusting spring torque.
- F. Brackets: Fabricate from minimum 3/16 inch (5 mm) steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures.
  - 1. Finish:
    - a. Powder Coat (Stock Colors): Zirconium treatment followed by a white baked-on polyester powder coat; minimum 2.5 mils (0.065 mm) cured film thickness
- G. Hood: Minimum 24 gauge galvanized steel with reinforced top and bottom edges. Provide minimum 1/4 inch (6.35 mm) steel intermediate support brackets as required to prevent excessive sag.
  - 1. Finish:
    - a. GalvaNex Coating System (Stock Colors):
      - 1) ASTM A 653 galvanized base coating treated with dual process rinsing agents in preparation for chemical bonding baked-on base coat and white baked-on polyester finish coat
- H. Weatherstripping:
  - 1. Bottom Bar:
    - a. Motor Operated Doors: Sensing/weather edge with neoprene astragal extending full width of door bottom bar
  - 2. Guides: Replaceable vinyl strip on guides sealing against both sides of curtain
  - 3. Lintel Seal: Double brush seal with EPDM sandwiched between the two brush seals at door header to impede air flow.
  - 4. Hood: Neoprene/rayon baffle to impede air flow above coil

Construction Documents

2.5 OPERATION

- A. Manual ControlGard Chain Hoist: Provide chain hoist operator with endless steel chain, chain pocket wheel and guard, geared reduction unit, and chain keeper secured to guide. Chain hoist to include integral brake mechanism that will immediately stop upward or downward travel and maintain the door in a stationary position when the hand chain is released by the user.
  
- B. Motor – Standard Use – Model MG (Industrial Duty Gear Head) Operator: The operator must not extend above or below the door coil when mounted front-of-coil. Rated for a maximum of 20 cycles per hour (not to be used for consecutive hours) cULus listed (to comply with UL requirements in The United States and Canada), Totally Enclosed Non Ventilated gear head operator(s) rated (1/3) (1/2) or (3/4) hp as recommended by door manufacture for size and type of door, 120 Volts, 3 Phase. Provide complete with electric motor and factory pre-wired motor control terminals, maintenance free solenoid actuated brake, emergency manual chain hoist and control station(s). Motor shall be high starting torque, industrial type, protected against overload with an auto-reset thermal sensing device. Primary speed reduction shall be heavy-duty, lubricated gears with mechanical braking to hold the door in any position. Operator shall be equipped with an emergency manual chain hoist assembly that safely cuts operator power when engaged. A disconnect chain shall not be required to engage or release the manual chain hoist. Operator drive and door driven sprockets shall be provided with #50 roller chain. Provide an integral Motor Mounted Interlock system to prevent damage to door and operator when mechanical door locking devices are provided. Operator shall be capable of driving the door at a speed of 8 to 9 inches per second (20 to 23 cm/sec). Fully adjustable, driven linear screw type cam limit switch mechanism shall synchronize the operator with the door. The electrical contractor shall mount the control station(s) and supply the appropriate disconnect switch, all conduit and wiring per the overhead door wiring instructions.
  
- C. Control Station: Provide one of the following as approved by the Architect.
  - 1. Flush mounted: "Open/Close/Stop" push buttons; NEMA 1B.
  - 2. Flush mounted: "Open/Close" key switch with "Stop" push button; NEMA 1B.
  
- D. Control Operation:
  - 1. Momentary Contact to Close: Fail-safe, UL325-2010 Compliant Entrapment Protection for Motor Operation.
    - a. NEMA 4X photo eye sensors consisting of a transmitter and receiver that are to be mounted within 6" (152.4 mm) of the floor, projecting an IR beam across the entire width of the door. Electrical contractor to provide low voltage wiring from the transmitter and receiver to the door operator.
  
  - 2. Sensing/Weather Edge: Automatic reversing control by an automatic sensing switch within neoprene or rubber astragal extending full width of door bottom bar
    - a. Electric sensing edge device. Provide a wireless sensing edge connection to motor operator eliminating the need for a physical traveling electric cord connection between bottom bar sensing edge device and motor operator.



Construction Documents

2.6 ACCESSORIES

A. Locking:

1. Masterkeyable cylinder operable from fascia side[s] of bottom bar, options for all types of operation. Provide interlock switches on Motor operated units.
  - a. Standard Mortise Cylinder.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.
- C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.
- D. Fire-Rated Doors: Install according to NFPA 80.
- E. Smoke-Control Doors: Install according to NFPA 80 and NFPA 105.
- F. Power-Operated Doors: Install according to UL 325.

3.3 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
  1. Perform installation and startup checks according to manufacturer's written instructions.
  2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

Construction Documents

3. Test door closing when activated by detector or alarm-connected fire-release system. Reset door-closing mechanism after successful test.

3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
  1. Adjust exterior doors and components to be weather-resistant.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust seals to provide tight fit around entire perimeter.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323

Construction Documents

SECTION 083800 – TRAFFIC DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Stainless steel swinging kitchen doors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of door. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
  - 1. Dimensions and locations of blocking.
  - 2. Dimensions and locations of holes for hardware.
  - 3. Dimensions and locations of cutouts.
  - 4. Undercuts.
  - 5. Doors to be factory finished and finish requirements.
- C. Samples: For factory-finished doors.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.

1.5 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

Construction Documents

1.6 WARRANTY

- A. Manufacturer's standard two-year warranty that products are free of defects in material and workmanship, guaranteeing to replace (exclusive of freight and labor) parts proven defective within two years after date of shipment to purchaser.

PART 2 - PRODUCTS

2.1 KITCHEN DOORS

- A. Basis-of-Design: Subject to compliance with requirements, provide product indicated below or a comparable product as approved by the Architect:
  - 1. Eliason SCP-3 Bi Directional Door.
- B. Cooler Doors: 3/4 inch exterior grade solid wood core; 1 inch total thickness; medium to heavy duty.
  - 1. Facing: Reinforcing metal plates. (Model SCG-3)
    - a. Full Length Panels: 18 gauge stainless steel both sides; stainless steel top hinge covers.
  - 2. Gasket: Full perimeter seal.
  - 3. Window Size: 9 inches (229 mm) wide by 14 inches high.
  - 4. Window Molding: Black rubber molding.
  - 5. Glazing: Clear acrylic.

2.2 HARDWARE AND ACCESSORIES

- A. Hinges: Double Action Easy Swing(r) proprietary hinges.
  - 1. Finish: Zinc coated.

2.3 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

Construction Documents

- B. Openings: Factory cut and trim openings through doors.
  - 1. Light Openings: Trim openings with moldings of material and profile indicated.
  - 2. Acrylic Glazing: Factory install glazing in doors indicated to be factory finished.

2.4 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
  - 1. Finish faces, including all exposed edges.
- B. Opaque Finish:
  - 1. Finish: Manufacturer's standard.
  - 2. Color: As selected by the Owner's interior designer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify jambs plumb and square.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Minimum jamb construction of double studded 2 by 4 wood construction or equivalent.
- C. Reinforce hollow metal jambs at hardware locations.
- D. Steel channel jambs are required for heavy duty traffic doors.

Construction Documents

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 083800

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Construction Documents

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Exterior storefront framing.
  - 2. Storefront framing for punched openings.
  - 3. Exterior manual-swing entrance doors and door-frame units.
  - 4. Interior aluminum-framed doors and officefronts.
  - 5. Sunshades.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
  - 1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
  - 2. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
    - a. Joinery, including concealed welds.
    - b. Anchorage.
    - c. Expansion provisions.
    - d. Glazing.
    - e. Flashing and drainage.
  - 3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
- C. Samples for Initial Selection: For units with factory-applied color finishes.

Construction Documents

- D. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:
  - 1. Joinery, including concealed welds.
  - 2. Anchorage.
  - 3. Expansion provisions.
  - 4. Glazing.
  - 5. Flashing and drainage.
  
- E. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.
  
- F. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and field testing agency.
  
- B. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.
  - 1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.
  
- C. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.
  
- D. Source quality-control reports.
  
- E. Field quality-control reports.
  
- F. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.



Construction Documents

- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
  - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.7 MOCKUPS

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Build mockup of typical wall area as shown on Drawings.
  - 2. Testing shall be performed on mockups according to requirements in "Field Quality Control" Article.
  - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including, but not limited to, excessive deflection.
    - b. Noise or vibration created by wind and thermal and structural movements.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - d. Water penetration through fixed glazing and framing areas.
    - e. Failure of operating components.
  - 2. Warranty Period: 10 years from date of Substantial Completion.

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Construction Documents

- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design aluminum-framed entrances and storefronts.
- B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
  - 1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
  - 2. Failure also includes the following:
    - a. Thermal stresses transferring to building structure.
    - b. Glass breakage.
    - c. Noise or vibration created by wind and thermal and structural movements.
    - d. Loosening or weakening of fasteners, attachments, and other components.
    - e. Failure of operating units.
- C. Structural Loads:
  - 1. Wind Loads: As indicated on Structural Drawings.
  - 2. Other Design Loads: As indicated on Structural Drawings.
- D. Deflection of Framing Members: At design wind pressure, as follows:
  - 1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding 1/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.

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Construction Documents

2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller.
    - a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.
  3. Cantilever Deflection: Where framing members overhang an anchor point, as follows:
    - a. Perpendicular to Plane of Wall: No greater than 1/240 of clear span plus 1/4 inch for spans greater than 11 feet 8-1/4 inches or 1/175 times span, for spans less than 11 feet 8-1/4 inches.
- E. Structural: Test according to ASTM E 330 as follows:
1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
  2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
  3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
1. Fixed Framing and Glass Area:
    - a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft..
  2. Entrance Doors:
    - a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
    - b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
- G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..
- H. Energy Performance: Certify and label energy performance according to NFRC as follows:
1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor as selected by the Architect.
  2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient as selected by the Architect.
  3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 15 as determined according to NFRC 500, unless otherwise indicated.

Construction Documents

- A. Sound Transmission Class (STC): As selected by the Architect.
- B. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 MANUFACTURERS

- A. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

2.3 EXTERIOR FRAMING

- A. Basis-of-Design: Subject to compliance with requirements, provide product indicated below by Kawneer, or a comparable product as approved by the Architect:
  - 1. Storefront: Kawneer Trifab VG 451T and 601T as indicated.
    - a. Glazing Location: Front glazed.
    - b. Finish: Clear anodic with Architectural Class I Finish.
- B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
  - 1. Construction: Thermally broken.
  - 2. Glazing System: Retained mechanically with gaskets on four sides.
  - 3. Glazing Plane: Front.
  - 4. Finish: Clear anodic finish.
  - 5. Fabrication Method: Field-fabricated stick system.
- C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- E. Materials:
  - 1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
    - a. Sheet and Plate: ASTM B 209.
    - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
    - c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
    - d. Structural Profiles: ASTM B 308/B 308M.

Construction Documents

2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.
  - a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
  - b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
  - c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.4 VENTING WINDOWS

- A. Basis-of-Design: Subject to compliance with requirements, provide product indicated below by Kawneer, or a comparable product as approved by the Architect:
  1. Operable Window: Kawneer Outswing Casement.
  2. Finish: Clear anodic with Architectural Class I Finish.
- B. Aluminum Windows: Manufacturer's standard units, complying with AAMA/WDMA/CSA 101/I.S.2/A440, with self-flashing mounting fins, and as follows:
  1. Window Type: As indicated on Drawings.
  2. Minimum Performance Class: CW.
  3. Minimum Performance Grade: 30.
  4. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish, but not less than 0.064-inch thickness at any location for main frame and sash members.
    - a. Thermally Improved Construction: Fabricate window units with an integral, concealed, low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.
  5. Mullions: Between adjacent windows, fabricated of extruded aluminum matching finish of window units.
  6. Fasteners, Anchors, and Clips: Nonmagnetic stainless steel, aluminum, or other noncorrosive material, compatible with aluminum window members, trim, hardware, anchors, and other components of window units. Fasteners shall not be exposed, except for attaching hardware.
    - a. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.128 inch thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard, noncorrosive, pressed-in, spline grommet nuts.
  7. Hardware: Manufacturer's standard; of aluminum, stainless steel, die-cast steel, malleable iron, or bronze; including the following:
    - a. Cam-action sweep sash lock and keeper at meeting rails.
    - b. Spring-loaded, snap-type lock at jambs.

Construction Documents

- c. Pole-operated, cam-action locking device on meeting rail where rail is more than 72 inches above floor.
  - d. Lift handles for single-hung units.
  - e. Nylon sash rollers for horizontal-sliding units.
  - f. Steel or bronze operating arms.
- 8. Sliding-Type Weather Stripping: Woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric; complying with AAMA 701/702.
  - 9. Insect Screens: Provide removable insect screen on each operable exterior sash, with screen frame finished to match window unit, complying with SMA 1004 or SMA 1201, and as follows:
    - a. Aluminum Wire Fabric: 18-by-18, 18-by-16, or 18-by-14 mesh of 0.013-inch-diameter, coated aluminum wire.
    - b. Glass-Fiber Mesh Fabric: 18-by-16 or 18-by-14 mesh of PVC-coated, glass-fiber threads, woven and fused to form a fabric mesh; complying with ASTM D 3656.
    - c. Fabric: Manufacturer's standard aluminum wire fabric or glass-fiber mesh fabric.
- C. Glazing: Same as adjacent aluminum-framed entrances and storefront glazing.
  - D. Finish: Match adjacent aluminum-framed entrances and storefront finish.

2.5 ENTRANCE DOOR SYSTEMS

- A. Basis-of-Design: Subject to compliance with requirements, provide product indicated below by Kawneer, or a comparable product as approved by the Architect:
  - 1. Entrance: Kawneer 350 Medium Stile Entrance
    - a. Hardware: One inch round, bent push/pull hardware except where panic hardware is indicated.
    - b. Finish: Clear anodic with Architectural Class I Finish.
- B. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
  - 1. Door Construction: 2-inch overall thickness, with minimum 0.188-inch-thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
    - a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.
  - 2. Door Design: Medium stile; as indicated.
  - 3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.
    - a. Provide nonremovable glazing stops on outside of door.

Construction Documents

2.6 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware."
- B. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

2.7 INTERIOR ALUMINUM-FRAMED DOORS AND OFFICEFRONTS

- A. Basis-of-Design: Subject to compliance with requirements, provide product indicated below by Kawneer, or a comparable product as approved by the Architect:
  - 1. RACO Liberty 487 & 725 2-inch Solutions II.
    - a. Finish: Clear anodic with Architectural Class I Finish.
  - 2. Interior Door Frames: RACO Solutions II fixed or adjustable throat frames to accommodate wall thicknesses indicated on Drawings; ceiling height as indicated on the Drawings; with applied full face trim of 2 inch width.
  - 3. Interior OfficeFront Framing: RACO Solutions II OfficeFronts, fixed throat frames to accommodate wall thicknesses indicated on Drawings; as indicated on the Drawings, with applied full face trim of 2 inch width.
  - 4. Swinging Aluminum and Glass Doors: RACO Series, 400 medium stile, having square or beveled glazing stops, and black or grey EPDM glazing gaskets, as selected by the Architect, and having ADA compliant bottom rail.
  - 5. STC: Manufacturer's standard.
  - 6. Provide non fire rated with adjustable bottom rails for field adjustment.
  - 7. Provide complete with the following hardware in finish as selected by the Architect from the manufacturer's full range:
    - a. 2 pair of 4-1/2 x 4-1/2 inch standard butts.
    - b. Exposed overhead closer, slim line profile.
    - c. Latch or lock set to match other devices in project.
    - d. Flush bolts for inactive leaf of pairs of doors.
    - e. Balance of hardware as specified in Section 087100.
  - 8. Materials:
    - a. Aluminum: Meeting requirements of ASTM B221, 6063T5 alloy, and as otherwise required to assure compliance with dimensional tolerances and maintain color uniformity. Billets shall be composed of at least 33% recycled aluminum, 48% post industrial scrap, 30% post consumer scrap, 22% primary aluminum.
    - b. Anchorage Devices, Clips and Fasteners: Manufacturer's standard type, compatible with materials being secured.
    - c. Accessories: As necessary for complete system.
    - d. Top Load glazing gasket grey or black, as selected by the Architect.
    - e. Glazing Thickness: Manufacturer's standard for each specific application.

Construction Documents

9. Extruded Aluminum Frame and Door Fabrication
  - a. Utilize reduced profile corner section for 90-degree corners.
  - b. Assemble all door frames, sidelights, and window units with screws utilizing internal screw spline system, insert into the drywall rough opening.
  - c. Assemble all sidelights and windows without the use of clips or exposed fasteners.
  - d. Do not exceed maximum size of window or door to meet applicable code requirements.
  - e. Factory pre-machine door frame jambs [and doors] and prepare for hardware, with concealed reinforcement plates, drilled and tapped as required, and fastened within frame with concealed screws.
  - f. Manufacturer shall precut and predrill for screwspline joinery. Miter cut snap on trim casing shall be furnished in exact cut lengths.
  - g. Manufacturer shall box and mark door frames and sidelites by opening number.

2.8 SUNSHADES

- A. Sunshades: Assemblies consisting of manufacturer's standard outrigger brackets, louvers, and fascia, designed for attachment to curtain wall with mechanical fasteners.
  1. Basis-of-Design: Subject to compliance with requirements, provide product indicated below by Ametco, or a comparable product as approved by the Architect:
    - a. Product: 104-90 Aluminum Bar Grille Sunshade.
  2. Orientation: Horizontal.
  3. Projection from Wall: As indicated on Drawings.
  4. Outriggers: Straight with square edges.
  5. Louvers: As indicated on Drawings.
  6. Fasciae: Rectangular.
  7. Finish: Match adjacent aluminum storefront.
- B. Materials:
  1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
    - a. Sheet and Plate: ASTM B 209.
    - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
    - c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
    - d. Structural Profiles: ASTM B 308/B 308M.

2.9 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.



Construction Documents

- C. Glazing Sealants: As recommended by manufacturer.

2.10 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
  - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
  - 2. Reinforce members as required to receive fastener threads.
  - 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system, fabricated from 300 series stainless steel.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
  - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.11 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fitted joints with ends coped or mitered.
  - 3. Physical and thermal isolation of glazing from framing members.
  - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - 5. Provisions for field replacement of glazing from interior for vision glass and exterior for spandrel glazing or metal panels.
  - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

Construction Documents

- E. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.
- F. Storefront Framing: Fabricate components for assembly using head-and-sill-receptor system with shear blocks at intermediate horizontal members.
- G. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
  - 1. At exterior doors, provide compression weather stripping at fixed stops.
  - 2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.
- H. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
  - 1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
  - 2. At exterior doors, provide weather sweeps applied to door bottoms.
- I. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- J. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.12 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General:
  - 1. Comply with manufacturer's written instructions.
  - 2. Do not install damaged components.

Construction Documents

3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

F. Install glazing as specified in Section 088000 "Glazing."

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.3 ERECTION TOLERANCES

A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. Alignment:
  - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
  - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
  - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

Construction Documents

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed entrances and storefronts.
  - 1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
    - a. Perform a minimum of three tests in areas as directed by Architect.
- C. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.5 MAINTENANCE SERVICE

- A. Entrance Door Hardware:
  - 1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.
  - 2. Initial Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of entrance door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper entrance door hardware operation at rated speed and capacity. Use parts and supplies that are the same as those used in the manufacture and installation of original equipment.

END OF SECTION 084113

Construction Documents

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Mechanical door hardware for the following:
    - a. Swinging doors.
    - b. Sliding doors.
    - c. Folding doors.
  - 2. Cylinders for door hardware specified in other Sections.
  - 3. Electrified door hardware.

1.3 COORDINATION

- A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- C. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- D. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

Construction Documents

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Conference participants shall include Installer's Architectural Hardware Consultant and Owner's security consultant.
- B. Keying Conference: Conduct conference at Project site.
  - 1. Conference participants shall include Installer's Architectural Hardware Consultant and Owner's security consultant.
  - 2. Incorporate conference decisions into keying schedule after reviewing door hardware keying system including, but not limited to, the following:
    - a. Flow of traffic and degree of security required.
    - b. Preliminary key system schematic diagram.
    - c. Requirements for key control system.
    - d. Requirements for access control.
    - e. Address for delivery of keys.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For electrified door hardware.
  - 1. Include diagrams for power, signal, and control wiring.
  - 2. Include details of interface of electrified door hardware and building safety and security systems.
- C. Samples: For each exposed product in each finish specified, in manufacturer's standard size.
  - 1. Tag Samples with full product description to coordinate Samples with door hardware schedule.
- D. Samples for Initial Selection: For each type of exposed finish.
- E. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
  - 1. Submittal Sequence: Submit door hardware schedule after or concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.

Construction Documents

2. Format: Use same scheduling sequence and format and use same door numbers as in door hardware schedule in the Contract Documents.
3. Content: Include the following information:
  - a. Identification number, location, hand, fire rating, size, and material of each door and frame.
  - b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
  - c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
  - d. Description of electrified door hardware sequences of operation and interfaces with other building control systems.
  - e. Fastenings and other installation information.
  - f. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
  - g. Mounting locations for door hardware.
  - h. List of related door devices specified in other Sections for each door and frame.

- F. Keying Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and Architectural Hardware Consultant.
- B. Product Certificates: For each type of electrified door hardware.
  1. Certify that door hardware for use on each type and size of labeled fire-rated doors complies with listed fire-rated door assemblies.
- C. Product Test Reports: For compliance with accessibility requirements, for tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.
- D. Field quality-control reports.
- E. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals.
- B. Schedules: Final door hardware and keying schedule.

Construction Documents

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Door Hardware: Types and quantities as approved by the Owner.
  - 2. Electrical Parts: Types and quantities as approved by the Owner.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.
  - 1. Warehousing Facilities: In Project's vicinity.
  - 2. Scheduling Responsibility: Preparation of door hardware and keying schedule.
  - 3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as an Architectural Hardware Consultant (AHC) and an Electrified Hardware Consultant (EHC).

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
- D. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including excessive deflection, cracking, or breakage.



Construction Documents

- b. Faulty operation of doors and door hardware.
  - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
2. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:
- a. Electromagnetic and Delayed-Egress Locks: Five years from date of Substantial Completion.
  - b. Exit Devices: Two years from date of Substantial Completion.
  - c. Manual Closers: 10 years from date of Substantial Completion.
  - d. Concealed Floor Closers: Five years from date of Substantial Completion.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Source Limitations: Obtain each type of door hardware from single manufacturer.
- 1. Provide electrified door hardware from same manufacturer as mechanical door hardware unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

**2.2 PERFORMANCE REQUIREMENTS**

- A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
- B. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
- 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. at the tested pressure differential of 0.3-inch wg of water.
- C. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

Construction Documents

- E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.
  - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
  - 2. Comply with the following maximum opening-force requirements:
    - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
    - b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
  - 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
  - 4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
  - 5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.3 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

2.4 SELF-CLOSING HINGES AND PIVOTS

- A. Self-Closing Hinges and Pivots: BHMA A156.17.

2.5 CONTINUOUS HINGES

- A. Continuous Hinges: BHMA A156.26; minimum 0.120-inch-thick, hinge leaves with minimum overall width of 4 inches; fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.
- B. Pin-and-barrel-type hinges.
- C. Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.

2.6 MECHANICAL LOCKS AND LATCHES

- A. Basis-of-Design: Subject to compliance with requirements, provide product indicated below or a comparable product as approved by the Architect:
  - 1. Product: 9K Series by Best with a #14K Lever Style and Trim.
- B. Lock Functions: As indicated in door hardware schedule.

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Construction Documents

- C. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
  - 1. Mortise Locks: Minimum 3/4-inch latchbolt throw.
  - 2. Deadbolts: Minimum 1-inch bolt throw.
  
- D. Lock Backset: 2-3/4 inches unless otherwise indicated.
  
- E. Lock Trim:
  - 1. Description: As indicated on Drawings.
  - 2. Levers: Cast.
  - 3. Knobs: Wrought.
  - 4. Dummy Trim: Match knob or lever lock trim and escutcheons.
  
- F. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
  - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
  - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
  - 3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
  - 4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

2.7 ELECTRIC STRIKES

- A. Electric Strikes: BHMA A156.31; Grade 1; with faceplate to suit lock and frame.

2.8 MANUAL FLUSH BOLTS

- A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.

2.9 AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

- A. Automatic and Self-Latching Flush Bolts: BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.

2.10 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.

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Construction Documents

2.11 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver. Provide cylinder from same manufacturer of locking devices.
- B. Standard Lock Cylinders: BHMA A156.5; Grade 1 permanent cores; face finished to match lockset.
- C. High-Security Lock Cylinders: BHMA A156.30; Grade 1 permanent cores that are removable; face finished to match lockset.
  - 1. Type: M, mechanical or E, electrical.
- D. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
- E. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.12 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock. Incorporate decisions made in keying conference.
  - 1. Master Key System: Change keys and a master key operate cylinders.
    - a. Provide three cylinder change keys and five master keys.
  - 2. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders.
    - a. Provide three cylinder change keys and five each of master and grand master keys.
  - 3. Keyed Alike: Key all cylinders to same change key.
- B. Keys: Nickel silver.
  - 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
    - a. Notation: "DO NOT DUPLICATE."

2.13 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; aluminum unless otherwise indicated.

Construction Documents

2.14 ACCESSORIES FOR PAIRS OF DOORS

- A. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release; and with internal override.
- B. Carry-Open Bars: BHMA A156.3; prevent the inactive leaf from opening before the active leaf; provide polished brass or bronze carry-open bars with strike plate for inactive leaves of pairs of doors unless automatic or self-latching bolts are used.
- C. Astragals: BHMA A156.22.

2.15 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

2.16 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: BHMA A156.16.

2.17 ELECTROMAGNETIC STOPS AND HOLDERS

- A. Electromagnetic Door Holders: BHMA A156.15, Grade 1; wall-mounted electromagnetic single unit with strike plate attached to swinging door; coordinated with fire detectors and interface with fire-alarm system for labeled fire-rated door assemblies.

2.18 OVERHEAD STOPS AND HOLDERS

- A. Overhead Stops and Holders: BHMA A156.8.

2.19 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
- B. Maximum Air Leakage: When tested according to ASTM E 283 with tested pressure differential of 0.3-inch wg, as follows:
  - 1. Smoke-Rated Gasketing: 0.3 cfm/sq. ft. of door opening.
  - 2. Gasketing on Single Doors: 0.3 cfm/sq. ft. of door opening.
  - 3. Gasketing on Double Doors: 0.50 cfm per foot of door opening.

Construction Documents

2.20 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

2.21 SLIDING DOOR HARDWARE

- A. Sliding Door Hardware: BHMA A156.14; consisting of complete sets including rails, hangers, supports, bumpers, floor guides, and accessories indicated.

2.22 FOLDING DOOR HARDWARE

- A. General: BHMA A156.14; complete sets including overhead rails, hangers, supports, bumpers, floor guides, and accessories indicated.

2.23 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch-thick aluminum; with manufacturer's standard machine or self-tapping screw fasteners.

2.24 AUXILIARY DOOR HARDWARE

- A. Auxiliary Hardware: BHMA A156.16.

2.25 AUXILIARY ELECTRIFIED DOOR HARDWARE

- A. Auxiliary electrified door hardware.

2.26 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rating labels and as otherwise approved by Architect.

- 1. Manufacturer's identification is permitted on rim of lock cylinders only.

- B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

Construction Documents

- C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.
  - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
  - 2. Fire-Rated Applications:
    - a. Wood or Machine Screws: For the following:
      - 1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
      - 2) Strike plates to frames.
      - 3) Closers to doors and frames.
    - b. Steel Through Bolts: For the following unless door blocking is provided:
      - 1) Surface hinges to doors.
      - 2) Closers to doors and frames.
      - 3) Surface-mounted exit devices.
  - 3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
  - 4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
  - 5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.27 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

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Construction Documents

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
- B. Wood Doors: Comply with door and hardware manufacturers' written instructions.

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated on Drawings and to comply with the following unless otherwise indicated or required to comply with governing regulations.
  - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
  - 2. Custom Steel Doors and Frames: HMMA 831.
  - 3. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
  - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
  - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.



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Construction Documents

- D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule, but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches of door height greater than 90 inches.
- E. Lock Cylinders: Install construction cores to secure building and areas during construction period.
  - 1. Replace construction cores with permanent cores as directed by Owner.
  - 2. Furnish permanent cores to Owner for installation.
- F. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, in equipment room. Verify location with Architect.
  - 1. Configuration: Provide one power supply for each door opening with electrified door hardware.
- G. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- H. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- I. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
  - 1. Do not notch perimeter gasketing to install other surface-applied hardware.
- J. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- K. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
  - 1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

Construction Documents

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
  - 1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
  - 2. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 70 degrees and so that closing time complies with accessibility requirements of authorities having jurisdiction.
  - 3. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
- B. Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

3.8 DEMONSTRATION

- A. Engage Installer to train Owner's maintenance personnel to adjust, operate, and maintain door hardware.

Construction Documents

3.9 DOOR HARDWARE SCHEDULE

- A. Door Hardware Schedule: Engage a qualified Architectural Hardware Consultant to provide door hardware schedule.

END OF SECTION 087100



Construction Documents

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
  - 1. Glass for storefront, windows and doors.
  - 2. Glazing sealants and accessories.

1.3 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.
- C. Glazing Accessory Samples: For sealants and colored spacers, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

Construction Documents

- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, manufacturers of insulating-glass units with sputter-coated, low-E coatings, glass testing agency, and sealant testing agency.
- B. Product Certificates: For glass.
- C. Product Test Reports: For tinted glass, insulating glass, and glazing sealants, for tests performed by a qualified testing agency.
  - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- D. Preconstruction adhesion and compatibility test report.
- E. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
  - 1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

Construction Documents

2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
  1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.11 WARRANTY

- A. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
  1. Warranty Period: 10 years from date of Substantial Completion.

Construction Documents

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AGC Glass Company North America, Inc.
2. Cardinal Glass Industries.
3. Cristacurva.
4. Dlubak Corporation.
5. Gardner Glass, Inc.
6. GGI; General Glass International.
7. Glasswerks LA, Inc.
8. GTI; Glaz-Tech Industries.
9. Guardian Industries Corp.; SunGuard.
10. Hartung Glass Industries.
11. JE Berkowitz, LP.
12. Northwestern Industries, Inc.
13. Oldcastle BuildingEnvelope™.
14. Pilkington North America.
15. PPG Flat Glass; PPG Industries, Inc.
16. Schott North America, Inc.
17. Tecnoglass.
18. Trulite Glass & Aluminum Solutions, LLC.
19. Vetrotech Saint-Gobain.
20. Viracon, Inc.

B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.

1. Obtain tinted glass from single source from single manufacturer.
2. Obtain reflective-coated glass from single source from single manufacturer.

C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing.



## Construction Documents

- C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.
  - 1. Design Wind Pressures: As indicated on Structural Drawings.
  - 2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
  - 3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
  
- D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
  
- E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
  - 1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
  - 2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
  - 3. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
  - 4. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
  - 5. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

**2.3 GLASS PRODUCTS, GENERAL**

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  - 1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
  - 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
  
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
  
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

Construction Documents

- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
  - 1. Minimum Glass Thickness for Exterior Lites: 6 mm.
  - 2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.
  
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.
- B. Ultraclear Float Glass: ASTM C 1036, Type I, Class I (clear), Quality-Q3; and with visible light transmission of not less than 91 percent and solar heat gain coefficient of not less than 0.87.
- C. Tinted Annealed Float Glass: ASTM C 1036, Type I, Class 2 (tinted), Quality-Q3.
- D. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
  - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- E. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
  - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- F. Ceramic-Coated Vision Glass: ASTM C 1048, Condition C, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3; and complying with Specification No. 95-1-31 in GANA's "Engineering Standards Manual."
- G. Ceramic-Coated Spandrel Glass: ASTM C 1048, Type I, Condition B, Quality-Q3.

2.5 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
  - 1. Sealing System: Dual seal, with polyisobutylene and silicone primary and secondary sealants.

Construction Documents

2. Perimeter Spacer: As selected by the Architect from the manufacturer's full range.
3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.6 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Dow Corning Corporation; Dow Corning® 790 Silicone Building Sealant.
  - b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS2700 SilPruf LM.
  - c. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 290.
  - d. Pecora Corporation; 890NST.
  - e. Sika Corporation; SikaSil WS-290.
  - f. Tremco Incorporated; Spectrem 1.

C. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Dow Corning Corporation; DOW CORNING® 756 SMS BUILDING SEALANT, Dow Corning® 791 Silicone Weatherproofing Sealant, Dow Corning® 795 Silicone Building Sealant, or DOW CORNING® 995 SILICONE STRUCTURAL SEALANT.
  - b. GE Construction Sealants; Momentive Performance Materials Inc.; Contractors N SCS1800, SCS2000 SilPruf, SCS2800 SilGlaze II, SCS9000 SilPruf NB, or UltraPruf II SCS2900.
  - c. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 295.
  - d. Pecora Corporation; 864NST, 864NST Silicone Sealant, 895, 895NST, 896, 898, or 898NST.
  - e. Polymeric Systems, Inc; PSI-641.
  - f. Sika Corporation; Sikasil WS-295.

Construction Documents

- g. Tremco Incorporated; Spectrem 2 or Spectrem 3.

2.7 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
  - 1. AAMA 804.3 tape, where indicated.
  - 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  - 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
  - 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
  - 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.8 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

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Construction Documents

2.9 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
  - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
    - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  - 2. Presence and functioning of weep systems.
  - 3. Minimum required face and edge clearances.
  - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

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Construction Documents

- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
  - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
  - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

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Construction Documents

- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

Construction Documents

- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
  - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 MONOLITHIC GLASS SCHEDULE

- A. Glass Type: Clear annealed float glass.
  - 1. Minimum Thickness: 6 mm.
  - 1. Fully tempered where required with safety glazing labeling.

3.9 INSULATING GLASS SCHEDULE

- A. Glass Type: Low-E-coated, clear insulating glass.
  - 1. Overall Unit Thickness: 1 inch.
  - 2. Minimum Thickness of Each Glass Lite: 6 mm.
  - 3. Outdoor Lite: Annealed float glass, unless fully tempered is required.
  - 4. Interspace Content: Air or argon.
  - 5. Indoor Lite: Annealed float glass, unless fully tempered is required.
  - 6. Low-E Coating: Pyrolytic on second surface.
  - 7. U-Factor: As selected by the Architect.
  - 8. SHGC: As selected by the Architect.
  - 9. Fully tempered where required with safety glazing labeling.

END OF SECTION 088000



Construction Documents

SECTION 088300 - MIRRORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes the following types of silvered flat glass mirrors:
  - 1. Tempered glass mirrors qualifying as safety glazing.
- B. Related Requirements:
  - 1. Section 102800 "Toilet and Bath Accessories" for framed mirrors in restrooms and bathrooms.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Mirrors. Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.
- B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachment details.
- C. Samples: For each type of the following:
  - 1. Mirrors: 12 inches square, including edge treatment on two adjoining edges.
  - 2. Mirror Clips: Full size.
  - 3. Mirror Trim: 12 inches long.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For each type of mirror and mirror mastic.

Construction Documents

- C. Preconstruction Test Reports: From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing and substrates on which mirrors are installed.
- D. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For mirrors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing.
  - 1. Testing is not required if data are submitted based on previous testing of mirror mastic products and mirror backing matching those submitted.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect mirrors according to mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

Construction Documents

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

- 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1. Avalon Glass and Mirror Company.
  - 2. Binswanger Mirror; a division of Vitro America, Inc.
  - 3. D & W Incorporated.
  - 4. Donisi Mirror Company.
  - 5. Gardner Glass, Inc.
  - 6. Gilded Mirrors, Inc.
  - 7. Glasswerks LA, Inc.
  - 8. Guardian Industries Corp.; SunGuard.
  - 9. Head West.
  - 10. Independent Mirror Industries, Inc.
  - 11. Lenoir Mirror Company.
  - 12. National Glass Industries.
  - 13. Stroupe Mirror Co., Inc.
  - 14. Sunshine Mirror.
  - 15. Trulite Glass & Aluminum Solutions, LLC.
  - 16. Virginia Mirror Company, Inc.
  - 17. Walker Glass Co., Ltd.

- B. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.

- C. Source Limitations for Mirror Accessories: Obtain mirror glazing accessories from single source.

2.2 SILVERED FLAT GLASS MIRRORS

- A. Mirrors, General: ASTM C 1503.

- B. Tempered Glass Mirrors: Mirror Glazing Quality for blemish requirements and complying with ASTM C 1048 for Kind FT, Condition A, tempered float glass before silver coating is applied; clear.

Construction Documents

1. Nominal Thickness: 6.0 mm.

C. Safety Glazing Products: For tempered mirrors, provide products that comply with 16 CFR 1201, Category II.

2.3 MISCELLANEOUS MATERIALS

A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.

C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.

D. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

2.4 MIRROR HARDWARE

A. Mirror Bottom Clips: As approved by the Architect.

B. Mirror Top Clips: As approved by the Architect.

C. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

D. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield, expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

2.5 FABRICATION

A. Fabricate mirrors in the shop to greatest extent possible.

B. Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.

C. Mirror Edge Treatment: Rounded polished.

1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.

2. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

Construction Documents

- D. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint, as recommended in writing by film-backing manufacturer, to produce a surface free of bubbles, blisters, and other imperfections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.
- B. Verify compatibility with and suitability of substrates, including compatibility of existing finishes or primers with mirror mastic.
- C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

- A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
  - 1. GANA Publications: "Glazing Manual" and "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."
- B. Provide a minimum airspace of 1/8 inch between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.
- C. Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.
  - 1. Mirror Clips: Place a felt or plastic pad between mirror and each clip to prevent spalling of mirror edges. Locate clips so they are symmetrically placed and evenly spaced.
  - 2. Install mastic as follows:
    - a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.

Construction Documents

- b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
- c. After mastic is applied, align mirrors and press into place while maintaining a minimum airspace of 1/8 inch between back of mirrors and mounting surface.

3.4 CLEANING AND PROTECTION

- A. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- B. Do not permit edges of mirrors to be exposed to standing water.
- C. Maintain environmental conditions that prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- D. Clean exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Clean mirrors as recommended in writing by mirror manufacturer.

END OF SECTION 088300

Construction Documents

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Non-load-bearing steel framing systems for interior partitions.
- 2. Suspension systems for interior ceilings and soffits.
- 3. Grid suspension systems for gypsum board ceilings.

B. Related Requirements:

- 1. Section 054000 "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; roof rafters and ceiling joists; and roof trusses.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of code-compliance certification for studs and tracks.
- B. Evaluation Reports: For embossed steel studs and tracks, firestop tracks, post-installed anchors, and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

Construction Documents

- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Horizontal Deflection: For wall assemblies, limited to 1/240 of the wall height based on horizontal loading of 5 lbf/sq. ft., unless otherwise indicated.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
  - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
  - 2. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized unless otherwise indicated.
- B. Studs and Tracks: ASTM C 645. Use either steel studs and tracks or embossed steel studs and tracks.
  - 1. Steel Studs and Tracks:
    - a. Minimum Base-Metal Thickness: .
    - b. Depth: As indicated on Drawings.
  - 2. Embossed Steel Studs and Tracks: Roll-formed and embossed with surface deformations to stiffen the framing members so that they are structurally equivalent to conventional ASTM C 645 steel studs and tracks.
    - a. Minimum Base-Metal Thickness: As required by horizontal deflection performance requirements.
    - b. Depth: As indicated on Drawings.
- C. Slip-Type Head Joints: Where indicated, provide one of the following:
  - 1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing 1-1/2-inch minimum vertical movement, unless otherwise indicated.
  - 2. Single Long-Leg Track System: ASTM C 645 top track with 2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
  - 3. Double-Track System: ASTM C 645 top outer tracks, inside track with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
  - 4. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.



Construction Documents

- D. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
  - 1. Minimum Base-Metal Thickness: 0.0179 inch, unless otherwise required for structural performance.
- F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.
  - 1.
  - 2. Depth: 1-1/2 inches, unless otherwise required for structural performance.
  - 3. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
  - 1. Minimum Base-Metal Thickness: 0.0179 inch, unless otherwise required for structural performance.
  - 2. Depth: As indicated on Drawings.
- H. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.
  - 1. Configuration: Asymmetrical or hat shaped.
- I. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.
  - 1. Depth: As indicated on Drawings.
  - 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch.
  - 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
- J. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.

2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
- B. Hanger Attachments to Concrete:

Construction Documents

1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, AC193, AC58, or AC308 as appropriate for the substrate.
    - a. Uses: Securing hangers to structure.
    - b. Type: Torque-controlled, expansion anchor, torque-controlled, adhesive anchor, or adhesive anchor.
    - c. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
    - d. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.
  2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- D. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.
- E. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch-wide flanges.
1. Depth: As indicated on Drawings.
- F. Furring Channels (Furring Members):
1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
  2. Steel Studs and Tracks: ASTM C 645.
    - a. Minimum Base-Metal Thickness: 0.0179 inch , unless otherwise required for structural performance.
    - b. Depth: As indicated on Drawings.
  3. Embossed Steel Studs and Tracks: ASTM C 645.
    - a. Minimum Base-Metal Thickness: 0.0147 inch, unless otherwise required for structural performance.
    - b. Depth: As indicated on Drawings.
  4. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
    - a. Minimum Base-Metal Thickness: 0.0179 inch, unless otherwise required for structural performance.
  5. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.
    - a. Configuration: Asymmetrical or hat shaped.

Construction Documents

- G. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
  - 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
  - 1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.
  - 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
  - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
- B. Coordination with Sprayed Fire-Resistive Materials:
  - 1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling tracks to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
  - 2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-

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Construction Documents

resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
  - 1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
  - 2. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
  - 1. Single-Layer Application: As required by horizontal deflection performance requirements.
  - 2. Multilayer Application: As required by horizontal deflection performance requirements.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
  - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
  - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
    - a. Install two studs at each jamb unless otherwise indicated.

Construction Documents

- b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
  - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
  - 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
    - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
  - 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- E. Direct Furring:
  - 1. Screw to wood framing.
  - 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- F. Z-Shaped Furring Members:
  - 1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches o.c.
  - 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
  - 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
- G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
  - 1. Hangers: As indicated on the Drawings and as required for structural performance.
  - 1. Carrying Channels (Main Runners): As indicated on the Drawings and as required for structural performance.
  - 2. Furring Channels (Furring Members): As indicated on the Drawings and as required for structural performance.

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Construction Documents

- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
    - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
    - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
  - 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  - 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  - 5. Do not attach hangers to steel roof deck.
  - 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
  - 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
  - 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

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Construction Documents

SECTION 092713 - GLASS-FIBER-REINFORCED PLASTER FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:

- 1. Factory-molded, glass-fiber-reinforced plaster fabrications for interior column covers.

- B. Related Requirements:

- 1. Section 061053 "Miscellaneous Rough Carpentry" for blocking, nailers, shims, and carpentry supporting glass-fiber-reinforced plaster fabrications.
- 2. Section 092216 "Non-Structural Metal Framing" for steel framing, blocking, and bracing supporting glass-fiber-reinforced plaster fabrications.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, weights, dimensions of individual components and profiles, and finishes.

- B. Shop Drawings:

- 1. Include plans, elevations, sections, and attachment details.
- 2. Detail fabrication and assembly of glass-fiber-reinforced plaster fabrications.
- 3. Indicate requirements for joint treatment.

- C. Samples: For each exposed product and for each color and texture specified.

- 1. Linear Moldings: 24-inch-long section with finished joint. Show complete pattern.
- 2. Nonlinear Shapes: Full-size unit.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

- 1. Ceiling suspension assembly members.

Construction Documents

2. Method of attaching hangers to glass-fiber-reinforced plaster fabrications and to building structure.
3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, moldings, and other fixtures.

1.5 QUALITY ASSURANCE

- A. Mockups: Build mockups to set quality standards for fabrication and installation.
1. Build mockup of each type of glass-fiber-reinforced plaster fabrication.
  2. Paint mockups to match final decoration scheduled or indicated and to comply with requirements specified in Section 099123 "Interior Painting."
  3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C 1467/C 1467M.

1.7 FIELD CONDITIONS

- A. Environmental Conditions:
1. Comply with ASTM C 1467/C 1467M.
  2. Do not deliver or install glass-fiber-reinforced plaster fabrications until building is enclosed, wet work is complete, and HVAC system is operating and continuously maintaining temperature and relative humidity at levels intended for building occupants.
- B. Conditioning: Acclimatize glass-fiber-reinforced plaster fabrications to ambient temperature and humidity of spaces in which they will be installed. Remove packaging and move units into installation spaces not less than 48 hours before installing them.
- C. Field Measurements: Where glass-fiber-reinforced plaster fabrications are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.



Construction Documents

PART 2 - PRODUCTS

2.1 GLASS-FIBER-REINFORCED PLASTER FABRICATIONS

- A. Ceiling Panel Type GFRG1: Molded, glass-fiber-reinforced plaster units complying with ASTM C 1381/C 1381M.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers as selected by the Architect:
    - a. Architectural Reproductions Inc.
    - b. Casting Designs, Inc.
    - c. Formglas Inc.
    - d. Melton Classics, Inc.
    - e. Plaster Concepts.
    - f. Plastrglas, Incorporated.
    - g. Stromberg Architectural Products, Inc.
- B. Embedments: As standard with glass-fiber-reinforced plaster fabrication manufacturer and as required for reinforcement and for anchorage to substrates and framing.
- C. Finish: As selected by the Architect.

2.2 AUXILIARY MATERIALS

- A. Adhesives: As recommended in glass-fiber-reinforced plaster fabrication manufacturer's written instructions and as follows:
  - 1. Adhesive shall have VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Steel Drill Screws: Of sufficient length and size to securely fasten glass-fiber-reinforced plaster fabrications to framing members, and as follows:
  - 1. Screws complying with ASTM C 1002 for fastening glass-fiber-reinforced plaster fabrications to wood members.
  - 2. Screws complying with ASTM C 954 for fastening glass-fiber-reinforced plaster fabrications to steel members from 0.033 to 0.112 inch thick.
- C. Joint-Treatment Materials: ASTM C 475/C 475M.

2.3 FABRICATION

- A. Fabricate glass-fiber-reinforced plaster units to comply with ASTM C 1381/C 1381M, with smooth-finished surfaces; repair hollows, voids, scratches, and other surface imperfections. Fabricate units in lengths and sizes that will minimize number of joints between abutting units.

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Construction Documents

- B. Embedments: Incorporate embedments into units to develop the full strength of glass-fiber-reinforced plaster fabrications. Cover embedments with not less than 3/16-inch (5-mm) thickness of glass-fiber-reinforced plaster composite.
- C. Connection Hardware: Designed and fabricated to support and connect glass-fiber-reinforced plaster fabrications to hangers, support framing, and substrates.

PART 3 - EXECUTION

3.1 GLASS-FIBER-REINFORCED PLASTER INSTALLATION

- A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Comply with ASTM C 1467/C 1467M.
- D. Install glass-fiber-reinforced plaster fabrications level, plumb, true, and aligned with adjacent materials. Use concealed shims where required for alignment.
- E. Attach glass-fiber-reinforced plaster fabrications to framing and substrates with steel drill screws unless otherwise indicated. Do not use pneumatic staple guns. Countersink screw heads below adjoining finished surface.
  - 1. Predrill fastener holes in units. Clean fastener holes to remove dirt and oil.
  - 2. Locate fasteners not less than 5/16 inch from edges or ends of units.
- F. Where glass-fiber-reinforced plaster fabrications are joined to form composite units, join fabrications with adhesive. Band or brace units together until adhesive cures.
- G. Install control joints between glass-fiber-reinforced plaster fabrications where indicated.
- H. Use joint-treatment materials to finish glass-fiber-reinforced plaster fabrications to produce surfaces ready to receive primers and paint finishes specified in Section 099123 "Interior Painting."
  - 1. Finish joints between units, other than control joints, and countersunk fastener heads to comply with ASTM C 840 for Level 5 and to match surface texture of units.
  - 2. Repair hollows, voids, scratches, and other surface imperfections on units.

END OF SECTION 092713

Construction Documents

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Interior gypsum board.
- 2. Exterior gypsum board for ceilings and soffits.
- 3. Tile backing panels.

B. Related Requirements:

- 1. Section 061600 "Sheathing" for gypsum sheathing for exterior walls.
- 2. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For the following products:

- 1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.

C. Samples for Initial Selection: For each type of trim accessory indicated.

1.4 QUALITY ASSURANCE

A. Mockups: Build mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Build mockups for the following:

- a. Each level of gypsum board finish indicated for use in exposed locations.

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Construction Documents

2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.
  1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

Construction Documents

2.3 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. American Gypsum.
  - 2. CertainTeed Corporation.
  - 3. Continental Building Products, LLC.
  - 4. Georgia-Pacific Building Products.
  - 5. National Gypsum Company.
  - 6. PABCO Gypsum.
  - 7. Temple-Inland Building Products by Georgia-Pacific.
  - 8. United States Gypsum Company.
  
- B. Gypsum Wallboard: ASTM C 1396/C 1396M.
  - 1. Thickness: 5/8 inch, unless otherwise indicated.
  - 2. Long Edges: Tapered.
  
- C. Gypsum Board, Type X: ASTM C 1396/C 1396M.
  - 1. Thickness: 5/8 inch, unless otherwise indicated.
  - 2. Long Edges: Tapered.
  
- D. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
  - 1. Thickness: 5/8 inch, unless otherwise indicated.
  - 2. Long Edges: Tapered.
  
- E. Abuse-Resistant Gypsum Board: ASTM C 1396/C 1396M gypsum board, tested according to ASTM C 1629/C 1629M.
  - 1. Core: 5/8 inch, regular type, unless Type X is indicated.
  - 2. Surface Abrasion: ASTM C 1629/C 1629M, meets or exceeds Level 2 requirements.
  - 3. Indentation: ASTM C 1629/C 1629M, meets or exceeds Level 1 requirements.
  - 4. Soft-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 2 requirements.
  - 5. Long Edges: Tapered.
  - 6. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

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- F. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
  - 1. Core: 5/8 inch, regular type, unless Type X is indicated.
  - 2. Long Edges: Tapered.
  - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 SPECIALTY GYPSUM BOARD

- A. Gypsum Board, Type C: ASTM C 1396/C 1396M. Manufactured to have increased fire-resistive capability.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Gypsum.
    - b. CertainTeed Corporation.
    - c. Continental Building Products, LLC.
    - d. Georgia-Pacific Building Products.
    - e. National Gypsum Company.
    - f. PABCO Gypsum.
    - g. Temple-Inland Building Products by Georgia-Pacific.
    - h. United States Gypsum Company.
  - 2. Thickness: As required by fire-resistance-rated assembly indicated on Drawings.
  - 3. Long Edges: Tapered.

2.5 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Gypsum.
    - b. CertainTeed Corporation.
    - c. Georgia-Pacific Building Products.
    - d. National Gypsum Company.
    - e. Temple-Inland Building Products by Georgia-Pacific.
    - f. United States Gypsum Company.
  - 2. Core: 5/8 inch, regular type, unless Type X is indicated.
  - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

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- B. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. C-Cure.
    - b. CertainTeed Corporation.
    - c. Custom Building Products.
    - d. FinPan, Inc.
    - e. James Hardie Building Products, Inc.
    - f. National Gypsum Company.
    - g. United States Gypsum Company.
  - 2. Thickness: 1/2 inch, unless otherwise indicated.
  - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.6 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
  - 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
  - 2. Shapes:
    - a. Cornerbead.
    - b. Bullnose bead.
    - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
    - d. L-Bead: L-shaped; exposed long flange receives joint compound.
    - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
    - f. Expansion (control) joint.
    - g. Curved-Edge Cornerbead: With notched or flexible flanges.

2.7 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
  - 1. Interior Gypsum Board: Paper.
  - 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
  - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.

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2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
  - a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

D. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
2. Cementitious Backer Units: As recommended by backer unit manufacturer.
3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.8 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
  1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
  2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
  1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- E. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."
- F. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."



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Construction Documents

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both

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faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

- I. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

### 3.3 APPLYING INTERIOR GYPSUM BOARD

#### A. Install interior gypsum board in the following locations:

1. Wallboard Type: Vertical surfaces unless otherwise indicated.
2. Type X: Where required for fire-resistance-rated assembly and as indicated on Drawings.
3. Ceiling Type: Ceiling surfaces.
4. Abuse-Resistant Type: As indicated on Drawings.
5. Mold-Resistant Type: At wet wall locations and as indicated on Drawings.
6. Type C: Where required for specific fire-resistance-rated assembly indicated and as indicated on Drawings.
7. Glass-Mat Interior Type: As indicated on Drawings.

#### B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
  - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
  - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

#### C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

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3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
  4. Fastening Methods: Fasten base layers and face layers separately to supports with screws where required for fire-resistance-rated assemblies.
- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install where indicated. Install with 1/4-inch gap where panels abut other construction or penetrations.
- B. Cementitious Backer Units: ANSI A108.11, where indicated.
- C. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
  1. Cornerbead: Use at outside corners unless otherwise indicated.
  2. Bullnose Bead: Use where indicated.
  3. LC-Bead: Use at exposed panel edges.
  4. L-Bead: Use where indicated.
  5. U-Bead: Use where indicated.

3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

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- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
  - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
  - 2. Level 2: Panels that are substrate for tile, panels that are substrate for acoustical tile, and where indicated on Drawings.
  - 3. Level 3: Where indicated on Drawings.
  - 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
    - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
  - 5. Level 5: Where indicated on Drawings.
    - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
- E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

Construction Documents

SECTION 093013 - TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Floor tile.
2. Wall tile.
3. Waterproof membrane for thinset applications.
4. Crack isolation membrane.
5. Metal edge strips.

B. Related Requirements:

- 1.
2. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
3. Section 092900 "Gypsum Board" for cementitious backer units and glass-mat, water-resistant backer board.

1.3 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."
- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.

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1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Initial Selection: For tile, grout, and accessories involving color selection.
- D. Samples for Verification:
  - 1. Full-size units of each type and composition of tile and for each color and finish required.
  - 2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches square, but not fewer than four tiles. Use grout of type and in color or colors approved for completed Work.
  - 3. Full-size units of each type of trim and accessory for each color and finish required.
  - 4. Stone thresholds in 6-inch lengths.
  - 5. Metal edge strips in 6-inch lengths.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: For each type of product.
- D. Product Test Reports: For tile-setting and -grouting products.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
  - 2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

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Construction Documents

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Comply with one of the following:
  - 1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
  - 2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
  - 3. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.
  
- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockup of each type of floor tile installation.
  - 2. Build mockup of each type of wall tile installation.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.
  - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

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- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.
  - 1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
  - 2. Obtain waterproof membrane and crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.
  
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:
  - 1. Waterproof membrane.
  - 2. Crack isolation membrane.
  - 3. Cementitious backer units.
  - 4. Metal edge strips.

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
  - 1. Provide tile complying with Standard grade requirements unless otherwise indicated.
  
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
  
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
  
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
  - 1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

2.3 TILE PRODUCTS

- A. Floor Tile Type:
  - 1. Basis-of-Design: Subject to compliance with requirements, provide products indicated on the Finish Schedule, or comparable products as approved by the Architect.
  - 2. Composition: As indicated on the Finish Schedule.
  - 3. Module Size: As indicated on the Finish Schedule.



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4. Dynamic Coefficient of Friction: Not less than 0.42.
5. Tile Color and Pattern: As indicated on the Finish Schedule.
6. Grout Color: As selected by Architect from manufacturer's full range.
7. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile.

B. Wall Tile Type:

1. Basis-of-Design: Subject to compliance with requirements, provide products indicated on the Finish Schedule, or comparable products as approved by the Architect.
2. Composition: As indicated on the Finish Schedule.
3. Module Size: As indicated on the Finish Schedule.
4. Tile Color and Pattern: As indicated on the Finish Schedule.
5. Grout Color: As selected by Architect from manufacturer's full range.
6. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile.

2.4 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Chlorinated Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric.
  1. Nominal Thickness: 0.030 inch minimum.
- C. PVC Sheet: PVC heat-fused on both sides to facings of nonwoven polyester.
  1. Nominal Thickness: 0.025 inch, minimum.
- D. Polyethylene Sheet: Polyethylene faced on both sides with fleece webbing; 0.008-inch nominal thickness.
- E. Waterproof and Vaporproof Fabric Membrane:
  1. Basis-of-Design: Subject to compliance with requirements, provide Redgard Fabric Membrane by Custom Building Products or a comparable product by one of the following:
    - a. Custom Building Products.
    - b. Laticrete International, Inc.
    - c. MAPEI Corporation.

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Construction Documents

2.5 CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Chlorinated Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric; 0.030-inch nominal thickness.
- C. PVC Sheet: PVC heat-fused on both sides to facings of nonwoven polyester; 0.040-inch nominal thickness.
- D. Polyethylene Sheet: Polyethylene faced on both sides with fleece webbing; 0.008-inch nominal thickness.
- E. Corrugated Polyethylene: Corrugated polyethylene with dovetail-shaped corrugations and with anchoring webbing on the underside; 3/16-inch nominal thickness.
- F. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.
- G. Latex-Portland Cement Crack-Resistant Mortar: Flexible mortar consisting of cement-based mix and latex additive.
- H. Crack Isolation Membrane and Tile-Setting Adhesive: One-part, fluid-applied product intended for use as both a crack isolation membrane and tile-setting adhesive in a two-step process.

2.6 SETTING MATERIALS

- A. Standard Dry-Set Mortar (Thinset): ANSI A118.1.
  - 1. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.1.
- B. Modified Dry-Set Mortar (Thinset): ANSI A118.4.
  - 1. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
  - 2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.
- C. Water-Cleanable, Tile-Setting Epoxy: ANSI A118.3.
  - 1. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F, respectively, and certified by manufacturer for intended use.

Construction Documents

2.7 GROUT MATERIALS

- A. Standard Cement Grout: ANSI A118.6.
- B. Water-Cleanable Epoxy Grout: ANSI A118.3.
  - 1. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F, respectively, and certified by manufacturer for intended use.
- C. Grout for PregROUTed Tile Sheets: Same product used in factory to pregROUT tile sheets.

2.8 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Vapor-Retarder Membrane: Polyethylene sheeting, ASTM D 4397, 4.0 mils thick.
- C. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide products indicated on the Finish Schedule by Schluter Systems L.P., or comparable products as approved by the Architect.
- D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- E. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

2.9 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

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Construction Documents

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
  - 2. Verify that concrete substrates for tile floors installed with adhesives, bonded mortar bed, or thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
    - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
  - 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
  - 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives or thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA

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installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
  - a. Tile floors in wet areas.
  - b. Tile floors in laundries.
  - c. Tile floors consisting of tiles 8 by 8 inches or larger.
  - d. Tile floors consisting of rib-backed tiles.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
- F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
  1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
  2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
  3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- G. Joint Widths: Install tile with the joint widths as directed by the Architect.
- H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
  1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
- J. Metal Edge Strips: Install at locations indicated and where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

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- K. Floor Sealer: Apply floor sealer to grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 TILE BACKING PANEL INSTALLATION

- A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use modified dry-set mortar for bonding material unless otherwise directed in manufacturer's written instructions.

3.5 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
- B. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.

3.6 CRACK ISOLATION MEMBRANE INSTALLATION

- A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
- B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

3.7 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all tile surfaces so they are free of foreign matter.
  - 1. Remove grout residue from tile as soon as possible.
  - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

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3.8 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.9 INTERIOR TILE INSTALLATION SCHEDULE

- A. Interior Floor Installations, Concrete Subfloor:
  - 1. Tile Installation: TCNA F114 and ANSI A108.1A; cement mortar bed (thickset) with cleavage membrane; epoxy grout.
    - a. Tile Type: As indicated on the Finish Schedule.
    - a. Grout: Water-cleanable epoxy grout complying with ANSI A118.3 or better.
    - b. Cementitious Bond Coat: Portland cement paste on a mortar bed that is still workable; or on a cured mortar bed, use portland cement mortar; ANSI A118.1 or better
    - c. Mortar bed, reinforcing, and cleavage membrane: ANSI A108.1A.
  - 2. Tile Installation: TCNA F115; thinset mortar; epoxy grout with on crack isolation membrane per TCNA F125-Full.
    - a. Tile Type: As indicated on the Finish Schedule.
    - b. Thinset Mortar: Latex portland cement mortar complying with ANSI A118.4 or better.
    - c. Grout: Water-cleanable epoxy grout complying with ANSI A118.3 or better.
  - 3. Tile Installation: TCNA F122; thinset mortar on waterproof membrane at wet areas.
    - a. Tile Type: As indicated on the Finish Schedule.
    - b. Grout: Water-cleanable epoxy grout complying with ANSI A118.3 or better.
    - c. Cementitious Bond Coat: ANSI A-118.4 or better unless A-118.1 is recommended by membrane manufacturer.
    - d. Waterproof Membrane: ANSI A-118.10.
  - 4. Tile Installation: TCNA F125-Full; thinset mortar on crack isolation membrane for all tile greater than 12 inches in any direction.
    - a. Tile Type: As indicated on the Finish Schedule.
    - b. Thinset Mortar: Latex portland cement mortar complying with ANSI A118.4 or better.
    - c. Grout: Standard unsanded cement grout.

Construction Documents

B. Interior Wall Installations, Masonry or Concrete:

1. Tile Installation: TCNA W221 and ANSI A108.1A, cement mortar bed (thickset) over metal lath on solid CMU or metal stud and cementitious backer units.
  - a. Tile Type: As indicated on the Finish Schedule.
  - b. Grout: Water-cleanable epoxy grout complying with ANSI A118.3 or better.
  - c. Epoxy Bond Coat: ANSI - A118.3
  - d. Latex Portland Cement Mortar: ANSI 118.4
  - e. Waterproof Membrane: ANSI A118.10
  - f. Mortar Bed, Metal Lath and Cleavage Membrane: ANSI A108.1A

C. Interior Wall Installations, Metal Studs or Furring:

1. Tile Installation: TCNA W244C or TCNA W244F; thinset mortar on cementitious backer units or fiber-cement backer board over vapor-retarder membrane.
  - a. Tile Type: As indicated on the Finish Schedule.
  - b. Grout: Water-cleanable epoxy grout complying with ANSI A118.3 or better.
  - c. Latex Portland Cement Mortar: ANSI A-118.4 or better
  - d. Waterproof Membrane: ANSI A118.10.

END OF SECTION 093013



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Construction Documents

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
- C. Samples for Initial Selection: For components with factory-applied finishes.
- D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
  - 1. Acoustical Panels: Set of 6-inch-square Samples of each type, color, pattern, and texture.
  - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- long Samples of each type, finish, and color.
- E. Delegated-Design Submittal: For seismic restraints for ceiling systems.
  - 1. Include design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.

Construction Documents

- C. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.
- D. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
  - 2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.

1.7 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  - 1. Build mockup of typical ceiling area as shown on Drawings.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

Construction Documents

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design seismic restraints for ceiling systems.
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: Class A according to ASTM E 1264.
  - 2. Smoke-Developed Index: 50 or less.
- C. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Indicate design designations from UL or from the listings of another qualified testing agency.

2.3 ACOUSTICAL PANELS

- A. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide products indicated below by Armstrong World Industries, Inc, or comparable products as approved by the Architect:
  - 1. Standard ACT:
    - a. Product: Cirrus.
    - b. Type and Form: Type III, mineral base with painted finish; Form 1, nodular.

Construction Documents

- c. Type and Form: Type XX, high-density, ceramic- and mineral-base panels with scubbable finish, resistant to heat, moisture, and corrosive fumes.
  - d. Color: White.
  - e. Edge/Joint Detail: Tegular.
  - f. Thickness: 7/8 inch.
  - g. Modular Size: 24 by 24 inches.
- 2. Kitchen ACT:
  - a. Product: As selected by the Architect.
  - b. Type and Form: Type XX, high-density, ceramic- and mineral-base panels with scubbable finish, resistant to heat, moisture, and corrosive fumes.
  - c. Color: White.
  - d. Edge/Joint Detail: As selected by the Architect.
  - e. Thickness: 7/8 inch.
  - f. Modular Size: 24 by 24 inches.
- C. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273, ASTM D 3274, or ASTM G 21 and evaluated according to ASTM D 3274 or ASTM G 21.

2.4 METAL SUSPENSION SYSTEM

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Armstrong World Industries, Inc.
  - 2. CertainTeed Corporation.
  - 3. United States Gypsum Company.
- B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.
- C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.
  - 1. Structural Classification: Heavy-duty system.
  - 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
  - 3. Face Design: Flat, flush.
  - 4. Cap Material: Cold-rolled steel or aluminum.
  - 5. Cap Finish: Painted to match color of acoustical unit, unless otherwise selected by the Architect.

Construction Documents

2.5 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
  - 1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488/E 488M or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
    - a. Type: Cast-in-place, postinstalled expansion, or postinstalled bonded anchors as acceptable to the Structural Engineer.
    - b. Corrosion Protection: Carbon-steel components zinc plated according to ASTM B 633, Class SC 1 (mild) service condition.
    - c. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Group 1 Alloy 304 or 316.
    - d. Corrosion Protection: Components fabricated from nickel-copper-alloy rods complying with ASTM B 164 for UNS No. N04400 alloy.
  - 2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
  - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
  - 2. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
  - 3. Nickel-Copper-Alloy Wire: ASTM B 164, nickel-copper-alloy UNS No. N04400.
  - 4. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch- diameter wire.
- C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- E. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.

2.6 METAL EDGE MOLDINGS AND TRIM

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

Construction Documents

1. Armstrong World Industries, Inc.
  2. CertainTeed Corporation.
  3. United States Gypsum Company.
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
  2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
  3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
- C. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements.
1. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.
  2. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils. Comply with ASTM C 635/C 635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

2.7 ACOUSTICAL SEALANT

- A. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

Construction Documents

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.
- B. Suspend ceiling hangers from building's structural members and as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  - 4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  - 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
  - 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
  - 7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  - 8. Do not attach hangers to steel deck tabs.
  - 9. Do not attach hangers to steel roof deck unless permitted by the Structural Engineer and authorities having jurisdiction. Attach hangers to structural members unless otherwise required for structural performance.
  - 10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
  - 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

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Construction Documents

1. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
  1. Arrange directionally patterned acoustical panels as follows:
    - a. As indicated on reflected ceiling plans.
  2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
  3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
  4. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
  5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113



Construction Documents

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Resilient base.
  - 2. Resilient molding accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.
- C. Samples for Initial Selection: For each type of product indicated.
- D. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Coordinate mockups in this Section with mockups specified in other Sections.

Construction Documents

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.7 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 THERMOPLASTIC-RUBBER BASE

- A. Basis-of-Design: Subject to compliance with requirements, provide products indicated on the Finish Schedule, or comparable products as approved by the Architect.
  - 1. Styles: As indicated on the Finish Schedule.
  - 2. Heights: 4 inches and 6 inches as indicated on the Finish Schedule.
    - a. Provide 6-inch architectural wall base where indicated.
  - 3. Colors: As indicated on the Finish Schedule.
- B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).
  - 1. Group: I (solid, homogeneous).
- C. Thickness: 0.125 inch.
- D. Lengths: Cut lengths 48 inches long or coils in manufacturer's standard length.
- E. Outside Corners: Preformed.
- F. Inside Corners: Job formed or preformed.

Construction Documents

2.2 RUBBER MOLDING ACCESSORY

- A. Basis-of-Design: Subject to compliance with requirements, provide products indicated on the Finish Schedule, or comparable products as approved by the Architect.
- B. Description: Rubber cap for cove carpet, cap for cove resilient flooring, carpet bar for tackless installations, carpet edge for glue-down applications, nosing for carpet, nosing for resilient flooring, reducer strip for resilient flooring, joiner for tile and carpet, and transition strips.
- C. Profile and Dimensions: As indicated.
- D. Locations: Provide rubber molding accessories in areas indicated.
- E. Colors and Patterns: As indicated on the Finish Schedule.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
- C. Metal Edge Strips:
  - 1. Basis-of-Design: Subject to compliance with requirements, provide products indicated on the Finish Schedule, or comparable products as approved by the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

Construction Documents

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are the same temperature as the space where they are to be installed.
  - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
  - 1. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
    - a. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.

Construction Documents

- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces.
  - 2. Sweep and vacuum horizontal surfaces thoroughly.
  - 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513



Construction Documents

SECTION 096516 - RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
  - 1. Vinyl sheet flooring

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of flooring. Include flooring layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
  - 1. Show details of special patterns.
- C. Samples: For each exposed product and for each color and texture specified in manufacturer's standard size, but not less than 6-by-9-inch sections.
  - 1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches long, of each color required.
- D. Welded-Seam Samples: For seamless-installation technique indicated and for each resilient sheet flooring product, color, and pattern required; with seam running lengthwise and in center of 6-by-9-inch Sample applied to a rigid backing and prepared by Installer for this Project.
- E. Product Schedule: For resilient sheet flooring. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of resilient sheet flooring to include in maintenance manuals.

Construction Documents

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Resilient Sheet Flooring: Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, in roll form and in full roll width for each type, color, and pattern of flooring installed.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for resilient sheet flooring installation and seaming method indicated.
  - 1. Engage an installer who employs workers for this Project who are trained or certified by resilient sheet flooring manufacturer for installation techniques required.
- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockups for resilient sheet flooring including resilient base and accessories.
    - a. Size: Minimum 100 sq. ft. for each type, color and pattern in locations directed by Architect.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient sheet flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store rolls upright.

1.9 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 85 deg F, in spaces to receive resilient sheet flooring during the following time periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.



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Construction Documents

- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during resilient sheet flooring installation.
- D. Close spaces to traffic for 48 hours after resilient sheet flooring installation.
- E. Install resilient sheet flooring after other finishing operations, including painting, have been completed.

**PART 2 - PRODUCTS**

**2.1 PERFORMANCE REQUIREMENTS**

- A. Fire-Test-Response Characteristics: For resilient sheet flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

**2.2 VINYL SHEET FLOORING**

- A. Basis-of-Design: Subject to compliance with requirements, provide product indicated on the Finish Schedule, or a comparable product as approved by the Architect.
  - 1. Thickness: Manufacturer's standard.
  - 2. Sheet Width: Manufacturer's standard.
  - 3. Installation Method: Manufacturer's standard.
  - 4. Colors and Patterns: As indicated on the Finish Schedule.
  - 5. Integral Base: 4 inches high with vinyl cap.

**2.3 INSTALLATION MATERIALS**

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit resilient sheet flooring and substrate conditions indicated.
- C. Seamless-Installation Accessories:
  - 1. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.
    - a. Color: Match flooring.
  - 2. Chemical-Bonding Compound: Manufacturer's product for chemically bonding seams.

Construction Documents

- D. Integral-Flash-Cove-Base Accessories:
  - 1. Cove Strip: 1-inch radius provided or approved by resilient sheet flooring manufacturer.
  - 2. Cap Strip: Square or tapered vinyl cap provided or approved by resilient sheet flooring manufacturer.
  - 3. Corners: Metal inside and outside corners and end stops provided or approved by resilient sheet flooring manufacturer.
  
- E. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient sheet flooring manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient sheet flooring.
  
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to resilient sheet flooring manufacturer's written instructions to ensure adhesion of resilient sheet flooring.
  
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by resilient sheet flooring manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by resilient sheet flooring manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
  - 4. Moisture Testing: Proceed with installation only after substrates pass testing according to resilient sheet flooring manufacturer's written recommendations, but not less stringent than the following:
    - a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.

Construction Documents

- b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient sheet flooring until it is the same temperature as the space where it is to be installed.
  - 1. At least 48 hours in advance of installation, move flooring and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient sheet flooring.

3.3 RESILIENT SHEET FLOORING INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient sheet flooring.
- B. Unroll resilient sheet flooring and allow it to stabilize before cutting and fitting.
- C. Lay out resilient sheet flooring as follows:
  - 1. Maintain uniformity of flooring direction.
  - 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in flooring substrates.
  - 3. Match edges of flooring for color shading at seams.
  - 4. Avoid cross seams.
- D. Scribe and cut resilient sheet flooring to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, and door frames.
- E. Extend resilient sheet flooring into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on resilient sheet flooring as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Adhere resilient sheet flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- H. Seamless Installation:
  - 1. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and heat weld with welding bead to permanently fuse sections into a seamless flooring. Prepare, weld, and finish seams to produce surfaces flush with adjoining flooring surfaces.

Construction Documents

2. Chemically Bonded Seams: Bond seams with chemical-bonding compound to permanently fuse sections into a seamless flooring. Prepare seams and apply compound to produce tightly fitted seams without gaps, overlays, or excess bonding compound on flooring surfaces.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient sheet flooring.
- B. Perform the following operations immediately after completing resilient sheet flooring installation:
  1. Remove adhesive and other blemishes from surfaces.
  2. Sweep and vacuum surfaces thoroughly.
  3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient sheet flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, adhesive, and blemishes from flooring surfaces before applying liquid floor polish.
  1. Apply two coat(s).
- E. Cover resilient sheet flooring until Substantial Completion.

END OF SECTION 096516

Construction Documents

SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Luxury vinyl plank floor tile.
  - 2. Vinyl composition floor tile.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
  - 1. Show details of special patterns.
- C. Samples: Full-size units of each color and pattern of floor tile required.
- D. Product Schedule: For floor tile. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

Construction Documents

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
  - 1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.
- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockups for floor tile including resilient base and accessories.
    - a. Size: Minimum 100 sq. ft. for each type, color, and pattern in locations directed by Architect.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.9 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following time periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.

Construction Documents

- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

**PART 2 - PRODUCTS**

**2.1 PERFORMANCE REQUIREMENTS**

- A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

**2.2 SOLID VINYL PLANK FLOOR TILE**

- A. Luxury Vinyl Plank Tile:
  - 1. Basis-of-Design: Subject to compliance with requirements, provide products indicated on the Finish Schedule, or comparable products as approved by the Architect:
    - a. Style: As indicated on the Finish Schedule.
    - b. Color: As indicated on the Finish Schedule.
    - c. Size: As indicated on the Finish Schedule.
    - d. Thickness: As indicated on the Finish Schedule.
    - e. Finish: As indicated on the Finish Schedule.
- B. Tile Standard: ASTM F 1700.
  - 1. Class: Class III, printed film vinyl tile.
  - 2. Type: B, embossed surface.

**2.3 VINYL COMPOSITION FLOOR TILE**

- A. Basis-of-Design: Subject to compliance with requirements, provide products indicated on the Finish Schedule, or comparable products as approved by the Architect:
  - 1. Sizes: As indicated on the Finish Schedule.
  - 2. Colors and Patterns: As indicated on the Finish Schedule.
- B. Tile Standard: ASTM F 1066, Class 1, solid-color or Class 2, through-pattern tile as selected by the Architect.

Construction Documents

- C. Wearing Surface: Smooth.
- D. Thickness: 0.125 inch.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
  - 4. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:



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Construction Documents

- a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
  - b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until they are the same temperature as the space where they are to be installed.
- 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
- 1. Lay tiles in pattern indicated.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
- 1. Lay tiles with grain running in one direction, unless otherwise indicated.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

Construction Documents

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
  - 1. Apply two coat(s).
- E. Cover floor tile until Substantial Completion.

END OF SECTION 096519

Construction Documents

SECTION 096723 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes resinous flooring systems.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.
- B. Samples for Initial Selection: For each type of exposed finish required.
- C. Samples for Verification: For each resinous flooring system required, 6 inches square, applied to a rigid backing by Installer for this Project.

1.5 INFORMATIONAL SUBMITTALS

- A. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- B. Material Certificates: For each resinous flooring component, from manufacturer.
- C. Material Test Reports: For each resinous flooring system, by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For resinous flooring to include in maintenance manuals.

Construction Documents

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Apply full-thickness mockups on 96-inch-square floor area selected by Architect.
    - a. Include 96-inch length of integral cove base with inside and outside corner.
  - 2. Simulate finished lighting conditions for Architect's review of mockups.
  - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for 24 hours after application unless manufacturer recommends a longer period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Flammability: Self-extinguishing according to ASTM D 635.

Construction Documents

2.2 MANUFACTURERS

- A. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.

2.3 RESINOUS FLOORING

- A. Abrasion-, impact-, and chemical-resistant, aggregate-filled, and resin-based monolithic floor surfacing designed to produce a seamless floor and 4-inch integral cove base.

- B. Resinous Flooring System Type POLY-1

- 1. Basis-of-Design: Subject to compliance with requirements, provide Dur-A-Flex, Inc, Poly-Crete MDB as indicated on the Finish Schedule, or a comparable system as approved by the Architect.

- 2. System Characteristics:

- a. Color and Pattern: As indicated on the Finish Schedule.
- b. Finish: As indicated on the Finish Schedule.
- c. Wearing Surface: Manufacturer's standard.
- d. Overall Finished System Thickness: 1/4 inch nominal.
- e. System Materials: Urethane topcoat seamless flooring system with self-leveling broadcast quartz.

- 1) Topping: Dur-A-Flex, Inc, Poly-Crete MD resin, hardener and aggregate.
- 2) The aggregate shall be Dur-A-Flex, Inc. Flintshot quartz aggregate.
- 3) Topcoat: Dur-A-Flex, Inc. Poly-Crete Color-Fast resin, hardener and powder aggregate.

- f. Patch Materials:

- 1) Shallow Fill and Patching: Use Dur-A-Flex, Inc. Poly-Crete MD (up to 1/4 inch).
- 2) Deep Fill and Sloping Material (over 1/4 inch): Use Dur-A-Flex, Inc. Dur-A-Tex UM.

- C. Resinous Flooring System Type HYBRI-1:

- 1. Basis-of-Design: Subject to compliance with requirements, provide HYBRI-FLEX EC as indicated on the Finish Schedule, or a comparable system as approved by the Architect.

- a. Color and Pattern: As indicated on the Finish Schedule.
- b. Finish: As indicated on the Finish Schedule.
- c. Wearing Surface: Manufacturer's standard.
- d. Overall Finished System Thickness: 3/16 inch nominal.

Construction Documents

- e. System Materials: Decorative chip system composed of an 1/8" POLY-CRETE SL body coat with a decorative chip broadcast.
  - 1) DUR-A-GLAZE #4 broadcast coat.
  - 2) DUR-A-GLAZE #4 grout coat.
  - 3) ARMOR TOP topcoat.
- D. Primer: Type recommended by resinous flooring manufacturer for substrate and resinous flooring system indicated.
  - 1. Formulation Description: 100 percent solids.
- E. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
  - 1. Roughen concrete substrates as follows:
    - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
    - b. Comply with ASTM C 811 requirements unless manufacturer's written instructions are more stringent.
  - 2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
  - 3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
    - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. of slab area in 24 hours.
    - b. Plastic Sheet Test: ASTM D 4263. Proceed with application only after testing indicates absence of moisture in substrates.
    - c. Relative Humidity Test: Use in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

Construction Documents

4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- C. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
  1. Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.
- D. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

3.2 APPLICATION

- A. Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
  1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
  2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
  3. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.
- B. Primer: Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Reinforcing Membrane: Apply reinforcing membrane to substrate cracks.
- D. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details, including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.
  1. Integral Cove Base: 4 inches high.
- E. Self-Leveling Body Coats: Apply self-leveling slurry body coats in thickness indicated for flooring system.
  1. Aggregates: Broadcast aggregates at rate recommended by manufacturer and, after resin is cured, remove excess aggregates to provide surface texture indicated.
- F. Troweled or Screeded Body Coats: Apply troweled or screeded body coats in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel marks and roughness using method recommended by manufacturer.
- G. Grout Coat: Apply grout coat, of type recommended by resinous flooring manufacturer, to fill voids in surface of final body coat.

Construction Documents

- H. Topcoats: Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer and to produce wearing surface indicated.

3.3 FIELD QUALITY CONTROL

- A. Material Sampling: Owner may, at any time and any number of times during resinous flooring application, require material samples for testing for compliance with requirements.
  - 1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
  - 2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
  - 3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.
- B. Core Sampling: At the direction of Owner and at locations designated by Owner, take one core sample per 1000 sq. ft. of resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two additional samples. Repair damage caused by coring. Correct deficiencies in installed flooring as indicated by testing.

3.4 PROTECTION

- A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION 096723



Construction Documents

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Modular carpet tile, including textile composite and walk-off mat carpet tiles.
- 2. Metal edge strips.
- 3. Welded rod transitions.

B. Related Requirements:

- 1. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

- 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
- 2. Include manufacturer's written installation recommendations for each type of substrate.

B. Shop Drawings: For carpet tile installation, plans showing the following:

- 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
- 2. Carpet tile type, color, and dye lot.
- 3. Type of subfloor.
- 4. Type of installation.
- 5. Pattern of installation.
- 6. Pattern type, location, and direction.
- 7. Pile direction.
- 8. Type, color, and location of insets and borders.
- 9. Type, color, and location of edge, transition, and other accessory strips.
- 10. Transition details to other flooring materials.

Construction Documents

- C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
  - 1. Carpet Tile: Full-size Sample.
  - 2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.
- D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
- C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
  - 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
  - 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
  - 1. Build mockups at locations and in sizes shown on Drawings.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

Construction Documents

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI's "CRI Carpet Installation Standard."

1.9 FIELD CONDITIONS

- A. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.10 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
  - 2. Failures include, but are not limited to, the following:
    - a. More than 10 percent edge raveling, snags, and runs.
    - b. Dimensional instability.
    - c. Excess static discharge.
    - d. Loss of tuft-bind strength.
    - e. Loss of face fiber.
    - f. Delamination.
  - 3. Warranty Period: 10 years from date of Substantial Completion.

Construction Documents

PART 2 - PRODUCTS

2.1 CARPET TILE

- A. Carpet Tile Type: Standard field and accent tiles.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated below:
    - a. Manufacturer: As indicated on the Finish Schedule.
    - b. Pattern: As indicated on the Finish Schedule.
    - c. Color: As indicated on the Finish Schedule.
    - d. Size: As indicated on the Finish Schedule.
    - e. Installation: As selected by the Architect.
- B. Carpet Tile Type: Textile composite hybrid carpet tile.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated below:
    - a. Manufacturer: As indicated on the Finish Schedule.
    - b. Pattern: As indicated on the Finish Schedule.
    - c. Color: As indicated on the Finish Schedule.
    - d. Size: As indicated on the Finish Schedule.
    - e. Installation: As selected by the Architect.
- C. Carpet Tile Type: Walk-off carpet tiles.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated below:
    - a. Manufacturer: As indicated on the Finish Schedule.
    - b. Pattern: As indicated on the Finish Schedule.
    - c. Color: As indicated on the Finish Schedule.
    - d. Size: As indicated on the Finish Schedule.
    - e. Installation: As selected by the Architect.
- D. Primary Backing/Backcoating: Manufacturer's standard composite materials.
- E. Secondary Backing: Manufacturer's standard material.
- F. Applied Treatments:
  - 1. Soil-Resistance Treatment: Manufacturer's standard treatment.
  - 2. Antimicrobial Treatment: Manufacturer's standard treatment that protects carpet tiles as follows:

Construction Documents

- a. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.
- C. Metal Edge/Transition Strips:
  1. Basis-of-Design: Subject to compliance with requirements, provide products indicated on the Finish Schedule, or comparable products as approved by the Architect.
- D. Welded Rod Transitions:
  1. Basis-of-Design: Subject to compliance with requirements, provide products indicated on the Finish Schedule, or comparable products as approved by the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
- B. Examine carpet tile for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
  1. Moisture Testing for Adhesively Applied Carpet Tile: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
    - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    - b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

Construction Documents

- c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI's "Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer, unless otherwise indicated.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.

Construction Documents

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
  - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
  - 2. Remove yarns that protrude from carpet tile surface.
  - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI's "Carpet Installation Standard," Section 20, "Protecting Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813





Construction Documents

SECTION 096816 - SHEET CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Broadloom carpet.
- 2. Carpet cushion.
- 3. Metal edge strips.

B. Related Requirements:

- 1. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

- 1. Review methods and procedures related to carpet installation including, but not limited to, the following:
  - a. Review delivery, storage, and handling procedures.
  - b. Review ambient conditions and ventilation procedures.
  - c. Review subfloor preparation procedures.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

- 1. Include manufacturer's written data on physical characteristics and durability.
- 2. Include manufacturer's written installation recommendations for each type of substrate.

B. Shop Drawings: For carpet installation, showing the following:

- 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.

Construction Documents

2. Carpet type, color, and dye lot.
3. Seam locations, types, and methods.
4. Type of subfloor.
5. Type of installation.
6. Pattern type, repeat size, location, direction, and starting point.
7. Pile direction.
8. Types, colors, and locations of edge, transition, and other accessory strips.
9. Transition details to other flooring materials.
10. Type of carpet cushion.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet: 12-inch-square Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.
3. Carpet Cushion: 6-inch-square Sample.
4. Carpet Seam: 6-inch Sample.

D. Product Schedule: For carpet and carpet cushion. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For carpet and carpet cushion, for tests performed by a qualified testing agency.
- C. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet to include in maintenance manuals. Include the following:
  1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
  2. Precautions for cleaning materials and methods that could be detrimental to carpet and carpet cushion.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

Construction Documents

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
  - 1. Build mockups at locations and in sizes as approved by the Architect.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI's "CRI Carpet Installation Standard."
- B. Deliver carpet in original mill protective covering with mill register numbers and tags attached.

1.10 FIELD CONDITIONS

- A. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet and carpet cushion until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet and carpet cushion over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.

1.11 WARRANTY

- A. Special Warranty for Carpet: Manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
  - 2. Failures include, but are not limited to, the following:
    - a. More than 10 percent loss of face fiber, edge raveling, snags, and runs.
    - b. Loss of tuft bind strength.
    - c. Excess static discharge.
    - d. Delamination.
  - 3. Warranty Period: 10 years from date of Substantial Completion.

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Construction Documents

- B. Special Warranty for Carpet Cushion: Manufacturer agrees to repair or replace components of carpet cushion installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty includes removal and replacement of carpet and accessories required by replacement of carpet cushion.
  - 2. Warranty does not include deterioration or failure of carpet cushion due to unusual traffic, failure of substrate, vandalism, or abuse.
  - 3. Failure includes, but is not limited to, permanent indentation or compression.
  - 4. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 BROADLOOM CARPET

- A. Carpet Type:
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated below:
    - a. Manufacturer: As indicated on the Finish Schedule.
    - b. Pattern: As indicated on the Finish Schedule.
    - c. Color: As indicated on the Finish Schedule.
    - d. Size: As indicated on the Finish Schedule.
    - e. Installation: As selected by the Architect.
- B. Primary Backing: Manufacturer's standard material.
- C. Secondary Backing: Manufacturer's standard material.
- D. Backcoating: Manufacturer's standard material.
- E. Applied Treatments:
  - 1. Applied Soil-Resistance Treatment: Manufacturer's standard material.
  - 2. Antimicrobial Treatment: Manufacturer's standard material.
    - a. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.
- F. Performance Characteristics:
  - 1. Appearance Retention Rating: Heavy traffic, 3.0 minimum according to ASTM D 7330.

Construction Documents

2.2 CARPET CUSHION

- A. Manufacturers: Subject to compliance with requirements, provide products by carpet manufacturer or by one of the following:
  - 1. Carpenter Co.
  - 2. Dalton Foam; a division of NCFI Polyurethanes; a division of Barnhardt Manufacturing Company.
  - 3. Dura Undercushions Ltd.
  - 4. Foam Products Corporation.
  - 5. Hickory Springs Manufacturing Company, Inc.
  - 6. Leggett & Platt, Inc.
  - 7. Los Angeles Fiber.
  - 8. Scottdel Cushion LLC.
  - 9. Sponge Cushion, Inc.; A Leggett & Platt company.
- B. Traffic Classification: CCC Class II, heavy traffic.
- C. Rubber Cushion: Flat, rippled waffle, or textured flat as approved by the Architect.
  - 1. Density: 5 lb./cu. ft. minimum, unless otherwise indicated.
  - 2. Thickness: 7/16-inch minimum, unless otherwise indicated.
- D. Performance Characteristics:
  - 1. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm according to NFPA 253.

2.3 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet cushion manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet and carpet cushion manufacturers.
- C. Tackless Carpet Stripping: Water-resistant plywood, in strips as required to match cushion thickness and that comply with CRI's "CRI Carpet Installation Standard."
- D. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.
- E. Metal Edge/Transition Strips:
  - 1. Basis-of-Design: Subject to compliance with requirements, provide products indicated on the Finish Schedule, or comparable products as approved by the Architect.

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Construction Documents

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance.
- B. Examine carpet for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
  - 1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
    - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    - b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
    - c. Perform additional moisture tests recommended in writing by adhesive, carpet cushion, and carpet manufacturers. Proceed with installation only after substrates pass testing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard" and with carpet manufacturer's written installation instructions for preparing substrates.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive, carpet, and carpet cushion manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

Construction Documents

3.3 CARPET INSTALLATION

- A. Comply with CRI's "CRI Carpet Installation Standard" and carpet and carpet cushion manufacturers' written installation instructions for the following:
  - 1. Direct-glue-down installation.
  - 2. Carpet with attached-cushion installation.
  - 3. Preapplied adhesive installation.
  - 4. Stretch-in installation.
- B. Comply with carpet manufacturer's written instructions and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
  - 1. Stretch-in Carpet Installation: Install carpet cushion seams at 90-degree angle with carpet seams.
- C. Do not bridge building expansion joints with carpet.
- D. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- E. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet as marked on subfloor. Use nonpermanent, nonstaining marking device.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet:
  - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
  - 2. Remove yarns that protrude from carpet surface.
  - 3. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI's "CRI Carpet Installation Standard."
- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods recommended in writing by carpet manufacturer and carpet cushion and adhesive manufacturers.

END OF SECTION 096816





Construction Documents

SECTION 097200 - WALL COVERINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Vinyl wall covering.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include data on physical characteristics, durability, fade resistance, and fire-test-response characteristics.
- B. Shop Drawings: Show location and extent of each wall-covering type. Indicate pattern placement, seams and termination points.
- C. Samples: For each type of wall covering and for each color, pattern, texture, and finish specified, full width by 36-inch- long in size.
  - 1. Wall-Covering Sample: From same production run to be used for the Work, with specified treatments applied. Show complete pattern repeat. Mark top and face of fabric.
- D. Product Schedule: For wall coverings. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Product Test Reports: For each wall covering, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For wall coverings to include in maintenance manuals.

Construction Documents

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Wall-Covering Materials: For each type, color, texture, and finish, full width by length to equal to 5 percent of amount installed.

1.7 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for installation.
  - 1. Build mockups for each type of wall covering on each substrate required. Comply with requirements in ASTM F 1141 for appearance shading characteristics.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.
- B. Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

Construction Documents

- a. Flame-Spread Index: 25 or less.
  - b. Smoke-Developed Index: 50 or less.
2. Fire-Growth Contribution: No flashover and heat and smoke release according to NFPA 265.

2.2 VINYL WALL COVERING

- A. Advanced Wall Protection Vinyl Wall Covering Type: Impact-, chemical-, and abrasion-resistant.
1. Basis-of-Design Products: Subject to compliance with requirements, provide product indicated below, or a comparable product as approved by the Architect:
- a. Manufacturer: As indicated on the Finish Schedule.
  - b. Pattern: As indicated on the Finish Schedule.
  - c. Color: As indicated on the Finish Schedule.
  - d. Width: As indicated on the Finish Schedule.

2.3 ACCESSORIES

- A. Adhesive: Mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall-covering manufacturer.
- B. Primer/Sealer: Mildew resistant, complying with requirements in Section 099123 "Interior Painting" and recommended in writing by primer/sealer and wall-covering manufacturers for intended substrate.
- C. Seam Tape: As recommended in writing by wall-covering manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.

Construction Documents

- B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
  - 1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
  - 2. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
  - 3. Painted Surfaces: Treat areas susceptible to pigment bleeding.
- D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.
- E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- F. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 WALL-COVERING INSTALLATION

- A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.
- B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.
- C. Install strips in same order as cut from roll.
  - 1. For solid-color, even-texture, or random-match wall coverings, reverse every other strip.
- D. Install wall covering without lifted or curling edges and without visible shrinkage.
- E. Match pattern 72 inches above the finish floor.
- F. Install seams vertical and plumb at least 6 inches from outside corners and 6 inches from inside corners unless a change of pattern or color exists at corner. Horizontal seams are not permitted.
- G. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.
- H. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

3.4 CLEANING

- A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.

Construction Documents

- B. Use cleaning methods recommended in writing by wall-covering manufacturer.
- C. Replace strips that cannot be cleaned.
- D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 097200



Construction Documents

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following exterior substrates:
  - 1. Concrete.
  - 2. Fiber-cement board.
  - 3. Clay masonry.
  - 4. Steel.
  - 5. Galvanized metal.
  - 6. Aluminum (not anodized or otherwise coated).
  - 7. Gypsum board.

1.3 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

Construction Documents

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
  - 2. Indicate VOC content.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
    - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
    - b. Other Items: Architect will designate items or areas required.
  - 2. Final approval of color selections will be based on mockups.
    - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
  - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.



Construction Documents

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Benjamin Moore & Co.
  - 2. Dulux (formerly ICI Paints); a brand of AkzoNobel.
  - 3. Duron, Inc.
  - 4. PPG Architectural Coatings.
  - 5. Sherwin-Williams Company (The).
- B. Products: Subject to compliance with requirements, provide product listed in the Exterior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
  - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: As selected by Architect from manufacturer's full range.

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Construction Documents

2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
  - 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
  - 2. Testing agency will perform tests for compliance with product requirements.
  - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Concrete: 12 percent.
  - 2. Fiber-Cement Board: 12 percent.
  - 3. Masonry (Clay and CMUs): 12 percent.
  - 4. Gypsum Board: 12 percent.
- C. Exterior Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

Construction Documents

- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- E. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.
- F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- H. Aluminum Substrates: Remove loose surface oxidation.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
  - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
  - 4. Paint entire exposed surface of window frames and sashes.
  - 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  - 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

Construction Documents

- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
  - 1. Paint the following work where exposed to view:
    - a. Equipment, including panelboards.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.
    - g. Tanks that do not have factory-applied final finishes.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
  - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
  - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

Construction Documents

3.6 EXTERIOR PAINTING SCHEDULE

A. Cement Board Substrates:

1. Latex System MPI EXT 3.3A:

- a. Prime Coat: Latex, exterior, matching topcoat.
- b. Intermediate Coat: Latex, exterior, matching topcoat.
- c. Topcoat: Latex, exterior.

1) Sheen: As selected by the Architect.

B. Steel Substrates:

1. Alkyd System MPI EXT 5.1D:

- a. Prime Coat: Primer, alkyd, anticorrosive, for metal, MPI #79.
- b. Intermediate Coat: Exterior, alkyd enamel, matching topcoat.
- c. Topcoat: Alkyd, exterior.

1) Sheen: As selected by the Architect.

C. Galvanized-Metal Substrates:

1. Alkyd System MPI EXT 5.3B:

- a. Prime Coat: Primer, galvanized, cementitious, MPI #26.
- b. Intermediate Coat: Exterior, alkyd enamel, matching topcoat.
- c. Topcoat: Alkyd, exterior.

1) Sheen: As selected by the Architect.

D. Aluminum Substrates:

1. Alkyd System MPI EXT 5.4F:

- a. Prime Coat: Primer, quick dry, for aluminum, MPI #95.
- b. Intermediate Coat: Exterior, alkyd enamel, matching topcoat.
- c. Topcoat: Alkyd, exterior.

1) Sheen: As selected by the Architect.

Construction Documents

E. Exterior Gypsum Board Substrates:

1. Latex System MPI EXT 9.2A:

- a. Prime Coat: Primer, latex for exterior wood (reduced), MPI #6.
- b. Intermediate Coat: Latex, exterior, matching topcoat.
- c. Topcoat: Latex, exterior.

- 1) Sheen: As selected by the Architect.

END OF SECTION 099113

Construction Documents

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Concrete.
2. Concrete masonry units (CMUs).
3. Steel and iron.
4. Galvanized metal.
5. Aluminum (not anodized or otherwise coated).
6. Wood.
7. Plastic.
8. Gypsum board.
9. Cotton or canvas insulation covering.
10. ASJ insulation covering.

- B. Related Requirements:

1. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.3 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

Construction Documents

- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  - 1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
  - 2. Indicate VOC content.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
    - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
    - b. Other Items: Architect will designate items or areas required.
  - 2. Final approval of color selections will be based on mockups.
    - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.



Construction Documents

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
  1. Maintain containers in clean condition, free of foreign materials and residue.
  2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design: Subject to compliance with requirements, provide product indicated on the Finish Schedule, or a comparable product as approved by the Architect.
- B. Products: Subject to compliance with requirements, provide product listed in the Interior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
  1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

Construction Documents

- C. Colors: As indicated on the Finish Schedule.

2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
  - 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
  - 2. Testing agency will perform tests for compliance with product requirements.
  - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Concrete: 12 percent.
  - 2. Masonry (Clay and CMUs): 12 percent.
  - 3. Wood: 15 percent.
  - 4. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

Construction Documents

- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. Wood Substrates:
  - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
  - 2. Sand surfaces that will be exposed to view, and dust off.
  - 3. Prime edges, ends, faces, undersides, and backsides of wood.
  - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- K. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

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Construction Documents

1. Use applicators and techniques suited for paint and substrate indicated.
  2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following work where exposed in equipment rooms:
    - a. Equipment, including panelboards.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.
    - g. Tanks that do not have factory-applied final finishes.
    - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
  2. Paint the following work where exposed in occupied spaces:
    - a. Equipment, including panelboards.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.
    - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
    - h. Other items as directed by Architect.

Construction Documents

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
  1. Contractor shall touch up and restore painted surfaces damaged by testing.
  2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
  1. Latex System :
    - a. Prime Coat: Primer, alkali resistant, water based.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior.
      - 1) Sheen: As selected by the Architect.
- B. Concrete Substrates, Traffic Surfaces:
  1. Water-Based Concrete Floor Sealer System:
    - a. First Coat: Sealer, water based, for concrete floors, matching topcoat.
    - b. Topcoat: Sealer, water based, for concrete floors.

Construction Documents

C. CMU Substrates:

1. Pre-Catalyzed Waterbased Epoxy System:

- a. Block Filler: Block filler, latex, interior/exterior.
- b. Intermediate Coat: Pre-catalyzed waterbased epoxy, interior, matching topcoat.
- c. Topcoat: Pre-catalyzed waterbased epoxy, interior.

1) Sheen: Semi-gloss.

D. Steel Substrates: Hollow metal doors and frames.

1. Latex System, Alkyd Primer:

- a. Prime Coat: Primer, alkyd, quick dry, for metal.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Latex, interior.

1) Sheen: Semi-gloss.

E. Galvanized-Metal Substrates: Hollow metal doors and frames.

1. Latex System:

- a. Prime Coat: Primer, galvanized, cementitious.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Latex, interior.

1) Sheen: Semi-gloss, unless otherwise indicated.

F. Aluminum (Not Anodized or Otherwise Coated) Substrates:

1. Latex System:

- a. Prime Coat: Primer, quick dry, for aluminum.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Latex, interior.

1) Sheen: As selected by the Architect.

G. Wood Substrates:

1. Latex over Latex Primer System:

- a. Prime Coat: Primer, latex, for interior wood.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Latex, interior.

1) Sheen: As selected by the Architect.

Construction Documents

H. Plastic Substrates:

1. Latex System:

- a. Prime Coat: Primer, bonding, solvent based.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Latex, interior.

1) Sheen: As selected by the Architect.

I. Gypsum Board Substrates:

1. Pre-Catalyzed Waterbased Epoxy System: Walls and soffits were indicated.

- a. Prime Coat: Primer sealer, latex, interior.
- a. Intermediate Coat: Pre-catalyzed waterbased epoxy, interior, matching topcoat.
- b. Topcoat: Pre-catalyzed waterbased epoxy, interior.

1) Sheen: Eggshell.

2. Latex System: Ceilings.

- a. Prime Coat: Primer sealer, latex, interior.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Latex, interior.

1) Sheen: Flat.

J. Cotton or Canvas and ASJ Insulation-Covering Substrates: Including pipe and duct coverings.

1. Latex System:

- a. Prime Coat: Primer sealer, latex, interior.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Latex, interior.

1) Sheen: As selected by the Architect.

END OF SECTION 099123





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Construction Documents

SECTION 101419 - DIMENSIONAL LETTER SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Cutout dimensional characters.

1.3 ALLOWANCES

- A. Allowances for signage are specified in Section 012100 "Allowances."

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For signs.
  - 1. Include fabrication and installation details and attachments to other work.
  - 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
  - 3. Show message list, typestyles, graphic elements, and layout for each sign at least half size.
- C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
  - 1. Include representative Samples of available typestyles and graphic symbols.
- D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
  - 1. Dimensional Characters: Full-size Sample of each type of dimensional character.
  - 2. Exposed Accessories: Full-size Sample of each accessory type.
  - 3. Full-size Samples, if approved, will be returned to Contractor for use in the Project.

Construction Documents

- E. Product Schedule: For dimensional letter signs. Use same designations indicated on Drawings or specified.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For signs to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer of products or an entity that employs installers and supervisors who are trained and approved by manufacturer.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify locations of electrical service embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Deterioration of finishes beyond normal weathering.
    - b. Separation or delamination of sheet materials and components.
  - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Signs and supporting elements shall withstand the effects of gravity and other loads within limits and under conditions indicated.

Construction Documents

- B. Thermal Movements: For exterior fabricated channel dimensional characters, allow for thermal movements from ambient and surface temperature changes.

- 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 DIMENSIONAL CHARACTERS

- A. Cutout Characters: Characters with uniform faces; square-cut, smooth edges; precisely formed lines and profiles; and as follows:

- 1. Basis-of-Design: Subject to compliance with requirements, provide products indicated in the Architect's signage quote from ASI, or comparable products as approved by the Architect.
  - 2. Character Material: Sheet or plate aluminum.
  - 3. Character Height: As indicated on Drawings.
  - 4. Thickness: Manufacturer's standard for size of character.
  - 5. Finishes:
    - a. Integral Aluminum Finish: Anodized color as selected by Architect from full range of industry colors and color densities.
  - 6. Mounting: Concealed, stainless-steel back bar or bracket assembly.
  - 7. Typeface: As selected by the Architect from the manufacturer's full range.

2.3 DIMENSIONAL CHARACTER MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M, alloy and temper recommended by sign manufacturer for casting process used and for type of use and finish indicated.
- B. Aluminum Sheet and Plate: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- C. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

2.4 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:
  - 1. Use concealed fasteners and anchors unless indicated to be exposed.
  - 2. For exterior exposure, furnish stainless-steel devices unless otherwise indicated.
  - 3. Exposed Metal-Fastener Components, General:
    - a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.

Construction Documents

4. Sign Mounting Fasteners:

- a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.

B. Adhesive: As recommended by sign manufacturer.

C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

2.5 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

- 1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
- 2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
- 3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
- 4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
- 5. Internally brace dimensional characters for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
- 6. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

B. Brackets: Fabricate brackets, fittings, and hardware for bracket-mounted signs to suit sign construction and mounting conditions indicated. Modify manufacturer's standard brackets as required.

- 1. Stainless-Steel Brackets: Factory finish brackets to match sign background finish unless otherwise indicated.

2.6 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

Construction Documents

- C. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker.
- B. Color Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
  - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
  - 2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
  - 3. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- B. Mounting Methods:
  - 1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
    - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
    - b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.

Construction Documents

2. Back Bar and Brackets: Remove loose debris from substrate surface and install backbar or bracket supports in position, so that signage is correctly located and aligned.
3. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.

3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed characters and signs that do not comply with specified requirements. Replace characters with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101419

Construction Documents

SECTION 101423 - PANEL SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Panel signs.

- B. Related Requirements:

- 1. Section 015000 "Temporary Facilities and Controls" for temporary Project identification signs and for temporary informational and directional signs.

1.3 ALLOWANCES

- A. Allowances for signage are specified in Section 012100 "Allowances."

1.4 DEFINITIONS

- A. Accessible: In accordance with the accessibility standard.

1.5 COORDINATION

- A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: For panel signs.

- 1. Include fabrication and installation details and attachments to other work.
- 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.

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Construction Documents

3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.

C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.

1. Include representative Samples of available typestyles and graphic symbols.

D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:

1. Panel Signs: Full-size Sample.

2. Full-size Samples, if approved, will be returned to Contractor for use in Project.

E. Product Schedule: For panel signs. Use same designations indicated on Drawings or specified.

1.7 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.9 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Variable Component Materials: 12 replaceable text inserts and interchangeable characters (letters, numbers, and graphic elements) of each type.

2. Tools: One set(s) of specialty tools for assembling signs and replacing variable sign components.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.

b. Deterioration of embedded graphic image.

c. Separation or delamination of sheet materials and components.

2. Warranty Period: Five years from date of Substantial Completion.



Construction Documents

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: For exterior signs, allow for thermal movements from ambient and surface temperature changes.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design", the ABA standards of the Federal agency having jurisdiction, and ICC A117.1.

2.2 PANEL SIGNS

- A. Panel Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
  - 1. Basis-of-Design: Subject to compliance with requirements, provide products indicated in the Architect's signage quote from ASI, or comparable products as approved by the Architect.
  - 2. Solid-Sheet Sign: Aluminum sheet with finish specified in "Surface Finish and Applied Graphics" Subparagraph and as follows:
    - a. Thickness: Manufacturer's standard for size of sign.
    - b. Surface-Applied, Flat Graphics: Applied vinyl film.
    - c. Surface-Applied, Raised Graphics: Applied Braille.
  - 3. Laminated-Sheet Sign: Photopolymer face sheet with raised graphics laminated to acrylic backing sheet to produce composite sheet.
    - a. Composite-Sheet Thickness: Manufacturer's standard for size of sign.
    - b. Surface-Applied, Flat Graphics: Applied vinyl film.
    - c. Surface-Applied, Raised Graphics: Applied Braille.
    - d. Subsurface Graphics: Slide-in changeable insert.
  - 4. Sign-Panel Perimeter: Finish edges smooth.
    - a. Edge Condition: Square cut.
    - b. Corner Condition in Elevation: Square.
  - 5. Mounting: Manufacturer's standard method for substrates indicated with.
  - 6. Surface Finish and Applied Graphics:
    - a. Aluminum Finish: As selected by Architect from full range of industry colors.
    - b. Integral Acrylic Sheet Color: As selected by Architect from full range of industry colors.

Construction Documents

7. Text and Typeface: Accessible raised characters and Braille typeface as selected by Architect from manufacturer's full range. Finish raised characters to contrast with background color, and finish Braille to match background color.

2.3 PANEL-SIGN MATERIALS

- A. Aluminum Sheet and Plate: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- B. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
- C. Vinyl Film: UV-resistant vinyl film of nominal thickness indicated, with pressure-sensitive, permanent adhesive on back; die cut to form characters or images as indicated on Drawings and suitable for exterior applications.
- D. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.4 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following unless otherwise indicated:
  1. Use concealed fasteners and anchors unless indicated to be exposed.
  2. For exterior exposure, furnish stainless-steel devices unless otherwise indicated.
  3. Sign Mounting Fasteners:
    - a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material or screwed into back of sign assembly unless otherwise indicated.
  4. Inserts: Furnish inserts to be set by other installers into concrete or masonry work.
- B. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC193, ICC-ES AC58, or ICC-ES AC308 as appropriate for the substrate.
  1. Uses: Securing signs with imposed loads to structure.
  2. Type: Torque-controlled, expansion anchor, torque-controlled, adhesive anchor, or adhesive anchor.
  3. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

Construction Documents

- 4. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.
- C. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Adhesive: As recommended by sign manufacturer.
- E. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.
- F. Hook-and-Loop Tape: Manufacturer's standard two-part tape consisting of hooked part on sign back and looped side on mounting surface.
- G. Magnetic Tape: Manufacturer's standard magnetic tape with adhesive on one side.
- H. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

2.5 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
  - 1. Preassemble signs in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
  - 2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
  - 3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
  - 4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
  - 5. Internally brace signs for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
  - 6. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
- B. Shop- and Subsurface-Applied Vinyl: Align vinyl film in final position and apply to surface. Firmly press film from the middle outward to obtain good bond without blisters or fishmouths.
- C. Signs with Changeable Message Capability: Fabricate signs to allow insertion of changeable messages as follows:
  - 1. For slide-in changeable inserts, fabricate slot without burrs or constrictions that inhibit function. Furnish initial changeable insert. Furnish two blank inserts for each sign for Owner's use. Subsequent changeable inserts are by Owner.

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Construction Documents

2. For frame to hold changeable sign panel, fabricate frame without burrs or constrictions that inhibit function. Furnish initial sign panel. Subsequent changeable sign panels are by Owner.

2.6 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker.
- B. Color Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker.
- C. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Verify that anchorage devices embedded in permanent construction are correctly sized and located to accommodate signs.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
  1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.

Construction Documents

2. Install signs so they do not protrude or obstruct according to the accessibility standard.
  3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
  4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- B. Accessible Signage: Install in locations on walls as indicated on Drawings and according to the accessibility standard.
- C. Mounting Methods:
1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
    - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
    - b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.
  2. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
  3. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.
  4. Hook-and-Loop Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply sign component of two-part tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage; push to engage tape adhesive. Keep tape strips 0.250 inch away from edges to prevent visibility at sign edges when sign is initially installed or reinstalled. Apply substrate component of tape to substrate in locations aligning with tape on back of sign; push and rub well to fully engage tape adhesive to substrate.
  5. Magnetic Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position.

3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

Construction Documents

- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101423

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Construction Documents

SECTION 101426 - POST AND PANEL SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Nonilluminated post-and-panel signs.

B. Related Requirements:

- 1. Section 015000 "Temporary Facilities and Controls" for temporary Project identification signs and for temporary informational and directional signs.
- 2. Section 101423 "Panel Signage" for wall-mounted sign panels.

1.3 ALLOWANCES

- A. Allowances for signage are specified in Section 012100 "Allowances."

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For signage.

- 1. Include fabrication and installation details and attachments to other work.
- 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
- 3. Show message list, typestyles, graphic elements, and layout for each sign at least half size.

C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.

- 1. Include representative Samples of available typestyles and graphic symbols.

D. Samples for Verification: For each type of sign assembly, showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:

Construction Documents

1. Post-and-Panel Signs: Full-size Sample.
2. Exposed Accessories: Full-size Sample of each accessory type.
3. Full-size Samples, if approved, will be returned to Contractor for use in Project.

E. Product Schedule: For post-and-panel signs. Use same designations indicated on Drawings or specified.

F. Delegated-Design Submittal: For signs indicated in "Performance Requirements" Article.

1. Include structural analysis calculations for signs indicated to comply with design loads; signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Evaluation Reports: For post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer of products or an entity that employs installers and supervisors who are trained and approved by manufacturer.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
  - a. Deterioration of finishes beyond normal weathering.
  - b. Deterioration of embedded graphic image.
  - c. Separation or delamination of sheet materials and components.

2. Warranty Period: Five years from date of Substantial Completion.



Construction Documents

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design sign structure and anchorage of post-and-panel sign type(s) according to structural performance requirements.
- B. Structural Performance: Signs and supporting elements shall withstand the effects of gravity and other loads within limits and under conditions indicated.
  - 1. Uniform Wind Load: As indicated on Structural Drawings.
  - 2. Concentrated Horizontal Load: As indicated on Structural Drawings.
  - 3. Other Design Load: As indicated on Structural Drawings.
  - 4. Uniform and concentrated loads need not be assumed to act concurrently.
- C. Thermal Movements: For exterior signs, allow for thermal movements from ambient and surface temperature changes.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- D. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design," the ABA standards of the Federal agency having jurisdiction, and ICC A117.1.

2.2 POST-AND-PANEL SIGNS

- A. Post-and-Panel Sign: Sign of single-panel or hollow-box configuration; with smooth, uniform surfaces and support assembly; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
  - 1. Basis-of-Design: Subject to compliance with requirements, provide products indicated in the Architect's signage quote from ASI, or comparable products as approved by the Architect.
  - 2. Solid-Sheet Sign Panels, Returns, and Back: Aluminum sheet with finish specified in "Sign-Panel-Face Finish and Applied Graphics" Subparagraph and as follows:
    - a. Thickness: Manufacturer's standard for size of sign.
    - b. Surface-Applied Graphics: Manufacturer's standard applied vinyl film or baked enamel or powder coat.
  - 3. Single-Panel Sign Frame: Entire perimeter.
    - a. Material: Aluminum.
    - b. Material Thickness: Manufacturer's standard for selected sign type and size.
    - c. Frame Depth: As selected by the Architect from the manufacturer's full range.
    - d. Profile: Square.
    - e. Corner Condition in Elevation: Mitered.

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Construction Documents

- f. Finish and Color: Match sign-panel face.
- 4. Hollow-Box Sign Frame: Entire perimeter framed with formed-aluminum sheet or extruded-aluminum, hollow-box-type frame with vertical edges attached to supports with aluminum fittings. Close top and bottom edges of panels with manufacturer's standard welded seams or extrusions.
  - a. Hollow-Box Depth: Manufacturer's standard for selected sign type and size.
  - b. Profile: Square.
  - c. Corner Condition in Elevation: Mitered.
  - d. Finish and Color: Match sign-panel face.
- 5. Sign-Frame Mounting: Between posts or over posts as selected by the Architect.
- 6. Posts: Aluminum.
  - a. Shape: Round or square as selected by the Architect for each sign.
  - b. Size: Manufacturer's standard for selected sign type and size.
  - c. Installation Method: Direct burial, unless otherwise selected by the Architect.
  - d. Finish and Color: Match sign-panel frame.
- 7. Sign-Panel-Face Finish and Applied Graphics:
  - a. Baked-Enamel or Powder-Coat Finish and Graphics: Manufacturer's standard, in color as selected by Architect from manufacturer's full range.
  - b. Overcoat: Manufacturer's standard baked-on clear coating.
- 8. Text and Typeface: Typeface as selected by Architect from manufacturer's full range.

### 2.3 MATERIALS

- A. Aluminum Sheet and Plate: ASTM B209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- B. Aluminum Extrusions: ASTM B221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- C. Vinyl Film: UV-resistant vinyl film of nominal thickness indicated, with pressure-sensitive, permanent adhesive on back; die cut to form characters or images as indicated on Drawings and suitable for exterior applications.
- D. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

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Construction Documents

2.4 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following unless otherwise indicated:
  - 1. Use concealed fasteners and anchors unless indicated to be exposed.
  - 2. For exterior exposure, furnish nonferrous-metal or stainless-steel devices unless otherwise indicated.
  - 3. Exposed Metal-Fastener Components, General:
    - a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.
    - b. Fastener Heads: For nonstructural connections, use flathead or oval countersunk screws and bolts with tamper-resistant, Allen-head, spanner-head, or one-way-head slots unless otherwise indicated.
- B. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC193, ICC-ES AC58, or ICC-ES AC308 as appropriate for the substrate.
  - 1. Uses: Securing signs with imposed loads to structure.
  - 2. Type: Torque-controlled, expansion anchor, torque-controlled, adhesive anchor, or adhesive anchor.
  - 3. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F593, and nuts, ASTM F594.
- C. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- E. Anchoring Materials:
  - 1. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
  - 2. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
    - a. Water-Resistant Product: At exterior locations, provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

Construction Documents

2.5 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
  - 1. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in locations concealed from view after final assembly.
  - 2. Mill joints to tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
  - 3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed joints of flux, and dress exposed and contact surfaces.
  - 4. Conceal fasteners and anchors unless indicated to be exposed; locate exposed fasteners where they will be inconspicuous.
  - 5. Internally brace signs for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
  
- B. Sign Message Panels: Construct sign-panel surfaces to be smooth and to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner.
  - 1. Coordinate dimensions and attachment methods to produce message panels with closely fitting joints. Align edges and surfaces with one another in the relationship indicated.
  - 2. Increase panel thickness or reinforce with concealed stiffeners or backing materials as needed to produce surfaces without distortion, buckles, warp, or other surface deformations.
  - 3. Continuously weld joints and seams unless other methods are indicated; grind, fill, and dress welds to produce smooth, flush, exposed surfaces with welds invisible after final finishing.
  
- C. Post Fabrication: Fabricate posts designed for structural performance indicated and of lengths required for installation method indicated for each sign.
  - 1. Aluminum Posts: Manufacturer's standard 0.125-inch-thick, extruded-aluminum tubing unless otherwise indicated, with brackets or slots to engage sign panels. Include post caps, fillers, spacers, junction boxes, access panels, reinforcement where required for loading conditions, and related accessories required for complete installation.
  - 2. Direct Burial: Fabricate posts 36 inches longer than height of sign to permit direct burial or embedment in concrete foundations or concrete-filled postholes.

2.6 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
  
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

Construction Documents

- C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.
- D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

2.7 ALUMINUM FINISHES

- A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs.
- C. Verify that anchorage devices embedded in permanent construction are correctly sized and located to accommodate signs.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install signs using installation methods indicated and according to manufacturer's written instructions.
  - 1. Install signs level, plumb, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
  - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
  - 3. Before installation, verify that sign components are clean and free of materials or debris that would impair installation.
  - 4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

3.3 INSTALLING POSTS

- A. Vertical Tolerance: Set posts plumb within a tolerance of 1/16 inch in 3 feet.
- B. Direct-Burial Method:

Construction Documents

1. Excavation: Excavate posthole to dimensions indicated. Reconstruct subgrade that is not firm, undisturbed, or compacted soil, or that is damaged by freezing temperatures, frost, rain, accumulated water, or construction activities by excavating an additional 12 inches, backfilling with satisfactory soil or well-graded aggregate, and compacting to original subgrade elevation.
2. Setting in Earth: Set post in position, support to prevent movement, and backfill with satisfactory soil or well-graded aggregate as recommended in writing by manufacturer. Place and compact backfill in 6-inch lifts, compacting each lift.
3. Setting in Cast-in-Place Concrete: Set post in position, support to prevent movement, and place concrete in posthole or for concrete foundation as indicated on Drawings.
4. Setting in Preformed Hole in Concrete Foundation: Form or core drill holes in concrete foundation not less than 3/4 inch larger than outside dimension of post for installing posts in concrete. Set post in position, shim to prevent movement, and fill annular space between post and hole with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with manufacturer's written instructions.
  - a. Cover anchorage joint in concrete foundations with flange of same metal and finish as post, welded to post after placing anchoring material or attached to post with set screws.
  - b. Leave anchorage joint exposed with 1/8-inch anchoring material sloped away from post.

3.4 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101426

Construction Documents

SECTION 102113.19 - PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Solid-plastic toilet compartments configured as toilet enclosures and urinal screens.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.
- B. Shop Drawings: For toilet compartments.
  - 1. Include plans, elevations, sections, details, and attachment details.
  - 2. Show locations of cutouts for compartment-mounted toilet accessories.
  - 3. Show locations of centerlines of toilet fixtures.
  - 4. Show locations of floor drains.
- C. Samples for Initial Selection: For each type of toilet compartment material indicated.
  - 1. Include Samples of hardware and accessories involving material and color selection.
- D. Product Schedule: For toilet compartments, prepared by or under the supervision of supplier, detailing location and selected colors for toilet compartment material.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of toilet compartment.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For toilet compartments to include in maintenance manuals.

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Construction Documents

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents and source.
  - 1. Door Hinges: One hinge(s) with associated fasteners.
  - 2. Latch and Keeper: One latch(es) and keeper(s) with associated fasteners.
  - 3. Door Bumper: One bumper(s) with associated fasteners.
  - 4. Door Pull: One door pull(s) with associated fasteners.
  - 5. Fasteners: Ten fasteners of each size and type.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for toilet compartments designated as accessible.

2.2 SOLID-PLASTIC TOILET COMPARTMENTS

- A. Basis-of-Design: Subject to compliance with requirements, provide product indicated on the Finish Schedule, or a comparable product as approved by the Architect.
  - 1. Color and Pattern: As indicated on the Finish Schedule.
  - 2. Finish Texture: As indicated on the Finish Schedule.
- B. Toilet-Enclosure Style: Overhead braced.
- C. Urinal-Screen Style: Wall hung.
- D. Door, Panel, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.



Construction Documents

1. Heat-Sink Strip: Manufacturer's standard continuous, stainless-steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
- E. Pilaster Shoes: Manufacturer's standard design; stainless steel.
- F. Brackets (Fittings):
  1. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

2.3 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard operating hardware and accessories.
  1. Material: Stainless steel.
  2. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees, allowing emergency access by lifting door.
  3. Latch and Keeper: Manufacturer's standard recessed or surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
  4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
  5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
  6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless-steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.4 MATERIALS

- A. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- B. Stainless-Steel Castings: ASTM A 743/A 743M.

2.5 FABRICATION

- A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.

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Construction Documents

- B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Door Size and Swings: Unless otherwise indicated, provide 24-inch-wide, in-swinging doors for standard toilet compartments and 36-inch-wide, out-swinging doors with a minimum 32-inch-wide, clear opening for compartments designated as accessible.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
  - 1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 INSTALLATION**

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
  - 1. Maximum Clearances:
    - a. Pilasters and Panels: 1/2 inch.
    - b. Panels and Walls: 1 inch.
  - 2. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.
    - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
    - b. Align brackets at pilasters with brackets at walls.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.
- C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

Construction Documents

3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 102113.19



Construction Documents

SECTION 102116.19 - PLASTIC SHOWER AND DRESSING COMPARTMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Solid-plastic compartments.
- 2. Shower receptors.

B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for supports that attach floor-and-ceiling-anchored compartments to the overhead structural system.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For shower and dressing compartments.

- 1. Include plans, elevations, sections, and attachment details.
- 2. Show locations of cutouts for compartment-mounted accessories.
- 3. Show locations of centerlines of drains.

C. Samples for Initial Selection: For each type of compartment material indicated.

- 1. Include Samples of hardware and accessories for material and color selection.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of shower and dressing compartment.

Construction Documents

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For shower and dressing compartments to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Door Hinges: One door hinge(s) with associated fasteners.
  - 2. Latch and Keeper: One latch(es) and keeper(s) with associated fasteners.
  - 3. Clothing Hook: One clothing hook(s) with associated fasteners.
  - 4. Door Bumper: One door bumper(s) with associated fasteners.
  - 5. Door Pull: One door pull(s) with associated fasteners.
  - 6. Fasteners: 10 fasteners of each size and type.
  - 7. Curtain Rod: One curtain rod(s) with associated fasteners.
  - 8. Curtain Hooks: Five curtain hooks.

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of fixtures, drains, walls, columns, ceilings, and other construction contiguous with shower and dressing compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 450 or less.
- B. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for shower and dressing compartments designated as accessible.

2.2 SOLID-PLASTIC COMPARTMENTS

- A. Basis-of-Design: Subject to compliance with requirements, provide product indicated on the Finish Schedule, or a comparable product as approved by the Architect.
  - 1. Color and Pattern: As indicated on the Finish Schedule.
  - 2. Finish Texture: As indicated on the Finish Schedule.

Construction Documents

- B. Configuration: As indicated on Drawings.
- C. Enclosure Style: Overhead braced.
- D. Panel and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch thick, seamless, with eased edges and with homogenous color and pattern throughout thickness of material.
  - 1. Heat-Sink Strip: Manufacturer's standard, continuous, stainless-steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
  - 2. Color and Pattern: One color and pattern in each room; as selected by Architect from manufacturer's full range.
- E. Door Construction: Match panels.
- F. Pilaster Shoes: Manufacturer's standard design; stainless steel.
- G. Brackets (Fittings):
  - 1. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

2.3 SHOWER RECEPTORS

- A. General: Manufacturer's standard, prefabricated, terrazzo receptor complete with integral drain.
  - 1. Curb: Not less than 2 inches and not more than 9 inches deep when measured from the top of the curb to the top of the drain; with curb threshold not less than 1 inch below the sides and back of the receptor; and with a ramped entrance surface for accessible compartments.
  - 2. Floor: Finished, sloping uniformly toward the drain and not less than 1/4 unit vertical in 12 units horizontal and not more than 1/2 inch.
  - 3. Drain Strainer: Manufacturer's standard, removable stainless-steel strainer.
  - 4. Drain Gasket: Manufacturer's standard gasket sized to fit waste pipe.
  - 5. Waterstop: Manufacturer's standard, continuous galvanized-steel flange or rabbeted groove to receive panels and create a waterstop when panels are in place.
- B. Finish: Manufacturer's standard finish on exposed surfaces, as selected by Architect from manufacturer's full range and with slip-resistant floor surface texture.

2.4 MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M.
- B. Aluminum Extrusions: ASTM B 221.
- C. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- D. Stainless-Steel Castings: ASTM A 743/A 743M.

Construction Documents

2.5 ACCESSORIES

- A. Door Hardware and Accessories: Manufacturer's standard design, heavy-duty, operating hardware and accessories.
  - 1. Material: Stainless steel.
  - 2. Hinges: Manufacturer's standard, paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees, allowing emergency access by lifting door.
  - 3. Latch and Keeper: Manufacturer's standard, recessed or surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
  - 4. Clothing Hooks: Manufacturer's standard clothing hooks in each dressing compartment; include one combination hook and rubber-tipped bumper at inswinging doors, sized to prevent door from hitting wall panel or compartment-mounted accessories.
  - 5. Door Bumper: Manufacturer's standard, rubber-tipped bumper at outswinging doors.
  - 6. Door Pull: Manufacturer's standard unit at outswinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
- B. Overhead Bracing: Manufacturer's standard, continuous, extruded-aluminum headrail or cap with antigrip profile; in manufacturer's standard finish.
- C. Headrail with Hooks: Manufacturer's standard, continuous, extruded-aluminum headrail or cap with curtain hooks running in concealed track; with antigrip profile; in manufacturer's standard finish.
- D. Curtain Rod with Hooks: Manufacturer's standard, 1-inch-diameter, stainless-steel curtain rod with matching hooks.
- E. Curtain: Flame-resistant, manufacturer's standard fabric that is stain resistant, self-sanitizing, antistatic, antimicrobial, and launderable to a temperature of not less than 90 deg F.
  - 1. Flame Resistance: Passes NFPA 701 tests when tested by a testing and inspecting agency acceptable to authorities having jurisdiction.
  - 2. Labeling: Identify fabrics with appropriate markings of applicable testing and inspecting agency.
  - 3. Curtain Grommets: Two-piece, rolled-edge, rustproof, nickel-plated brass; spaced not more than 6 inches o.c.; machined into top hem.
  - 4. Width: Minimum 12 inches wider than opening.
  - 5. Length: Where curtain extends to a floor surface, size so that bottom hem clears finished floor by not more than 1 inch and not less than 1/2 inch above floor surface. Where curtains extend to a shower-receptor curb, size so that bottom hem hangs above curb line and clears curb line by not more than 1/2 inch.
  - 6. Color and Pattern: As selected by Architect from manufacturer's full range.
- F. Anchorages and Fasteners: Manufacturer's standard, exposed fasteners of stainless steel, chrome-plated steel, or solid brass, finished to match the items they are securing; with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. Use countersunk,



Construction Documents

flush-type bolt heads or otherwise make fasteners inconspicuous if exposed on opposite side of panel from hardware or accessory item. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.

2.6 FABRICATION

- A. Overhead-Braced Compartments: Manufacturer's standard, corrosion-resistant supports, leveling method, and anchors at pilasters and walls to suit floor and wall conditions. Provide shoes at pilasters to conceal supports and leveling method.
- B. Door Sizes and Swings: Unless otherwise indicated, provide 24-inch-wide, inswinging doors for standard shower and dressing compartments, and 36-inch-wide, outswinging doors with a minimum 32-inch-wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install compartments rigid, straight, level, and plumb. Secure compartments in position with manufacturer's recommended anchoring devices.
  - 1. Clearances for Dressing Compartments: Maximum 1/2 inch between pilasters and panels; 1 inch between panels and walls.
  - 2. Full-Height (Continuous) Brackets for Dressing Compartments: Secure panels to walls and to pilasters with full-height brackets.
    - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
    - b. Align brackets at pilasters with brackets at walls.
- B. Overhead-Braced Compartments: Secure pilasters to floor, and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous headrail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.
- C. Curtains: Install curtains to specified length, and verify that they hang vertically without stress points or diagonal folds.
- D. Shower Receptors: Install prefabricated shower receptors with drain gasket compression fit to OD of waste pipe.

Construction Documents

3.2 ADJUSTING

- A. Curtain Adjustment: After hanging curtains, test and adjust each track or rod to produce unencumbered, smooth operation. Steam and dress down curtains as required to produce crease- and wrinkle-free installation. Remove and replace curtains that are stained or soiled or that have stress points or diagonal folds.
  
- B. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on inswinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on outswinging doors to return doors to fully closed position.

END OF SECTION 102116.19

Construction Documents

SECTION 102239 - FOLDING PANEL PARTITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Manually operated, acoustical panel partitions.

B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for supports that attach supporting tracks to overhead structural system.

1.3 DEFINITIONS

- A. NIC: Noise Isolation Class.
- B. NRC: Noise Reduction Coefficient.
- C. STC: Sound Transmission Class.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For operable panel partitions.
  - 1. Include plans, elevations, sections, attachment details, and numbered panel installation sequence.
  - 2. Indicate stacking and operating clearances. Indicate location and installation requirements for hardware and track, blocking, and direction of travel.
- C. Samples for Initial Selection: For each type of exposed material, finish, covering, or facing.
  - 1. Include Samples of accessories involving color selection.

Construction Documents

- D. Samples for Verification: For each type of exposed material, finish, covering, or facing, prepared on Samples of size indicated below:
  - 1. Panel Facing Material: Manufacturer's standard-size unit, not less than 3 inches square.
  - 2. Panel Edge Material: Not less than 3 inches long.
  - 3. Chair Rail: Manufacturer's standard-size unit, 6 inches long.
  - 4. Hardware: One of each exposed door-operating device.
- E. Delegated-Design Submittal: For operable panel partitions.

1.5 INFORMATIONAL SUBMITTALS

- A. Setting Drawings: For embedded items and cutouts required in other work, including support-beam, mounting-hole template.
- B. Qualification Data: For Installer.
- C. Product Certificates: For each type of operable panel partition.
- D. Product Test Reports: For each operable panel partition, for tests performed by a qualified testing agency.
- E. Field quality-control reports.
- F. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For operable panel partitions to include in maintenance manuals.
  - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
    - a. Panel finish facings and finishes for exposed trim and accessories. Include precautions for cleaning materials and methods that could be detrimental to finishes and performance.
    - b. Seals, hardware, track, track switches, carriers, and other operating components.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same production run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Panel Finish-Facing Material: Furnish full width in quantity to cover both sides of two panels when installed.

Construction Documents

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protectively package and sequence panels in order for installation. Clearly mark packages and panels with numbering system used on Shop Drawings. Do not use permanent markings on panels.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of operable panel partitions that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Faulty operation of operable panel partitions.
    - b. Deterioration of metals, metal finishes, and other materials beyond normal use.
  - 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design seismic bracing of tracks to structure above.
- B. Acoustical Performance: Provide operable panel partitions tested by a qualified testing agency for the following acoustical properties according to test methods indicated:
  - 1. Sound-Transmission Requirements: Operable panel partition assembly tested for laboratory sound-transmission loss performance according to ASTM E 90, determined by ASTM E 413, and rated for not less than the STC indicated.
  - 2. Noise-Reduction Requirements: Operable panel partition assembly, identical to partition tested for STC, tested for sound-absorption performance according to ASTM C 423, and rated for not less than the NRC indicated.
  - 3. Noise-Isolation Requirements: Installed operable panel partition assembly, identical to partition tested for STC, tested for NIC according to ASTM E 336, determined by ASTM E 413, and rated for 10 dB less than STC value indicated.

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Construction Documents

- C. Fire-Test-Response Characteristics: Provide panels with finishes complying with one of the following as determined by testing identical products by a testing and inspecting agency acceptable to authorities having jurisdiction:
  - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Flame-Spread Index: 25 or less.
    - b. Smoke-Developed Index: 450 or less.
  - 2. Fire Growth Contribution: Complying with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 286.
- D. Fire Resistance: Provide fire-rated operable panel partition assemblies complying with NFPA 80, based on testing according to UL 10B for fire-rated door assemblies.
  - 1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.

2.2 OPERABLE ACOUSTICAL PANELS

- A. Operable Acoustical Panels: Partition system, including panels, seals, finish facing, suspension system, operators, and accessories.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Series 633M by Hufcor, Inc, or a comparable product as approved by the Architect.
- B. Panel Operation: Manually operated, paired panels.
- C. Panel Construction: As required to support panel from suspension components and with reinforcement for hardware attachment. Fabricate panels with tight hairline joints and concealed fasteners. Fabricate panels so finished in-place partition is rigid; level; plumb; aligned, with tight joints and uniform appearance; and free of bow, warp, twist, deformation, and surface and finish irregularities.
- D. Dimensions: Fabricate operable acoustical panel partitions to form an assembled system of dimensions indicated and verified by field measurements.
  - 1. Panel Width: As indicated.
- E. STC: Not less than 49.
- F. NRC: Not less than 0.50.
- G. Panel Thickness: As selected by the Architect from the manufacturer's full range.

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Construction Documents

H. Panel Materials:

1. Steel Frame: Steel sheet, manufacturer's standard nominal minimum thickness for uncoated steel.
2. Steel Face/Liner Sheets: Tension-levleed steel sheet, manufacturer's standard minimum nominal thickness for uncoated steel.
3. Gypsum Board: ASTM C 1396/C 1396M.
4. Cement Board: ASTM C 1288.
5. Particleboard: ANSI A208.1.
6. Medium-Density Fiberboard: ANSI A208.2.
7. Plywood: DOC PS 1.

I. Panel Closure: Manufacturer's standard unless otherwise indicated.

J. Hardware: Manufacturer's standard as required to operate operable panel partition and accessories; with decorative, protective finish.

1. Hinges: Manufacturer's standard.

K. Finish Facing: Vinyl-coated fabric wall covering.

2.3 SEALS

A. Description: Seals that produce operable panel partitions complying with performance requirements and the following:

1. Manufacturer's standard seals unless otherwise indicated.
2. Seals made from materials and in profiles that minimize sound leakage.
3. Seals fitting tight at contact surfaces and sealing continuously between adjacent panels and between operable panel partition perimeter and adjacent surfaces, when operable panel partition is extended and closed.

B. Vertical Seals: Deep-nesting, interlocking astragals mounted on each edge of panel, with continuous, resilient acoustical seal.

C. Horizontal Top Seals: Continuous-contact, resilient seal exerting uniform constant pressure on track or resilient, mechanical, retractable, constant-force-contact seal exerting uniform constant pressure on track when extended.

D. Horizontal Bottom Seals: Manufacturer's standard continuous-contact seal exerting uniform constant pressure on floor.

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Construction Documents

2.4 PANEL FINISH FACINGS

- A. Description: Finish facings for panels that comply with indicated fire-test-response characteristics and that are factory applied to operable panel partitions with appropriate backing, using mildew-resistant nonstaining adhesive as recommended by facing manufacturer's written instructions.
  - 1. Apply one-piece, seamless facings free of air bubbles, wrinkles, blisters, and other defects, with edges tightly butted, and with invisible seams complying with Shop Drawings for location, and with no gaps or overlaps. Horizontal butted edges or seams are not permitted. Tightly secure and conceal raw and selvage edges of facing for finished appearance.
  - 2. Where facings with directional, repeating, or matching grain are indicated, mark facing top and attach facing in same direction.
  - 3. Match facing pattern 72 inches above finished floor.
- B. Vinyl-Coated Fabric Wall Covering: Manufacturer's standard, mildew-resistant, washable, vinyl-coated fabric wall covering; complying with WA-101, Type III-Heavy Duty; Class A.
  - 1. Antimicrobial Treatment: Additives capable of inhibiting growth of bacteria, fungi, and yeasts.
  - 2. Color/Pattern: As selected by Architect from manufacturer's full range.
- C. Trimless Edges: Fabricate exposed panel edges so finish facing wraps uninterrupted around panel, covering edge and resulting in an installed partition with facing visible on vertical panel edges, without trim, for minimal sightlines at panel-to-panel joints.

2.5 SUSPENSION SYSTEMS

- A. Tracks: Steel or aluminum mounted directly to overhead structural support, or with adjustable steel hanger rods for overhead support, designed for operation, size, and weight of operable panel partition indicated. Size track to support partition operation and storage without damage to suspension system, operable panel partitions, or adjacent construction. Limit track deflection to no more than 0.10 inch between bracket supports. Provide a continuous system of track sections and accessories to accommodate configuration and layout indicated for partition operation and storage.
  - 1. Panel Guide: Aluminum guide on both sides of the track to facilitate straightening of the panels; finished with factory-applied, decorative, protective finish.
  - 2. Head Closure Trim: As required for acoustical performance; with factory-applied, decorative, protective finish.
- B. Carriers: Trolley system as required for configuration type, size, and weight of partition and for easy operation; with ball-bearing wheels.
- C. Track Intersections, Switches, and Accessories: As required for operation, storage, track configuration, and layout indicated for operable panel partitions, and compatible with partition assembly specified. Fabricate track intersections and switches from steel or aluminum.



Construction Documents

- D. Aluminum Finish: Mill finish or manufacturer's standard, factory-applied, decorative finish unless otherwise indicated.
- E. Steel Finish: Manufacturer's standard, factory-applied, corrosion-resistant, protective coating unless otherwise indicated.

2.6 ACCESSORIES

- A. Storage Pocket Door: Full height at end of partition runs to conceal stacked partition; of same materials, finish, construction, thickness, and acoustical qualities as panels; complete with operating hardware and acoustical seals at soffit, floor, and jambs. Hinges in finish to match other exposed hardware.
  - 1. Manufacturer's standard method to secure storage pocket door in closed position.
  - 2. Rim Lock: Key-operated lock cylinder to secure storage pocket door in closed position. Include two keys per lock.
  - 3. Rim Lock: Deadlock to receive cylinder, to secure storage pocket door in closed position. See Section 087100 "Door Hardware" for lock cylinder and keying requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine flooring, floor levelness, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable panel partitions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install operable panel partitions and accessories after other finishing operations, including painting, have been completed in area of partition installation.
- B. Install panels in numbered sequence indicated on Shop Drawings.
- C. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.
- D. Broken, cracked, deformed, or unmatched gasketing or gasketing with gaps at butted ends is not acceptable.
- E. Light-Leakage Test: Illuminate one side of partition installation and observe vertical joints and top and bottom seals for voids. Adjust partitions for alignment and full closure of vertical joints and full closure along top and bottom seals. Perform test and make adjustments before NIC testing.

Construction Documents

3.3 FIELD QUALITY CONTROL

- A. NIC Testing: Owner will engage a qualified testing agency to perform tests and inspections.
  - 1. Testing Extent: Testing agency shall randomly select one operable panel partition installation(s) for testing.
  - 2. Testing Methodology: Perform testing of installed operable panel partition for noise isolation according to ASTM E 336, determined by ASTM E 413, and rated for not less than NIC indicated. Adjust and fit partitions to comply with NIC test method requirements.
- B. An operable panel partition installation will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.4 ADJUSTING

- A. Adjust operable panel partitions, hardware, and other moving parts to function smoothly, and lubricate as recommended by manufacturer.
- B. Adjust storage pocket doors to operate smoothly and easily, without binding or warping.
- C. Verify that safety devices are properly functioning.

3.5 MAINTENANCE SERVICE

- A. Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by manufacturer's authorized service representative. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operable-partition operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain operable panel partitions.

END OF SECTION 102239

Construction Documents

SECTION 102600 - WALL PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Corner guards.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.
- 2. Include fire ratings of units recessed in fire-rated walls.

- B. Shop Drawings: For each type of wall protection showing locations and extent.

- 1. Include plans, elevations, sections, and attachment details.

- C. Samples for Initial Selection: For each type of impact-resistant wall-protection unit indicated, in each color and texture specified.

- 1. Include Samples of accent strips and accessories to verify color selection.
- 2. Corner Guards: 12 inches long. Include example top caps.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of handrail.

- B. Material Certificates: For each type of exposed plastic material.

- C. Sample Warranty: For special warranty.

Construction Documents

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of wall protection product to include in maintenance manuals.
  - 1. Include recommended methods and frequency of maintenance for maintaining best condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Corner-Guard Covers: Full-size plastic covers of maximum length equal to 2 percent of each type, color, and texture of cover installed, but no fewer than two, 48-inch- long units.
  - 2. Mounting and Accessory Components: Amounts proportional to the quantities of extra materials. Package mounting and accessory components with each extra material.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store wall protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
  - 1. Maintain room temperature within storage area at not less than 70 deg F during the period plastic materials are stored.
  - 2. Keep plastic materials out of direct sunlight.
  - 3. Store plastic wall-protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F.
    - a. Store corner-guard covers in a vertical position.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of wall-protection units that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.
    - b. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.
  - 2. Warranty Period: Five years from date of Substantial Completion.

Construction Documents

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain wall-protection products from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1.

2.3 CORNER GUARDS

- A. Surface-Mounted, Opaque-Plastic Corner Guards: Fabricated as one piece from PVC plastic, PVC-free plastic, acrylic-modified vinyl sheet, or opaque polycarbonate sheet; with formed edges; fabricated with 90- or 135-degree turn to match wall condition.
  - 1. Basis-of-Design: Subject to compliance with requirements, provide the following products by Construction Specialties, Inc., or a comparable product as approved by the Architect:
    - a. Acrovyn Corner Guards FS-20N: Provide where indicated.
    - b. Acrovyn Corner Guards FS-20RN: Provide where fire rating is required.
  - 2. Wing Size: 3 inches by 3 inches.
  - 3. Corner Radius: 1/4 inch.
  - 4. Mounting: Countersunk screws through factory-drilled mounting holes.
  - 5. Color and Texture: As selected by Architect from manufacturer's full range.
- B. Surface-Mounted, Metal Corner Guards Insert drawing designation: Fabricated as one piece from formed or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.
  - 1. Basis-of-Design: Subject to compliance with requirements, provide the following products by Construction Specialties, Inc., or a comparable product as approved by the Architect:
    - a. Acrovyn Corner Guards CO-8: Provide where indicated.
    - b. Acrovyn Corner Guards SCO-8: Provide where indicated.

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Construction Documents

2. Material: Stainless-steel sheet, Type 304.
  - a. Thickness: As selected by the Architect from the manufacturer's full range.
  - b. Finish: Directional satin, No. 4.
3. Wing Size: Nominal 3-1/2 by 3-1/2 inches.
4. Corner Radius: 3/16 inch.
5. Mounting: Adhesive.

2.4 MATERIALS

- A. Plastic Materials: Chemical- and stain-resistant, high-impact-resistant plastic with integral color throughout; extruded and sheet material as required, thickness as indicated.
- B. Polycarbonate Plastic Sheet: ASTM D 6098, S-PC01, Class 1 or Class 2, abrasion resistant; with a minimum impact-resistance rating of 15 ft.-lbf/in. of notch when tested according to ASTM D 256, Test Method A.
- C. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.
- D. Adhesive: As recommended by protection product manufacturer.

2.5 FABRICATION

- A. Fabricate wall protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.
- B. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.
- C. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.6 FINISHES

- A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

Construction Documents

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine walls to which wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
  - 1. For wall protection attached with adhesive, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing wall protection.
- B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

- A. Installation Quality: Install wall protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
- B. Mounting Heights: Install wall protection in locations and at mounting heights indicated on Drawings.
- C. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.
  - 1. Provide anchoring devices and suitable locations to withstand imposed loads.
  - 2. Where splices occur in horizontal runs of more than 20 feet, splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches apart.
  - 3. Adjust caps as required to ensure tight seams.

3.4 CLEANING

- A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.

Construction Documents

- B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 102600



Construction Documents

SECTION 102800 - TOILET AND BATH, ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Public-use washroom accessories.
- 2. Private-use bathroom accessories.
- 3. Warm-air dryers.
- 4. Custodial accessories.

B. Related Requirements:

- 1. Section 088300 "Mirrors" for frameless mirrors.

1.3 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- 2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
- 3. Include electrical characteristics.

B. Samples: Full size, for each exposed product and for each finish specified.

- 1. Approved full-size Samples will be returned and may be used in the Work.

Construction Documents

- C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
  - 1. Identify locations using room designations indicated.
  - 2. Identify accessories using designations indicated.

1.5 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

1.7 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, visible silver spoilage defects.
  - 2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

- A. Basis-of-Design: Subject to compliance with requirements, provide products indicated or comparable products by one of the following as approved by the Architect:
  - 1. A & J Washroom Accessories, Inc.
  - 2. American Specialties, Inc.
  - 3. Bobrick Washroom Equipment, Inc.
  - 4. Bradley Corporation.
  - 5. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
  - 6. Tubular Specialties Manufacturing, Inc.

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Construction Documents

B. Toilet Tissue (Roll) Dispenser:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product selected by the Architect.
2. Description: Double-roll dispenser.
3. Mounting: Surface mounted.
4. Operation: Noncontrol delivery with theft-resistant spindle.
5. Capacity: Designed for 4-1/2- or 5-inch- diameter tissue rolls.
6. Material and Finish: Stainless steel, No. 4 finish (satin).

C. Combination Towel (Folded) Dispenser/Waste Receptacle:

1. Basis-of-Design Product: Bobrick B-369 ClassicSeries® Recessed Paper Towel Dispenser/Waste Receptacle.
2. Description: Combination unit for dispensing C-fold or multifold towels, with removable waste receptacle.
3. Mounting: Recessed.
4. Minimum Towel-Dispenser Capacity: 350 C-fold or 475 multifold paper towels.
5. Minimum Waste-Receptacle Capacity: 2 gal.
6. Material and Finish: Stainless steel, No. 4 finish (satin).
7. Liner: Reusable, vinyl waste-receptacle liner.
8. Lockset: Tumbler type for towel-dispenser compartment.

D. Automatic Liquid-Soap Dispenser:

1. Basis-of-Design Product: Sloan ESD-200 Optima® Deck-Mounted Liquid Soap Dispenser.

E. Grab Bar:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product selected by the Architect.
2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch thick.
  - a. Finish: Smooth, No. 4 finish (satin).
4. Outside Diameter: 1-1/4 inches.
5. Configuration and Length: As indicated on Drawings.

F. Sanitary-Napkin Disposal Unit: Surface-Mounted.

1. Basis-of-Design Product: Bradley Corp. Model 4722-15 Standard Series Napkin Disposal, Surface-Mounted.
2. Mounting: Surface.
3. Door or Cover: Self-closing, disposal-opening cover and hinged face panel with tumbler lockset.
4. Receptacle: Removable.
5. Material and Finish: Stainless steel, No. 4 finish (satin).

Construction Documents

G. Sanitary-Napkin Disposal Unit: Partition-Mounted.

1. Basis-of-Design Product: Bradley Corp. Model 4721-15 Standard Series Napkin Disposal, Partition-Mounted.
2. Mounting: Partition.
3. Door or Cover: Self-closing, disposal-opening cover and hinged face panel with tumbler lockset.
4. Receptacle: Removable.
5. Material and Finish: Stainless steel, No. 4 finish (satin).

H. Mirror Unit:

1. Basis-of-Design Product: Bobrick B-290 Glass Mirror with Stainless Steel Angle Frame.
2. Size: As indicated on Drawings.

I. Coat Hook:

1. Basis-of-Design Product: Bradley Corp. Model 915 Chrome-Plated Hook and Bumper.
2. Description: Single-prong unit.
3. Material and Finish: Chrome-plated brass.

2.3 PRIVATE-USE BATHROOM ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Basco, Inc.
2. Bobrick Washroom Equipment, Inc.
3. Franklin Brass by Liberty Hardware Manufacturing Corporation; a Masco company.
4. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
5. Ginger; a Masco company.
6. Seachrome Corporation.
7. Tubular Specialties Manufacturing, Inc.

B. Toilet Tissue Dispenser:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product selected by the Architect.
2. Description: Single-roll dispenser.
3. Mounting: Surface mounted.
4. Capacity: Designed for 4-1/2- or 5-inch-diameter tissue rolls.
5. Material and Finish: Stainless steel, No. 4 finish (satin).

C. Shower Curtain Rod: Provide curved shower rod unless otherwise indicated.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product selected by the Architect.
2. Outside Diameter: 1-1/4 inches.
3. Mounting: Flanges with concealed fasteners.

Construction Documents

4. Rod Material and Finish: Stainless steel, No. 4 finish (satin).
5. Flange Material and Finish: Stainless steel, No. 4 finish (satin).
6. Accessories: Integral chrome-plated brass glide hooks.

D. Robe Hook:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product selected by the Architect.
2. Description: Double-prong unit.
3. Material and Finish: Stainless steel, No. 4 finish (satin).

E. Towel Bar:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product selected by the Architect.
2. Description: 3/4-inch-round tube with circular end brackets.
3. Mounting: Flanges with concealed fasteners.
4. Length: 24 inches .
5. Material and Finish: Stainless steel, No. 4 finish (satin).

F. Towel Ring:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product selected by the Architect.
2. Description: Pin projecting approximately 2-1/2 inches from wall with circular ring.
3. Pin Material and Finish: Stainless steel, No. 4 finish (satin).
4. Ring Material and Finish: Matching pin.

2.4 WARM-AIR DRYERS

A. Source Limitations: Obtain warm-air dryers from single source from single manufacturer.

B. High-Speed Warm-Air Dryer:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. AJW Architectural Products.
  - b. American Dryer, Inc.
  - c. American Specialties, Inc.
  - d. Bradley Corporation.
  - e. Excel Dryer Inc.
  - f. GAMCO Specialty Accessories; a division of Bobrick.
  - g. Saniflow Hand Dryer Corporation.
  - h. Sloan Valve Company.
  - i. World Dryer Corporation.
2. Description: High-speed, warm-air hand dryer for rapid hand drying.
3. Mounting: Surface mounted.

Construction Documents

4. Operation: Electronic-sensor activated with operation time of 10 to 20 seconds.
5. Cover Material and Finish: As selected by the Architect from the manufacturer's full range.
6. Electrical Requirements: As selected by the Architect from the manufacturer's full range.

2.5 CUSTODIAL ACCESSORIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.
5. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
6. Tubular Specialties Manufacturing, Inc.

- B. Mop and Broom Holder:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product selected by the Architect.
2. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
3. Length: 36 inches.
4. Hooks: Three or four.
5. Mop/Broom Holders: Three or four, spring-loaded, rubber hat, cam type.
6. Material and Finish: Stainless steel, No. 4 finish (satin).
  - a. Shelf: Not less than nominal 0.05-inch-thick stainless steel.
  - b. Rod: Approximately 1/4-inch-diameter stainless steel.

- C. Paper Towel (Roll) Dispenser:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product selected by the Architect.
2. Description: Lever-actuated mechanism permits controlled delivery of paper rolls in preset lengths per stroke.
3. Mounting: Surface mounted.
4. Minimum Capacity: 8-inch-wide, 800-foot-long roll.
5. Material and Finish: Stainless steel, No. 4 finish (satin).
6. Lockset: Tumbler type.

- D. Liquid-Soap Dispenser:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product selected by the Architect.
2. Description: Designed for dispensing soap in liquid or lotion form.
3. Mounting: Vertically oriented, surface mounted, unless otherwise indicated.
4. Capacity: 40 oz.
5. Materials: Stainless steel, No. 4 finish (satin).

Construction Documents

- 6. Lockset: Tumbler type.
- 7. Refill Indicator: Window type.

2.6 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.
- E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.7 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

Construction Documents

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 102800



Construction Documents

SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Fire-protection cabinets for the following:
    - a. Portable fire extinguishers.
- B. Related Requirements:
  - 1. Section 104416 "Fire Extinguishers."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semirecessed-, or surface-mounting method and relationships of box and trim to surrounding construction.
- B. Shop Drawings: For fire-protection cabinets. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each type of exposed finish required.
- D. Product Schedule: For fire-protection cabinets. Indicate whether recessed, semirecessed, or surface mounted. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

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Construction Documents

1.5 COORDINATION

- A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 FIRE-PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
  - 1. Basis-of-Design: Subject to compliance with requirements, provide product indicated below or a comparable product as approved by the Architect:
    - a. Manufacturer: JL Industries, Inc. a division of Activar Construction Products Group.
    - b. Product: Academy Series Aluminum Fire Extinguisher Cabinet.
    - c. Style: 1027V10 with a rolled edge.
- A. Cabinet Construction: Nonrated and fire rated, matching rating of substrate wall.
  - 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.043-inch-thick cold-rolled steel sheet lined with minimum 5/8-inch-thick fire-barrier material. Provide factory-drilled mounting holes.
- B. Cabinet Material: Aluminum sheet.
  - 1. Shelf: Same metal and finish as cabinet.
- C. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
  - 1. Rolled-Edge Trim: 3-inch backbend depth.
- D. Cabinet Trim Material: Same material and finish as door.
- E. Door Material: Aluminum sheet.

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- F. Door Style: Vertical duo panel with frame.
- G. Door Glazing: Acrylic sheet.
  - 1. Acrylic Sheet Color: Clear transparent acrylic sheet.
- H. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
  - 1. Provide manufacturer's standard.
- I. Accessories:
  - 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
  - 2. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.
  - 3. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.
    - a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
      - 1) Location: Applied to cabinet glazing.
      - 2) Application Process: Silk-screened.
      - 3) Lettering Color: White.
      - 4) Orientation: Vertical.
  - 4. Alarm: Manufacturer's standard alarm that actuates when fire-protection cabinet door is opened and that is powered by batteries or low voltage, complete with transformer.
- J. Materials:
  - 1. Aluminum: ASTM B 221, with strength and durability characteristics of not less than Alloy 6063-T5 for aluminum sheet. ASTM B 221 for extruded shapes.
    - a. Finish: Baked enamel or powder coat.
    - b. Color: As selected by the Architect from the manufacturer's full range.
  - 2. Transparent Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), manufacturer's standard thickness, with Finish 1 (smooth or polished).

2.3 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
  - 1. Weld joints and grind smooth.

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2. Provide factory-drilled mounting holes.
  3. Prepare doors and frames to receive locks.
  4. Install door locks at factory.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
  2. Miter and weld perimeter door frames.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.4 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire-protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

Construction Documents

3.3 INSTALLATION

- A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
- B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
  - 1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semirecessed fire-protection cabinets.
  - 2. Provide inside latch and lock for break-glass panels.
  - 3. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.
- E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413



Construction Documents

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.
- B. Related Requirements:
  - 1. Section 104413 "Fire Protection Cabinets."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function.

1.4 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.6 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

Construction Documents

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure of hydrostatic test according to NFPA 10.
    - b. Faulty operation of valves or release levers.
  - 2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
  - 1. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
  - 1. Basis-of-Design: Subject to compliance with requirements, provide product indicated below or a comparable product as approved by the Architect:
    - a. Manufacturer: JL Industries, Inc. a division of Activar Construction Products Group.
    - b. Extinguisher: Cosmic 10E.
  - 2. Valves: Manufacturer's standard.
  - 3. Handles and Levers: Manufacturer's standard.
  - 4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.
- B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.



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Construction Documents

2.3 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red or black baked-enamel finish.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Amerex Corporation.
    - b. Ansul Incorporated; Tyco International.
    - c. Badger Fire Protection.
    - d. Buckeye Fire Equipment Company.
    - e. Fire End & Croker Corporation.
    - f. Guardian Fire Equipment, Inc.
    - g. JL Industries, Inc.; a division of the Activar Construction Products Group.
    - h. Larsens Manufacturing Company.
    - i. Nystrom, Inc.
    - j. Potter Roemer LLC.
    - k. Strike First Corporation of America.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
  - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
    - a. Orientation: Vertical.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
  - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
  - 1. Mounting Brackets: 54 inches above finished floor to top of fire extinguisher.

Construction Documents

- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

Construction Documents

SECTION 105126 - PLASTIC LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes plastic lockers and benches.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of plastic locker.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of locker and bench.
- B. Shop Drawings: For plastic lockers.
  - 1. Include plans, elevations, sections, details, and attachments to other work.
  - 2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
  - 3. Show locations and sizes of cutouts and holes for items installed in lockers.
  - 4. Show locker fillers, trim, base, sloping tops, and accessories.
  - 5. Show locker numbering sequence.
- C. Samples: For the following:
  - 1. Each type of locker material indicated.
  - 2. Exposed cabinet hardware and accessories, one unit for each type and finish.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Sample Warranty: For special warranty.

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Construction Documents

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Full-size locker doors, complete with specified door hardware. Furnish no fewer than five doors of each type and color installed.
  - 2. Full-size units of the following locker hardware items equal to 10 percent of amount installed for each type and finish installed, but no fewer than five units:
    - a. Hinges.
    - b. Pulls.
    - c. Shelf rests.
    - d. Cylinder locks.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver lockers until painting and similar operations that could damage lockers have been completed in installation areas. If lockers must be stored in other-than-installation areas, store only in areas where environmental conditions are the same as those in final installation location, and comply with requirements specified in "Field Conditions" Article.
- B. Deliver combination control charts to Owner by registered mail or overnight package service.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install lockers until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 43 and 70 percent during the remainder of the construction period.
- B. Field Measurements: Where lockers are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - 1. Locate concealed framing, blocking, and reinforcements that support lockers by field measurements before being enclosed, and indicate measurements on Shop Drawings.
- C. Established Dimensions: Where lockers are indicated to fit to other construction, establish dimensions for areas where lockers are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

Construction Documents

1.9 COORDINATION

- A. Coordinate sizes and locations of concealed wood support bases.
  - 1. Requirements are specified in Section 061053 " Miscellaneous Rough Carpentry."
- B. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that lockers can be supported and installed as indicated.
- C. Hardware Coordination: Distribute copies of approved hardware schedule specified in Section 087100 "Door Hardware" to fabricator of lockers; coordinate Shop Drawings and fabrication with hardware requirements.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of lockers that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures.
    - b. Faulty operation of locks or hardware.
    - c. Deterioration of materials beyond normal use.
  - 2. Warranty Period: One year from date of Substantial Completion.
- B. Manufacturer's Limited Warranty: Manufacturer agrees to repair or replace any of the plastic components of lockers that delaminate or break under normal use.
  - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Requirements: For lockers indicated to be accessible, comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC A117.1.

2.2 PLASTIC LOCKERS

- A. Basis-of-Design: Subject to compliance with requirements, provide product indicated below or a comparable product as approved by the Architect:
  - 1. General Partitions; Solid Plastic HGPE Lockers.

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- B. Locker Body: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.
  - 1. Side Panels: 3/8 inch.
  - 2. Back Panel: 3/8 inch.
  - 3. Top Panel: 3/8 inch.
  - 4. Bottom Panel: 3/8 inch.
  
- C. Plastic Doors: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.
  - 1. Thickness: 1/2 inch.
  
- D. End Panels: Match style, material, construction, and finish of plastic doors.
  
- E. Shelves: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.
  - 1. Thickness: 3/8 inch.
  
- F. Corners and Filler Panels: Match style, material, construction, and finish of plastic doors.
  
- G. Continuous Finish Base: Plastic panel that matches door faces; fabricated in lengths as long as practical to enclose base and base ends of lockers.
  
- H. Continuously Sloping Tops: Plastic panel that matches door faces for installation over lockers with separate flat tops. Fabricate tops in lengths as long as practical, without visible fasteners at splice locations. Provide fasteners, supports, and closures, as follows:
  - 1. Closures: Vertical-end type.
  - 2. Sloping-top corner fillers, mitered.
  
- I. Plastic Colors and Finishes:
  - 1. As selected by Architect from plastic manufacturer's full range of colors.

2.3 MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
  
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

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- C. Wood Support Base: 2-by-4-inch nominal-size lumber treated with manufacturer's standard preservative-treatment, nonpressure process.

2.4 HARDWARE

- A. General: Provide manufacturer's standard locker hardware complying with the requirements in this Section.
- B. Cam Padlock Hasp: Surface mounted, steel; finished to match other locker hardware.
- C. Digital Keypad Locks: Battery-powered electronic keypad with reprogrammable manager and owner codes that override access. Three consecutive incorrect code entries shall disable lock for three minutes.
  - 1. Designed for shared or temporary access by multiple users, with user-defined code to lock and unlock. Provide LED indicator to show when lock is in use.
- D. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees, allowing emergency access by lifting door.
- E. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
- F. Accessible Handle: Metal, fixed, graspable lever handle and rose trim; surface mounted.
- G. Shelf Rests: BHMA A156.9, B04013.
- H. Hooks: Manufacturer's standard, ball-pointed aluminum or steel; chrome finished. Attach hooks with at least two fasteners.
  - 1. Provide hooks as indicated on Drawings.
  - 2. Provide two single-prong wall hooks for each compartment of single-tier or double-tier lockers.
- I. Exposed Hardware Finishes: Satin chrome unless otherwise indicated.
- J. Exposed Hardware Finishes: Unless otherwise indicated, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

2.5 BENCHES

- A. Pedestal-Leg Locker Benches: Bench supported by pedestal legs, minimum of two pedestals for each bench, with overall height of 17-1/2 inches measured from top of bench to floor, as follows:
  - 1. Basis-of-Design: Subject to compliance with requirements, provide product indicated below or a comparable product as approved by the Architect:

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- a. Scranton Products; Tufftec Benches.
  - b. Color: As selected by the Architect from the manufacturer's full range.
2. Metal Pedestal Legs: 2-3/8-inch-diameter, aluminum round tube or pipe.
  3. Bench Tops:
    - a. Plastic Top: Solid, high-density polyethylene (HDPE) panel material, not less than 1-1/2 inches thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.
    - b. Width: As selected by the Architect from the manufacturer's full range. Provide minimum 20-inch width where accessible benches are indicated.
    - c. Length: As selected by the Architect from the manufacturer's full range.

2.6 FABRICATION

- A. Fabricate each locker with shelves, an individual door and frame, an individual top, a bottom, and a back, and with common intermediate uprights separating compartments.
  1. Fabricate lockers to dimensions, profiles, and details indicated.
- B. Fabricate components square, rigid, without warp, and with finished faces flat and free of scratches and chips. Accurately factory machine components for attachments. Make joints tight and true.
  1. Fabricate lockers using manufacturer's standard construction.
- C. Accessible Lockers: Fabricate as follows:
  1. Locate bottom shelf no lower than 15 inches above the floor.
  2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches above the floor.
- D. Venting: Fabricate lockers with space between doors and locker assembly of not less than 1/4 inch.
- E. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- F. Shop cut openings, to maximum extent possible, to receive hardware, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings.



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Construction Documents

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls, floors, and support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify that furring is attached to concrete and masonry walls that are to receive lockers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Condition lockers to average prevailing humidity conditions in installation areas before installation.
- B. Before installing lockers, examine factory-fabricated work for completeness and complete work as required, including removal of packing.

3.3 INSTALLATION

- A. Install wood support base with 1/2-inch-thick plywood top.
- B. Install lockers level, plumb, and true; use concealed shims.
- C. Connect groups of lockers together with manufacturer's standard fasteners, through predrilled holes, with no exposed fasteners on face frames. Fit lockers accurately together to form flush, tight, hairline joints.
- D. Install lockers without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings, providing unencumbered operation. Complete installation of hardware and accessory items as indicated.
  - 1. Installation Tolerance: No more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line. Shim as required with concealed shims.
- E. Locker Anchorage to Wall: Fasten lockers through wood locker base, at ends, and not more than 36 inches o.c. with No. 8 flush-head wood screws sized for 1-inch penetration into wood base.
- F. Locker Anchorage to Base: Fasten lockers through back, near top and bottom, and at ends with manufacturer's recommended screws sized for 1-inch penetration into wood framing, blocking, or furring and spaced not more than 16 inches o.c.
- G. Scribe and cut corner and filler panels to fit adjoining work using fasteners concealed where practical. Repair damaged finish at cuts.

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- H. Attach sloping-top units to lockers, with end panels covering exposed ends.
- I. Anchor locker benches to floors.
  - 1. Uniformly space pedestals not more than 72 inches apart; securely fasten pedestals to bench top and anchor to floor.

3.4 ADJUSTING, CLEANING, AND PROTECTION

- A. Clean, lubricate, and adjust hardware. Adjust doors to operate easily without binding. Verify that integral locking devices operate properly.
- B. Protect lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.
- C. Touch up marred finishes, or replace lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 105126

Construction Documents

SECTION 107300 - ALUMINUM CANOPY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes: Design, fabrication, and installation of welded extruded aluminum walkway covers.

1.3 SYSTEM DESCRIPTION

- A. Design Requirements:
  - 1. This is a performance specification and canopy manufacturer shall be responsible for complete design and engineering required to meet specified performance requirements within physical and aesthetic requirements established.
  - 2. Contract Documents establish aesthetic criteria and performance requirements for the canopy. Requirements specified or indicated by details are intended to establish basic dimensions of module and sight lines and profiles of members. Include modifications or additions required to meet specified requirements and maintain the visual design concept.
  - 3. Contract Documents do not necessarily indicate or describe total work required for completion of Work. Furnish and install all items required for complete installation.
  - 4. Dimension and profile adjustments may be made in proposed design in interest of fabrication or erection methods or techniques, weatherability factor, or ability of design to satisfy aesthetic and performance requirements, provided that design intent and intent of Contract Documents are maintained.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's product information, specifications, and installation instructions for canopy components, accessories & finishes.
- B. Shop Drawings: Show details of fabrication and installation, including plans, elevations, sections, details of components and attachments to other work. Distinguish between shop and field assembled work.
  - 1. Prepared by manufacturer, not installer.
  - 2. Include typical unit elevations at 1/2 inch scale and details at full scale.

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3. Include details of provisions for assembly expansion and contraction and for draining water from the canopy.
4. Indicate where and how the system deviates from Contract Documents.
5. Shop drawings shall contain seal of a professional engineer currently registered in licensing jurisdiction of the project and a written statement that the canopy conforms to project requirements, applicable codes, and specified conditions.
6. Provide for information only, material properties and other information needed for structural analysis including computations, prepared, signed, or, and sealed by a professional engineer licensed to practice in the jurisdiction where the project is located.
7. Design Modifications: If design modifications are proposed to meet performance requirements and field conditions, submit design calculations and Shop Drawings. Do not adversely affect the appearance, durability, or strength of units when modifying details or materials and maintain the general design concept.

C. Samples:

1. Selection: Manufacturer's full range of colors for the finishes selected.
2. Verification: Provide pairs of samples of each aluminum type and color on 2-inch-square of each finish selected on the substrate specified.

D. Design Data: Design calculations bearing the seal of a Registered Professional Engineer, licensed in the state where the project is located. Design calculations shall state that the canopy system design complies with the wind requirements of ASCE 7, the stability criteria of applicable building code, and all other governing criteria.

E. Warranty: Sample of warranty.

1. Provide manufacturer's written warranty covering materials and installation (labor) stating obligations, remedies, limitations and exclusions.

F. Maintenance Data: To include in maintenance manuals.

## 1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to perform canopy work who has a minimum of 5 years specialized experience in installing canopy similar to that required for this Project and who is acceptable to manufacturer of canopy system.

B. Delegated Engineering Professional Qualifications: Professional engineer legally authorized to practice in jurisdiction where Project is located and experienced in providing engineering services of kind indicated that have resulted in installation of products and systems similar to this Project and has a record of successful in-service performance.

C. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum".

D. Preinstallation Conference: Before beginning canopy installation, conduct a preinstallation conference at the Project site with the canopy manufacturer, installer, and other interested

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parties to review procedures, schedules, and coordination of the canopy installation with other elements of the Work.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Where products and systems are indicated to fit adjacent construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 WARRANTY

- A. General: Submit written warranty signed by authorized representatives of the canopy manufacturer and installer warranting that canopy system is free from defects in material and workmanship, and in conformance with the requirements of the Contract Documents and agreeing to repair or replace defective Work during a 3-year period following date of Substantial Completion.
  - 1. Defects are defined to include but not limited to the following:
    - a. Deterioration of metals beyond normal weathering.
    - b. Failure of the system to meet performance requirements.
    - c. Failure of system to manage water.
- B. Factory Applied Finish Warranty for High-Performance Fluoropolymer Finishes: Furnish manufacturer's written warranty signed by an authorized representative using manufacturer's standard form agreeing to repair finish or replace work which exhibits finish defects. "Defects" is defined to include but not limited to deterioration or failure of finish to perform as required.
  - 1. Coverage includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
- C. Warranty Period: Manufacturer shall warrant the installation to be free from finish defects for a period of 5 years from date of Substantial Completion.

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Construction Documents

PART 2 - PRODUCT

2.1 MANUFACTURERS

- A. Basis-of-Design: Subject to compliance with requirements, provide product by Peachtree Protective Covers, Inc., or a comparable product as approved by the Architect.

2.2 MATERIALS - GENERAL

- A. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

2.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Engineer products and systems to withstand loads within limits of allowable working stresses of the materials involved under conditions indicated and without permanent deformation or failure of materials.
- B. Design Loads: Engineer to withstand design loads including but not limited to gravity, wind, and seismic design loads and thermal movements established by authorities having jurisdiction, applicable local building codes, and as indicated.
- C. Structural-Test Performance: Test according to ASTM E 330 as follows:
  - 1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
  - 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
  - 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- D. Seismic Performance: Withstand the effects of earthquake motions.
- E. Thermal Movements: Engineer products and systems to accommodate thermal movements of supporting elements resulting from the following maximum change (range) in ambient and surface temperatures without buckling, damaging stresses, damaging loads on fasteners, failure of operating units to function properly, and other detrimental effects.
  - 1. Temperature Change (Range): 120 deg F (49 deg C), ambient; 180 deg F (82 deg C), material surfaces.
- F. Dimensional Tolerances: Engineer products and systems to accommodate dimensional tolerances of framing members and adjacent construction.

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Construction Documents

2.4 MATERIALS

- A. Aluminum Members: Extruded aluminum, ASTM B 221, 6063 alloy, T6 temper.
- B. Fasteners & Accessories: Aluminum, 18-8 stainless steel, or 300 series stainless steel. Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
  - 1. Where fasteners are subject to loosening or turn out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
  - 2. Reinforce members as required to receive fastener threads.
  - 3. Use exposed fasteners with countersunk Phillips screw heads.
  - 4. Finish exposed portions to match framing system.
  - 5. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended by manufacturer.
- C. Protective Coating for Aluminum Columns Embedded in Concrete: Clear acrylic.
- D. Grout:
  - 1. Portland Cement: ASTM C 150, Type I.
  - 2. Sand: ASTM C 404.
  - 3. Water: Potable.
- E. Gaskets: Dry seal santoprene pressure type.
- F. Aluminum Flashing: ASTM B 209, Type 3003 H14, 0.040 inch, minimum.
- G. Components:
  - 1. Bituminous Paint: ASTM D 1187, cold-applied asphalt emulsion.
  - 2. Columns: Tubular extrusions, with cutouts and internal diverters for drainage.
  - 3. Beams: Open-top tubular extrusions.
  - 4. Deck: Extruded self-flashing sections interlocking into a composite unit.
  - 5. Fascia: Manufacturer's standard shape with concealed splices.
  - 6. Exposed Flashing and Closures: Manufacturer's standard aluminum components not less than 0.040 in (1.02 mm) thick.

2.5 MIXES

- A. Grout: 1 part portland cement to 3 parts sand, add water to produce a pouring consistency.

2.6 FABRICATION

- A. Form or extrude aluminum shapes before finishing.

Construction Documents

- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Welds shall be of adequate strength and durability, with jointing tight, flush, smooth and clean. Weld behind finished surfaces so as to cause no distortion and/or discoloration on the finished side. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fitted joints with ends coped or mitered.
  - 3. Fasteners, anchors, and connection devices that are concealed from view.
- D. Columns: Provide radius-cornered tubular extrusions with cutout and internal diverter for drainage where indicated. Circular downspout opening in column not acceptable.
- E. Beams: Provide open-top tubular extrusion, top edges thickened for strength and designed to receive deck members in self-flashing manner.
- F. Deck: Extruded self-flashing sections interlocking into a composite unit. Provide welded plate closures at deck ends.
- G. Fascia: Manufacturer's standard shape. Provide fascia splices where continuous runs of fascia are jointed. Locate splices to be in line with bents and fasten in place on hidden or non-vertical surfaces.

2.7 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of accepted Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of accepted Samples and are assembled or installed to minimize contrast.



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2.8 ALUMINUM FINISHES:

- A. Factory Finishing: Finish designations prefixed by AA comply with system established by the AAMA for designating aluminum finishes.
  - 1. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: Class I, clear coating 0.7 mils or thicker), complying with AAMA 611.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Verify that all concrete, masonry, and roofing work in the vicinity is complete and cleaned.
- B. Furnish inserts for setting in concrete formwork, and similar work required to support canopy.
- C. Field measure and verify governing dimensions, including floor elevations, floor-to-floor heights, minimum clearance between canopy and structural frames and other permissible dimensional tolerances in building frame.
- D. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

3.2 ERECTION

- A. Erect protective cover true to line, level, and plumb. Protect aluminum columns embedded in concrete with clear acrylic. Fill downspout columns with grout to the discharge level to prevent standing water. Install weep holes at top of concrete in non-draining columns to remove condensation.
- B. Fit joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight, unless otherwise indicated. Provide means to drain water to the exterior to produce a permanently weatherproof system.
- C. Comply with manufacturer's instructions for installing canopy components, with particular care and attention to preservation of applied finishes. Discard or remove and replace damaged members.
- D. Do not cut, trim, weld or braze component parts during erection, in any manner which would damage finish, decrease strength or result in visual imperfection or failure in performance of construction.

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- E. Secure to structure with non-staining and non-corrosive shims, anchors, fasteners, spacers and fillers.
- F. Anchor components securely in place. Shim and allow for movement resulting from changes in thermal conditions. Provide separators and isolators to prevent corrosion, electrolytic deterioration, and impede movement of moving joints.
- G. Erection Tolerances: Install components plumb, level, accurately aligned, and located in reference to column lines and floor levels. Adjust work to conform to the tolerances indicated below. Tolerances indicated below are maximum and are not cumulative.
  - 1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
  - 2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
  - 3. Alignment:
    - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 in wide, limit offset from true alignment to 1/16 in.
    - b. Where surfaces are separated by reveal or protruding element from 1/2-to-1 in wide, limit offset from true alignment to 1/8 in.
    - c. Where surfaces are separated by reveal or protruding element of 1 in wide or greater, limit offset from true alignment to 1/4 in.
    - d. Location: Limit variation from plane or location shown to 1/8 in in 12 ft or 1/2 in in any total length.
- H. Manufacturer's Field Service: Manufacturer's representative shall periodically inspect material and installation to insure installation is proceeding in accordance with manufacturer's recommendations and warranty requirements. Representative shall submit a written report of each visit indicating observations, findings and conclusions of inspection.

3.3 CLEANING

- A. Clean all protective cover components promptly after installation.

3.4 PROTECTION

- A. Protect materials during and after installation.

END OF SECTION 107300

Construction Documents

SECTION 113100 - RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Cleaning appliances.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include installation details, material descriptions, dimensions of individual components, and finishes for each appliance.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- B. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard size.
- C. Product Schedule: For appliances. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Product Certificates: For each type of appliance.
- C. Field quality-control reports.
- D. Sample Warranties: For manufacturers' special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each residential appliance to include in operation and maintenance manuals.

Construction Documents

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Maintains, within 30 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

1.7 WARRANTY

- A. Special Warranties: Manufacturer agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.

- 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of residential appliance from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Electrical Appliances: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply with applicable provisions in the DOJ's 2010 ADA Standards for Accessible Design, the ABA standards of the Federal agency having jurisdiction, and ICC A117.1.

2.3 CLOTHES WASHERS AND DRYERS

- A. Clothes Washer: ADA-compliant.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product selected by the Architect.
  - 2. Type: Freestanding, front-loading unit.
  - 3. Drum: Manufacturer's standard.
    - a. Capacity: 2.0 cu. ft. minimum.
  - 4. Controls: Front-mounted touch-pad or rotary-dial controls for water-fill levels, wash/rinse water temperatures, and variable-speed and fabric selectors.
    - a. Wash Cycles: At least four wash cycles including regular, delicate, and permanent press.
    - b. Wash Temperatures: Three settings.

Construction Documents

- c. Speed Combinations: Two minimum.
  5. Electrical Power: As indicated on Drawings.
  6. Motor: Manufacturer's standard with built-in overload protector.
  7. Features:
    - a. Agitator: Impeller (without spindle).
    - b. Unbalanced-load compensator.
    - c. Inlet Hoses: Minimum length 60 inches.
    - d. Drain Hoses: Minimum length 48 inches.
    - e. End-of-cycle signal.
    - f. Electronic temperature control.
  8. Energy Performance, ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.
  9. Water-Efficient Clothes Washer: Provide clothes washer with modified energy factor greater than or equal to 2.0 and water factor less than 5.5.
  10. Appliance Finish: Porcelain enamel on top; baked enamel on sides.
    - a. Color: White.
  11. Front-Panel: Manufacturer's standard finish with vision panel.
- B. Clothes Dryer: ADA-compliant.
  1. Basis-of-Design Product: Subject to compliance with requirements, provide product selected by the Architect.
  2. Type: Freestanding, frontloading, electric unit.
  3. Drum: Manufacturer's standard.
  4. Controls: Front-mounted touch-pad or rotary-dial controls for drying cycle, temperatures, and fabric selectors.
  5. Electric-Dryer Power: As indicated on Drawings.
  6. Features:
    - a. Removable lint filter.
    - b. Electronic temperature and moisture level sensor control.
    - c. End-of-cycle signal.
  7. Appliance Finish: Porcelain enamel on top; baked enamel on sides.
    - a. Color: White.
  8. Front-Panel: Manufacturer's standard finish with vision panel.

Construction Documents

2.4 CLOTHES WASHER/DRYER COMBINATIONS

A. Clothes Washer/Dryer Combination: Complying with ASSE 1007.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product selected by the Architect.
2. Type: Freestanding washer/dryer unit with dual-drum design and electric dryer; washer is front loading.
3. Dimensions:
  - a. Width: As selected by the Architect.
  - b. Depth: As selected by the Architect.
  - c. Height: As selected by the Architect.
4. Pedestal: Provide ADA-compliant pedestal for clothes washer/dryer combinations.
5. Washer and Dryer Drums: Manufacturer's standard.
  - a. Washer-Drum Capacity: 1.5 cu. ft. minimum.
  - b. Dryer-Drum Capacity: 2.0 cu. ft. minimum.
6. Washer Controls: Touch-pad or rotary-dial controls for water-fill levels, wash/rinse water temperatures, and variable-speed and fabric selectors.
7. Dryer Controls: Touch-pad or rotary-dial controls for drying cycle, temperatures, and fabric selectors.
  - a. Wash Cycles: Nine wash cycles including regular, delicate, and permanent press.
  - b. Wash Temperatures: Five settings.
  - c. Speed Combinations: Two.
8. Electric Washer/Dryer Power: As indicated on Drawings.
9. Motor: Manufacturer's standard with built-in overload protector.
10. Washing Features:
  - a. Unbalanced-load compensator.
  - b. Inlet Hoses: Minimum length 60 inches.
  - c. Drain Hoses: Minimum length 48 inches.
11. Drying Features:
  - a. Removable lint filter.
  - b. Electronic temperature and moisture level sensor control.
  - c. End-of-cycle signal.
12. Energy Performance, ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.
13. Water-Efficient Clothes Washer: Provide clothes washer with modified energy factor greater than or equal to 2.0 and water factor less than 5.5.

Construction Documents

14. Appliance Finish: Porcelain enamel on top and lid; baked enamel on front and sides.
  - a. Color: White.

2.5 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, power connections, and other conditions affecting installation and performance of residential appliances.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before appliance installation.
- C. Examine walls, ceilings, and roofs for suitable conditions where overhead exhaust hoods and microwave ovens with vented exhaust fans will be installed.
- D. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install appliances according to manufacturer's written instructions.
- B. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and that rough openings are completely concealed.
- C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

Construction Documents

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
  - 1. Perform visual, mechanical, and electrical inspection and testing for each appliance according to manufacturers' written recommendations. Certify compliance with each manufacturer's appliance-performance parameters.
  - 2. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.
  - 3. Operational Test: After installation, start units to confirm proper operation.
  - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.
- B. An appliance will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain residential appliances.

END OF SECTION 113100



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Construction Documents

SECTION 114000 – FOODSERVICE EQUIPMENT

1.1 Tray & Silver

A. Provide a Tray Holder with Silverware Holder with the following features:

1. UL listed, NSF Certified.
2. ¾” Millwork Panels
3. 34” overall height (ADA Requires Optional Tray Rest)
4. Stainless Steel Adjustable Bullet Feet
5. Adjustable, Removable, or Fixed Shelves.
6. Casters Optional

B. Tray Holder with Silverware Holder to be provided by BSI, Model CUSTOM, or Delfield or Randell

2.1 Cafeteria, Buffet Shield

A. Provide a Cafeteria Buffet Shield with the following features:

1. UL Listed, NSF Certified
2. Electrical characteristics as scheduled.
3. Light consists of an aluminum housing and an inner aluminum holder/reflector.
4. Light shall include a remote on/off switch and a remote ballast in an enclosure.
5. Finish options of Brushed Aluminum Stainless Steel, Gloss Black, Smoked Copper, Chrome SS, Wrinkle Black, or Polished Brass Finish.
6. Optional Light, or Light & Warmer.

B. Cafeteria, Buffet Shield to be provided by BSI, Model DECO-259-N, or Hel-Mar or Versa Gard

3.2 Drop-In, Hot/Cold Wells

QUANTITY AS SCHEDULED

A. Provide a Drop-In, Hot/Cold Wells with the following features:

1. UL Listed, NSF Certified.
2. Electrical characteristics as scheduled.
3. Fully insulated, self-contained.
4. Solid state digital controls.
5. 4,000 Watts

B. Drop-In, Hot/Cold Wells to be provided by Hatco, Model HCWBI-4DA

Construction Documents

4.1 Cafeteria, Buffet Shield

A. Provide a Cafeteria Buffet Shield with the following features:

1. UL Listed, NSF Certified
2. Electrical characteristics as scheduled.
3. Light consists of an aluminum housing and an inner aluminum holder/reflector.
4. Light shall include a remote on/off switch and a remote ballast in an enclosure.
5. Finish options of Brushed Aluminum Stainless Steel, Gloss Black, Smoked Copper, Chrome SS, Wrinkle Black, or Polished Brass Finish.
6. Optional Light, or Light & Warmer.

B. Cafeteria, Buffet Shield to be provided by BSI, Model ZG9930-5, or Hel-Mar or Versa Gard

5.1 Tray & Silver

A. Provide a Tray Holder with Silverware Holder with the following features:

1. UL listed, NSF Certified.
2. ¾" Millwork Panels
3. 34" overall height (ADA Requires Optional Tray Rest)
4. Stainless Steel Adjustable Bullet Feet
5. Adjustable, Removable, or Fixed Shelves.
6. Casters Optional

B. Tray Holder with Silverware Holder to be provided by BSI, Model CUSTOM, or Delfield or Randell

6.3 Drop-In, Dish Dispensers, Unheated QUANTITY AS SCHEDULED

A. Provide a Drop-In Dish Dispenser having the following features:

1. NSF Certified
2. Constructed of series 300 stainless steel.
3. Drop-in is self-leveling. Spring mechanism is adjustable.

B. Drop-In Dispenser to be provided by Atlas Metal, Model PD-8 1/8, or Delfield or Randell

Construction Documents

7.8 Cafeteria, Buffet Shield

A. Provide a Cafeteria Buffet Shield with the following features:

1. UL Listed, NSF Certified
2. Electrical characteristics as scheduled.
3. Light consists of an aluminum housing and an inner aluminum holder/reflector.
4. Light shall include a remote on/off switch and a remote ballast in an enclosure.
5. Finish options of Brushed Aluminum Stainless Steel, Gloss Black, Smoked Copper, Chrome SS, Wrinkle Black, or Polished Brass Finish.
6. Optional Light, or Light & Warmer.

B. Cafeteria, Buffet Shield to be provided by BSI, Model ZG9930-5, or Hel-Mar or Versa Gard

8.1 Drop-In, Hot/Cold Wells

QUANTITY AS SCHEDULED

A. Provide a Drop-In, Hot/Cold Wells with the following features:

1. UL Listed, NSF Certified.
2. Electrical characteristics as scheduled.
3. Fully insulated, self-contained.
4. Solid state digital controls.
5. 4,000 watts

B. Drop-In, Hot/Cold Wells to be provided by Hatco, Model HCWBI-4DA

9.1 Indoor Combination Refrigerator/Freezer Walk-In Unit

QUANTITY AS SCHEDULED

A. Provide pre-fabricated cold storage assembly of size and shape as shown on the plan and detail drawings. Exact overall size to be field verified prior to fabrication.

1. Insulation: Panels shall be insulated with 4" thick urethane foamed in place using eco-friendly 100% CFC and HCFC free foam. Foam shall be 2.25 lb. density, 95% closed cell. Panels shall meet ASTM-E-84 (UL-723) and be listed by UL. Panels shall have a maximum flame spread of 25 or less.
2. Finishes: Exterior and interior finishes as shown in the drawings.
3. Floors: Recessed floor by Food Service Equipment Contractor with quarry tile by general contractor. Reinforced panels to support 1000 pound per square foot in the freezer that will have a 3/4" marine grade plywood underlay that includes the non-skid strips every 6".
4. Doors with viewports: Door size and finishes shall be as shown on the drawings.
5. Coved corners: Assembly shall be constructed so that all interior wall, floor and ceiling intersections shall comply with NSF standards.

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6. Cam lock fasteners: All panel intersections and wall, floor and ceiling intersections shall be secured by cam lock fasteners.
7. Ceiling panels: All ceiling panels to be one piece, self -supporting, and span the full width of the assembly.
8. Lights: Each compartment to have (2) 48" Universal LED light assembly with bulbs.
9. Warranty: One-year parts and labor from date of installation. Panels will have a 10-year warranty period.
10. Miscellaneous: Provide 5-bar wainscot as shown on the drawings. ADT will be unacceptable.
11. Provide heated pressure relief port in the freezer. Provide trim strips, closure panels, etc. as necessary to adjacent building surfaces. Provide plastic strip curtains for door entrances. Provide sleeves properly located for utility entrance, drain lines, and refrigeration lines. After lines are installed, fill sleeves with spray foam compound. Trim excess foam away and cover with stainless steel escutcheon.

- B. Cold storage assembly to be manufactured by TAFCO. Approved equals that meet the specifications are ThermoKool and Bally.

10.0 Deleted

11.1 Ice Maker/ Dispenser

QUANTITY AS SCHEDULED

- A. Provide an Ice Maker with the following features:

1. UL Listed, NSF Certified
2. 3-year parts and labor warranty on Ice Maker, 5-year parts and labor on Evaporator, 5 year part warranty on Compressor.
3. Electrical characteristics as scheduled.
4. R-404A Refrigerant.
5. 618 lbs per day ice production capacity.
6. Advanced CleanCycle24 design.
7. Protected by H-Guard Plus Antimicrobial Agent.
8. Corrosion resistant, Stainless steel exterior.

- B. Ice Maker to be provided by HOSHIZAKI, Model DCM-500BAH-OS OPTI-SERVE SERIES, or Scotsman, Manitowoc

12.12 Floor Drain

QUANTITY AS SCHEDULED

- A. Provide a Floor Drain, having the following features:

1. All TIG welded, all external corners welded and polished to a satin finish.
2. Perimeter flange mounts directly to sub floor.
3. 3/4" vertical step design to accommodate floor tile installation.
4. 14-gauge type 304 stainless steel polished stainless-steel grating.

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Construction Documents

- 5. Accommodates up to 4” waste pipe.
  - B. Floor Drain to be provided by Advance Tabco, Model FDR-1212, or Aero Manufacturing or IC Teddy.
- 13.1 Dispenser, Milk QUANTITY AS SCHEDULED
- A. Provide a Milk Dispenser with the following features:
    - 1. UL Listed, NSF Certified.
    - 2. 1-year parts and labor warranty. Five-year warranty on compressor.
    - 3. Electrical characteristics as scheduled.
    - 4. Double valve, accommodates 3, 5, and 6-gallon bag-n-box
    - 5. Hands free operation, with temperature indicator on door front, and adjustable temperature control.
  - B. Milk Dispenser to be provided by Silver King, Model SKMAJ2, or Bon Chef or Vollrath
- 14.1 Iced Tea Brewer
- A. Provide an iced tea brewer with the following features:
    - 1. UL Listed, NSF Certified.
    - 2. Electrical characteristics as scheduled.
    - 3. Brew side sensor.
    - 4. Expandable dispenser base.
    - 5. Slim profile dispenser.
    - 6. 1.5 gpm minimum flow rate, with a 1/4” male flare fitting.
  - B. Iced Tea Brewer to be provided by Fetco, Model TBS-2121XTS, or Bunn or Bloomfield
- 15.1 Coffee Maker, Insulated Server, Automatic QUANTITY AS SCHEDULED
- A. Provide an insulated coffee maker with the following features:
    - 1. UL Listed, NSF Certified.
    - 2. Electrical characteristics as scheduled.
    - 3. Includes a manual hot water faucet.
    - 4. Programmable brewer.
    - 5. 1.25 gpm minimum flow rate, with a 3/8” male flare fitting.
  - B. Coffee maker to be provided by Fetco, Model CBS-52H-20, or Bunn or Bloomfield
- 16.0 Deleted

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Construction Documents

17.1 Warmer, Food, Electric QUANTITY AS SCHEDULED

A. Provide an electric food warmer with the following features:

1. UL Listed
2. 1-year parts and labor limited warranty.
3. (2) 4 qt. capacity.
4. Heavy gauge stainless steel constructions.
5. Electrical characteristics as scheduled.

B. Food Warmer to be provided by APW Wyott, Model W4-2, or Wells or Nemco

18.1 Toaster, Conveyor QUANTITY AS SCHEDULED

A. Provide a Conveyor Toaster with the following features:

1. UL listed, NSF 4 Certified.
2. 1-year parts and labor warranty.
3. Electrical characteristics as scheduled.
4. Constructed of corrosion resistant stainless steel, with heavy-duty motor.
5. One-piece cover.

B. Conveyor Toaster to be provided by Star Manufacturing, Model QCSE2-600H, or Belle Co or APW

19.1 Shelf, Microwave QUANTITY AS SCHEDULED

A. Provide a Microwave Shelf with the following features:

1. NSF Certified.
2. All TIG welded, exposed surfaces polished to a satin finish.
3. 18-gauge stainless steel.

B. Microwave shelf to be provided by Advance Tabco, Model MS-18-24, or Aero Manufacturing or Select Stainless.

20.2 Oven, Microwave QUANTITY AS SCHEDULED

A. Provide a Microwave Oven with the following features:

1. UL Listed, NSF Certified.
2. Electrical characteristics as scheduled.
3. 3-year limited warranty.
4. Microwave oven must meet or exceed all safety performance and sanitation standards set for commercial food service microwave ovens.

B. Microwave Oven to be provided by Panasonic, Model NE-1054, or Sharp or Amana

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21.1 Beverage Counter QUANTITY AS SCHEDULED

A. Provide a Beverage Counter with the following features:

1. UL listed, NSF Certified.
2. ¾" Millwork Panels
3. 34" overall height (ADA Requires Optional Tray Rest)
4. Stainless Steel Adjustable Bullet Feet
5. Adjustable, Removable, or Fixed Shelves.
6. Casters Optional

B. Beverage Counter to be provided by BSI, Model 96-BT-EB, Delfield or Randell

22.1 Water Filtration System, Steamers & Combi Ovens QUANTITY AS SCHEDULED

A. Provide a Water Filtration System with the following features:

1. NSF Certified
2. 1-year limited warranty against defects in material or workmanship.
3. Cold water inlet
4. 10,000-gal, chlorine removal capacity
5. ½" Male thread

B. Water Filtration System to be provided by Dormont, Model BRWMax-S2S, S2L, Cuno or Eve-pure

23.1 Deleted

24.1 Faucet, Service Sink QUANTITY AS SCHEDULED

A. Provide a Service Sink Faucet, having the following features:

1. [ANSI/A11@.18.1M](#)
2. Service sink faucet with long spout and vacuum breaker, with 36" supply lines.
3. Stainless Steel seats, seat screws, and handle screws, with atmospheric vacuum breaker.

B. Service Sink Faucet to be provided by Fisher, Model 8253, or Chicago Faucet or T&S Brass

25.2 Mop Holder QUANTITY AS SCHEDULED

A. Provide a Mop Holder with the following features:

1. NSF Certified
2. 4-Pole mop holder.

Construction Documents

3. 24" by 4"

B. Mop Holder to be provided by Eagle Group, Model 321561, or Uline or Rubbermaid

26.1 Floor Drain QUANTITY AS SCHEDULED

A. Provide a Floor Drain, having the following features:

1. All TIG welded, all external corners welded and polished to a satin finish.
2. Perimeter flange mounts directly to sub floor.
3. 3/4" vertical step design to accommodate floor tile installation.
4. 14-gauge type 304 stainless steel polished stainless-steel grating.
5. Accommodates up to 4" waste pipe.

B. Floor Drain to be provided by Advance Tabco, Model FDR-1212, or Aero Manufacturing or IC Teddy.

27.1 Pot Rack, Wall Mount QUANTITY AS SCHEDULED

A. Provide a Wall Mount Pot Rack, having the following features:

1. Secured to wall by means of bolts through welded brackets.
2. Flat steel bar is 2" by 1/4" Stainless Steel.
3. All welded stainless-steel units are blended to a satin finish.
4. 18" by 132", with 9 hooks included.

B. Wall Mount Pot Rack to be by Advance -Tabco, Model PS-18-120, or Aero Manufacturing or Select Stainless.

28.1 Air Curtain, Unheated QUANTITY AS SCHEDULED

A. Provide an Air Curtain with the following features:

1. Meets NEC and ETL standards.
2. Warranty shall be 5 years on all parts.
3. Self-contained, one-piece cabinet, fire retardant and corrosion proof paint.
4. Electrical characteristics as scheduled.
5. Optional door limit switch is field installed as is to be wired to the control panel.
6. Switch to be mounted such that air curtain turns on as door begins to open.

B. Air Curtain to be provided by Mars Air Doors, Model EP296-2U, or Curton or Berner

29.1 Custom Dish-table, 'L' Shape (per MSH Consultant Group) QUANTITY AS SCHEDULED

A. Provide a Custom Dish-table, having the following features:



Construction Documents

1. All TIG welded, with welded areas blended to match adjacent surfaces, to a satin finish, and with stainless steel gussets welded to a stainless-steel support channel, seamless, 14-gauge type 304 stainless steel.
2. 10-1/2" backsplash with 2" return and tile edge.
3. 8" deep sink bowl.
4. Faucet holes in SPLASH punched on 8" centers.
5. Waste drain is 1-1/2" IPS basket type and included.
6. NSF Certified.

- B. Custom Dish-table to be Advance Tabco, Model DTS-D30-108R, or Aero Manufacturing or Select Stainless

30.1 Dish table, Sorting Shelf QUANTITY AS SCHEDULED

- A. Provide a Dish-table, Sorting Shelf, having the following features:

1. NSF Certified.
2. Double Sided Design die formed wall mounted rack shelf with solid end brackets.
3. TIG welded with exposed areas blended to a satin finish.
4. Brackets are 16-gauge type 300 series stainless steel.
5. Shelf is 16-gauge type 300 stainless steel.

- B. Dish-table, Sorting Shelf to be provided by Advance Tabco, Model DTA-79, or Aero Manufacturing or Select Stainless.

31.1 Warewasher, Door Type, High Temp QUANTITY AS SCHEDULED.

- A. Provide a Warewasher, having the following features:

1. UL Listed, and NSF Certified.
2. 1-year parts and labor warranty.
3. Electrical characteristics as scheduled.
4. Energy Star Qualified
5. Dual-Rinse technology
6. One-piece cast stainless steel upper & lower spray arm assemblies.
7. Vertical opening, accommodating 18" by 26" sheet pans.
8. Top mount controls.
9. Never leak, ball valve drain closure.
10. Electric heat tank.
11. Wash pump 2 HP motor.
12. Ventless option. No hood in place.

Construction Documents

- B. Warewasher to be Champion, Model 44 PRO VHR or Hobart or Jackson

32.1 Dish-table, Straight QUANTITY AS SCHEDULED

- A. Provide a Dish-table, having the following features:

1. All TIG welded, with welded areas blended to match adjacent surfaces, to a satin finish, and with stainless steel gussets welded to a stainless-steel support channel, seamless, 14-gauge type 304 stainless steel.
2. 10-1/2" backsplash with 2" return and tile edge.
3. 8" deep sink bowl.
4. Faucet holes in SPLASH punched on 8" centers.
5. Waste drain is 1-1/2" IPS basket type and included.
6. NSF Certified.

- B. Dish-table to be Advance Tabco, Model DTS-S30-84L, or Aero Manufacturing or Select Stainless

33.1 Sink, 3 Compartment QUANTITY AS SCHEDULED

- A. Provide a 3 Compartment Sink, having the following features:

1. All TIG welded, with welded areas blended to match adjacent surfaces, to a satin finish, and with gussets welded die-embossed reinforced channel, seamless, 14-gauge type 304 stainless steel with 11" high splash.
2. Sink bowl must be 18" by 44" by 14"
3. Once piece Deep Drawn sink bowls with integral drain-boards with splash.
4. Adjustable front and rear cross brace featuring leg casting to secure left to right cross bracing.
5. Conforms to NSF 61 Standard 9 and are AB1953 Lead Free Compliant.
6. Waste drains are 1-1/2" IPS Stainless Steel basket type, located in center of sink bowl.

- B. 3 Compartment Sink to be Advance Tabco, Model FC-3-2424-24RL, or Aero Manufacturing or Select Stainless

34.1 Faucet, Deck Mount QUANTITY AS SCHEDULED

- A. Provide a Deck Mount Faucet, having the following features:

1. ANSI/A112.18.1-2005, NSF 61-9
2. Stainless Steel 4" Deck Mount Faucet with 12" Swing Spout with Wrist Handles
3. Stainless Steel construction.

- B. Deck Mount Faucet to be provided by Fisher, Model 53880, or Chicago Faucet or T&S Brass

34.1 Faucet, Deck Mount QUANTITY AS SCHEDULED

- A. Provide a Deck Mount Faucet, having the following features:

Construction Documents

1. ANSI/A112.18.1-2005, NSF 61-9
2. Stainless Steel 4" Deck Mount Faucet with 12" Swing Spout with Wrist Handles
3. Stainless Steel construction.

B. Deck Mount Faucet to be provided by Fisher, Model 53880, or Chicago Faucet or T&S Brass

35.2 Pre-Rinse Faucet, Back Splash Mount QUANTITY AS SCHEDULED

A. Provide a Pre-Rinse Faucet, Back Splash Mount, having the following features:

1. ANSI/A112.18.1M, ANSI/NSF 61.9
2. Standard Spray Valve with Wall Bracket.
3. Stainless Steel seats, seat screws, and handle screws, end fittings, and external jacket.
4. In-line Dual Check Valve
5. ½" NPT Female Elbows
6. Wall Hook
7. 8" C/C Back Splash Mounting
8. 36" Length
9. In-line Vacuum breaker.

B. Pre-Rinse Faucet, Back Splash Mounting to be provided by Fisher, Model 99643, or Chicago Faucet or T&S Brass

36.3 Floor Trough QUANTITY AS SCHEDULED

A. Provide a Floor Trough, having the following features:

1. All TIG welded, all external corners welded and polished to a satin finish.
2. Perimeter flange mounts directly to sub floor.
3. ¾" vertical step design to accommodate floor tile installation.
4. 14-gauge type 304 stainless steel polished stainless-steel grating.
5. Accommodates up to 4" waste pipe.

B. Floor trough to be provided by Advance Tabco, Model FFTG-1272, or Aero Manufacturing or IC Teddy.

37.1 Pre-Rinse Faucet, Back Splash Mount QUANTITY AS SCHEDULED

A. Provide a Pre-Rinse Faucet, Back Splash mount, having the following features:

1. ANSI/A112.18.1M
2. Standard Spray Valve with Wall Bracket.
3. Stainless Steel seats, seat screws, and handle screws, end fittings, and external jacket.
4. In-line Dual Check Valve
5. Elbows
6. Wall Hook
7. 8" C/C Back Splash Mounting
8. 36" Length
9. In-line Vacuum breaker.

B. Pre-Rinse Faucet, Back Splash Mounting to be provided by Fisher, Model 99708, or

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Construction Documents

Chicago Faucet or T&S Brass

38.6 Hand Sink, Wall Mount QUANTITY AS SCHEDULED

- A. Provide wall mounted hand sinks, having the following features:
  - 1. All TIG welded, with welded areas blended to match adjacent surfaces, to a satin finish, and with die formed countertop edge, with a no-drip offset, using one sheet of gauge type 304 series stainless steel – no seams.
  - 2. Sink bowl must be 10” by 14” by 5”
  - 3. Stainless Steel basket
  - 4. Faucet supply is ½” IPS male thread hot and cold.
  - 5. Conforms to NSF 61 Standard 9 and are AB1953 Lead Free Compliant.
  
- B. Wall Mount Hand Sink to be Advance Tabco, Model 7-PS-80, or Aero Manufacturing, or Select Stainless

39.22 Shelving, Max iQ Starter System QUANTITY AS SCHEDULED

- A. Provide a Max Q Shelving Starter System with the following features:
  - 1. NSF Certified.
  - 2. Microban Antimicrobial Protection.
  - 3. 800 lbs. per shelf capacity.
  - 4. Open grid, removable shelf mat.
  - 5. (4) tier model.
  
- B. Shelving to be provided by Metro, Model MQ2460, MQ2472G, MQ21154G, MQ2172G, MQ2448G, MQ2436G, or Nexel or Global Industrial

40.2 32-Gal Container QUANTITY AS SCHEDULED

- A. Provide a 32-gallon container with the following features:
  - 1. NSF Certified.
  - 2. Commercial grade construction.
  - 3. Rounded handles
  - 4. Reinforced base
  - 5. 27.77” by 21.92”
  
- B. Brute Container to be provided by Rubbermaid, Model FG263200GRAY or Uline

Construction Documents

40A.1 32-Gal Container QUANTITY AS SCHEDULED

A. Provide a 32-gallon container with the following features:

1. NSF Certified.
2. Commercial grade construction.
3. Rounded handles
4. Reinforced base
5. 27.77" by 21.92"

B. Brute Container to be provided by Rubbermaid, Model FG263200GRAY or Uline

40B.1 23-Gal Container QUANTITY AS SCHEDULED

A. Provide a 32-gallon container with the following features:

1. NSF Certified
2. Commercial grade construction.
3. Rounded handles.
4. Reinforced Base.
5. 11" by 22"

41.5 Shelving, Modular Wall System QUANTITY AS SCHEDULED

A. Provide a modular shelving wall system with the following features:

1. NSF Certified
2. Zinc finish, sealed with MasterSeal
3. Single or Double Shelf Kits options.
4. Included components are Wall Mats (3" by 3" grids), Vertical Wall Uprights (pair), and Wire Shelf Brackets (pair).

B. Modular Wall Shelving System to be provided by Eagle Group, Model WAL-2-1848, or Advance Tabco or Select Stainless

42.4 Table, Prep with Sink QUANTITY AS SCHEDULED

A. Provide a Prep Table with Sink, having the following features:

1. NSF Certified.
2. All TIG welded, with welded areas blended to match adjacent surfaces, to a satin finish, and with stainless steel gussets welded to a stainless-steel support hat channel, seamless, 16-gauge type 304 stainless steel top, 18-gauge type 430 series shelf.
3. Deck Mounted Faucet Included.
4. 1-5/8" sanitary rolled rim edge on front and square sides, and a 5" splash with a 1" return on the rear side.

B. Prep Table with Sink to be by Advance Tabco, Model KMS-11B-305R, or Aero Manufacturing or Select Stainless.

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Construction Documents

- 43.2 Bin, Ingredient QUANTITY AS SCHEDULED
- A. Provide an Ingredient Bin with the following features:
1. NSF Certified
  2. One-piece, seamless single-wall polyethylene bin construction, FDA accepted material.
  3. Injection molded polycarbonate, transparent lid.
- B. Ingredient Bin to be provided by Cambro, Model IB44148, or Vollrath or Rubbermaid
- 
- 44.1 Table, Work, Back Splash without Undershelf QUANTITY AS SCHEDULED
- A. Provide a Work Table with Back Splash, w/o Undershelf, having the following features:
1. NSF Certified.
  2. All TIG welded, with welded areas blended to match adjacent surfaces, to a satin finish, and with stainless steel gussets welded to a stainless-steel support hat channel, seamless, 14-gauge type 304 stainless steel top.
  3. Top is sound deadened.
  4. 1-5/8" sanitary rolled rim edge on front and square sides, 5" splash, 1" return on rear side.
- B. Work Table with Back Splash to be by Advance Tabco, Model TKSS-304, or Aero Manufacturing or Select Stainless.
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- 45.1 Slicer, Food QUANTITY AS SCHEDULED
- A. Provide a Food Slicer with the following features:
1. UL Listed, NSF Certified.
  2. 1-year parts and service, including knife. Lifetime guarantee on Borazon stones.
  3. Stainless steel carriage, gauge plate and knife cover. Anodized aluminum base.
  4. 12-gauge stainless steel knife cover.
  5. Electrical characteristics as scheduled.
  6. Top mounted Borazon Stone sharpener.
- B. Food Slicer to be provided by Hobart US Foodservice, Model 2812, or Globe or Berkel
- 
- 46.1 Hose Reel with Gun QUANTITY AS SCHEDULED
- A. Provide a Hose Reel with Gun having the following features:
1. Stainless Steel Reel Rinse Exposed with Spray Gun.
  2. 50' Length Hose
  3. Stainless steel construction.
  4. 5/8" High Temperature Hose
  5. 1/2" F NPT or 3/4" F Garden hose inlet.

Construction Documents

6. Spray gun with stainless steel construction with a locking trigger mechanism.

B. Hose Reel with Gun to be provided by T & S Brass, Model B-7142-05, or Chicago Faucet or Fisher

47.1-50.1 Hoods and Components

QUANTITY AS SCHEDULED

Must be provided by same manufacturer.

A. Provide wall type canopy exhaust hood of size, shape and content as shown on detail drawings, having the following features:

1. Left Side Hood, 8' – 6" long exhaust-only wall canopy hood with front perforated supply plenum with built-in 3" back standoff.
2. All exposed surfaces of 18-gauge type 430 Stainless Steel construction.
3. Filter is 20" tall by 16" wide Stainless Steel Capstrate Solo filter with hook, ETL Listed.
4. Canopy Light Fixture – High Temp Assembly. Including clear Thermal and Shock Resistant Globe.
5. Factory installed 14" diameter x 4" height Exhaust Riser.
6. 12" x 28" Supply Riser with Volume Dampers.
7. ½ Pint Grease Cup, flanged slotted.
8. Field Wrapper 17" High Front.
9. Backsplash 80" High x 291" Long, 430 Stainless Steel Vertical, including end caps & divider bars.
10. R end Standoff 1" wide by 54" long, insulated.
11. Left side-splash 80" high by 54" long, 430 Stainless Steel vertical, including end caps & divider bars.
12. Backsplash, inside corner, 80" high by 2" length. 430 Stainless Steel Vertical, including end caps & divider bars.

1. **Right Side Hood, 8' – 6" long exhaust-only wall canopy hood with front perforated supply plenum with built-in 3" back standoff.**
2. All exposed surfaces of 18-gauge type 430 Stainless Steel construction.
3. Filter is 20" tall by 16" wide Stainless Steel Capstrate Solo filter with hook, ETL Listed.
4. Canopy Light Fixture – High Temp Assembly. Including clear Thermal and Shock Resistant Globe.
5. Factory installed 14" diameter x 4" height Exhaust Riser.
6. 12" x 28" Supply Riser with Volume Dampers.
7. ½ Pint Grease Cup, flanged slotted.
8. Field Wrapper 17" High Front.
9. Backsplash 80" High x 291" Long, 430 Stainless Steel Vertical, including end caps & divider bars.
10. Right end Standoff 1" wide by 54" long, insulated.
11. Right side-splash 80" high by 54" long, 430 Stainless Steel vertical, including end caps & divider bars.
12. Backsplash, inside corner, 80" high by 2" length. 430 Stainless Steel Vertical, including end caps & divider bars.

Construction Documents

1. **Right Side Hood, 7' – 0"** long exhaust-only wall canopy hood with front perforated supply plenum with built-in 3" back standoff.
2. All exposed surfaces of 18-gauge type 430 Stainless Steel construction.
3. Filter is 20" tall by 16" wide Stainless Steel Capstrate Solo filter with hook, ETL Listed.
4. Canopy Light Fixture – High Temp Assembly. Including clear Thermal and Shock Resistant Globe.
5. Factory installed 14" diameter x 4" height Exhaust Riser.
6. 8" x 36" Supply Riser with Volume Dampers.
7. ½ Pint Grease Cup, flanged slotted.
8. Field Wrapper 17" High Front.
9. Backsplash 80" High x 104" Long, 430 Stainless Steel Vertical, including end caps & divider bars.
10. Right side-splash 80" high by 54" long, 430 Stainless Steel vertical, including end caps & divider bars.
11. Backsplash, inside corner, 80" high by 2" length. 430 Stainless Steel Vertical, including end caps & divider bars.
12. Fire Cabinet on left side, to be Ansul – 3.0/3.0/1.5 Ansul 7.5-gallon Fire System, piped for Hoods 1, 2, and 3, with a 1-1/2" Mechanical Shutoff Valve, including Upstream Strain assembly, supplied by distributor.
13. Electrical package installation in Utility Cabinet by Plant.

1. **Fan #1 - Belt Drive Centrifugal Up Blast Exhaust Fan with 15.75"** wheel Exhaust Fan handles 1700 CFM @ -0.800" wc ESP, with Fans running at 1080 RPM, and Exhaust Motor with 0.75 HP, 3 Phs, 208 V, 60Hz, 2.5 FLA, and ODP (Open Drip Proof)
2. Grease cup for kitchen-duty centrifugal exhaust fans, with a box dimension of 17-1/8 L by 5-1/6 W by 3-3/4 H, 18 gauge, including down spout.
3. Curb on Fan # 1 3.000: 12.000 Pitch
4. Hinged Base for Curb, with Standard Hinge attached to curb. Used on fans with wheels 20" or smaller, 12 gauge galvanized.
5. Vent base for curb.

1. **Fan #2 - Belt Drive Centrifugal Up Blast Exhaust Fan with 15.75"** wheel Exhaust Fan handles 1700 CFM @ -0.800" wc ESP, with Fans running at 1080 RPM, and Exhaust Motor with 0.75 HP, 3 Phs, 208 V, 60Hz, 2.5 FLA, and ODP (Open Drip Proof)
2. Grease cup for kitchen-duty centrifugal exhaust fans, with a box dimension of 17-1/8 L by 5-1/6 W by 3-3/4 H, 18 gauge, including down spout.
3. Curb on Fan # 2 3.000: 12.000 Pitch
4. Hinged Base for Curb, with Standard Hinge attached to curb. Used on fans with wheels 20" or smaller, 12 gauge galvanized.
5. Vent base for curb.

1. **Direct Fired Heated Make Up Air Unit with 15" Blower Supply Fan** handling 3952 CFM @ 0.600" wc ESP, Fans running at 966 RPM for Hood #1 & Hood #2.



Construction Documents

2. Heater to supply 234749 BTUs. 55°F Temperature Rise. [Fuel: Natural Gas] Supply Motor 3.000 HP, 3 Phase, 208 V, 60Hz, 8.7 FLA, ODP (Open Drip Proof). Down Discharge – Air Flow Right -> Left
3. Sloped Filter Intake for Size #2 Standard Untampered Make-Up Air Unit with 12” blower wheel. 26.75” Wide by 29.25” Long by 31.5” High, Including 2” MV EZ Kleen Metal Mesh Filters.
4. RTC Solutions – 40\*-90°F Discharge Temp Control.
5. Gas Manifold
6. Motorized Back Draft Damper 22.75” by 24” for Size 2 Standard & Modular Direct Fired Heaters with Extended Shaft, Standard Galvanized Construction, ¾” Rear Flange, including actuator.
7. Cooling Interlock Relay that locks out burner circuit when AC is energized.
8. Low Fire Start.
9. Hood #1 and Hood #2 Curb insulated on Fan #3 3.000:12.000 Pitch
10. Curb Corner Fully Welded with base flange corners fully welded by factory.

1. **Fan #5 - Belt Drive Centrifugal Up Blast Exhaust Fan with 15.75”** wheel Exhaust Fan handles 1400 CFM @ -0.750” wc ESP, with Fans running at 1000 RPM, and Exhaust Motor with 0.50 HP, 3 Phs, 208 V, 60Hz, 1.9 FLA, and ODP (Open Drip Proof)
2. Grease cup for kitchen-duty centrifugal exhaust fans, with a box dimension of 17-1/8 L by 5-1/6 W by 3-3/4 H, 18 gauge, including down spout.
3. Hood #2 Curb on Fan # 5 3.000: 12.000 Pitch
4. Hinged Base for Curb, with Standard Hinge attached to curb. Used on fans with wheels 20” or smaller, 12 gauge galvanized.
5. Vent base for curb.

1. **Fan #6 – (Pant Leg fan) High Speed Direct Drive Centrifugal Up Blast Exhaust Fan** with speed control, disconnect switch and 11-3/4” wheel. Exhaust Fan handles 1000 CFM @ -0.500” wc ESP, with Fans running at 1558 RPM, and Exhaust Motor with 0.333 HP, 1 Phs, 208 V, 60Hz, 1.9 FLA, and ODP (Open Drip Proof)
2. Bird Screen – ½” by ½” (5” by 56”) Wire Screen for Up blast & Down blast Fans.
3. Pant leg fan Curb on Fan #6 Flat Curb.

- B. Exhaust Hoods, Components, and Ducts to be manufactured by Captive Aire, Models 5424ND-2-PSPF, 5424ND-2-PSP-F, 5424ND-2-PSP-F, Ansul-3.0/3.0/1.5, NCA14FA, NCA14FA, A2-D.250-G15, NCA14FA, DU33HFA, SC-331110FP, Ventilation Direct, or Larkin.

51.1 Deleted

52.1 Deleted

Construction Documents

53.1 Kettle, Steam Jacketed, Gas, Tilt QUANTITY AS SCHEDULED

A. Provide a Steam Jacketed Tilt Kettle with the following features:

1. NSF Certified
2. One-year limited parts and labor warranty, with the second year extended limited parts and labor warranty option.
3. Gas self-contained, stainless steel, 2/3 jacketed floor mounted tilting steam kettle.
4. Embossed gallon/liter markings.
5. Stainless steel enclosure for “water resistant” controls, self-locking tilt mechanism and faucet bracket.
6. Tubular stainless-steel legs with flanged feet.
7. 40 Gallon true working capacity.
8. 100,000 BTU/hr.
9. Spring assist hinged stainless steel cover with condensate ring and drop-down lift handle accessory.

B. Steam Jacketed Tilt Kettle to be manufactured by Vulcan, Model K40GLT, Cleveland or Groen.

54.1 Range, Restaurant, Gas QUANTITY AS SCHEDULED

A. Provide a gas Restaurant Range, having the following features:

1. NSF Certified.
2. 6 Burner configurations, combining (3) standard 33K burners in the rear with (3) standard 33K burners in the front.
3. Natural Gas
4. One-year parts and labor warranty.
5. 45,000 BTU Nat oven with standing pilot and thermostat range of 175 degrees to 550 degrees F.
6. Standing pilot for open top burners.
7. Electrical characteristics as scheduled.
8. Factory installed Regulator.
9. Stainless steel front, sides and shelf.

B. Restaurant Range to be provided by Southbend, Model 4361D, or Wolf or Vulcan

55.1 Filler, Kettle with Pot QUANTITY AS SCHEDULED

A. Provide a Pot Filler, Hose Style, Deck Mount with the following features:

1. ANSI/A112.18.1M
2. 3/6” Supply line, with in-line dual check valve.
3. Stainless Steel seats, seat screws, and handle screws, with atmospheric vacuum breaker.

B. Pot Filler to be provided by Fisher, Model 2040, or Chicago Faucet or T&S Brass

Construction Documents

56.1 Convection Oven, Double QUANTITY AS SCHEDULED

A. Provide a Double Deck Convection Oven, having the following features:

1. NSF and ETL listed.
2. Three year parts and two year labor warranty, and a five year limited oven door warranty.
3. Full-Size Standard Depth
4. Stainless steel front, top, and sides.
5. Dual pane thermal glass windows encased in stainless-steel door frames.
6. Triple-mounted pressure lock door design with turnbuckle assembly.
7. Solid mineral fiber insulation at top, back, sides and bottom.
8. Dual Flow gas system for direct and indirect heat.
9. Pressure regulator.
10. Solid state thermostat with temperature control range of 200 degrees to 500 degrees F.
11. 110,000 BTU/hr

B. Double Convection Oven to be provided by Blodgett Oven Company, Model DFG100 Double, or Southbend or Vulcan

57A.1 Fryer, Deep fat, Gas with Filter QUANTITY AS SCHEDULED

A. Provide a Deep Fat Gas Fryer, having the following features:

1. NSF Listed.
2. 105,000 BTU Natural Gas
3. 75lb oil capacity.
4. Stainless steel construction. Heavy-duty stainless-steel fry pot with 10yr tank warranty.
5. Energy Star rated.
6. Electrical characteristics as scheduled.
7. Built in filtration with over-the-top return.
8. (4) heavy-duty casters, 2 locking.
9. 12" Splash guard option for left side (*noted as L on Model Number*)
10. 1 Full Basket
11. 2 Half baskets
12. Direct connect shortening disposal.
13. Shortening shuttle.

B. Deep Fat Fryer, Gas to be provided by Pitco, Model 7-SF-SSH75L, or Dean or Henny Penny

Construction Documents

57B.1 Fryer, Deep fat, Gas with Filter QUANTITY AS SCHEDULED

A. Provide a Deep Fat Gas Fryer, having the following features:

14. NSF Listed.
15. 105,000 BTU Natural Gas
16. 75lb oil capacity.
17. Stainless steel construction. Heavy-duty stainless-steel fry pot with 10yr tank warranty.
18. Energy Star rated.
19. Electrical characteristics as scheduled.
20. Built in filtration with over-the-top return.
21. (4) heavy-duty casters, 2 locking.
22. 12" Splash guard option for left side (*noted as R on Model Number*)
23. 1 Full Basket
24. 2 Half baskets
25. Direct connect shortening disposal.
26. Shortening shuttle.

B. Deep Fat Fryer, Gas to be provided by Pitco, Model 7-SF-SSH75R, or Dean or Henny Penny

*Note: R on Model number notates the side for the splash guard, not the high BTU model.*

58.2 Tilt Skillet QUANTITY AS SCHEDULED

A. Provide a Tilt Skillet, having the following features:

1. NSF Certified
2. Natural Gas, 100,000 BTU, 3/4" Supply pipe.
3. 10-gauge stainless steel with a #4 finish exterior and polished interior.
4. 5/8" thick stainless-steel clad cooking plate.
5. Enclosed with #4 finish type 304 stainless steel with removable side panels and two stainless steel front cabinet doors.
6. Etched gallon markings.
7. Electrical characteristics as scheduled.

B. Tilt Skillet to be provided by Southbend, Model BGMST-40, or Cleveland or Blodgett

59.3 Floor Trough QUANTITY AS SCHEDULED

A. Provide a Floor Trough, having the following features:

1. All TIG welded, all external corners welded and polished to a satin finish.
2. Perimeter flange mounts directly to sub floor.
3. 3/4" vertical step design to accommodate floor tile installation.
4. 14-gauge type 304 stainless steel polished stainless-steel grating.
5. Accommodates up to 4" waste pipe.

## Construction Documents

- B. Floor trough to be provided by Advance Tabco, Model FFTG-1224, or Aero Manufacturing or Select Stainless.
- 60.1 Supply Fan, Roof Top - Refer to 47.1-50.1 Hoods and Components
- 61.2 Exhaust Fan, Roof Top – Refer to 47.1-50.1 Hoods and Components
- 62.2 Refrigerator, Undercounter QUANTITY AS SCHEDULED
- A. Provide a roll in/undercounter refrigerator having the following features:
1. Three-year warranty on all parts and an additional 2-year warranty on compressor.
  2. 134A refrigerant, NSF-7 compliant.
  3. Stainless steel door, front & sides exterior with stainless steel side walls, back, floor, door liner & ceiling interior.
  4. Electrical characteristics as scheduled.
  5. Exterior digital temperature with either \*F or \*C.
  6. Top mounted refrigeration system with evaporator positioned out of food zone.
  7. Positive seal self-closing door with 120\* stay open feature.
  8. Magnetic door gasket of one-piece construction.
- B. Refrigerator, Roll-Thru to be manufactured by True Refrigeration, Model TUC-72 or STR2RRT-2S-2S, Traulsen, or Victory.
- 63.2 Table, Enclosed Base, Open Front QUANTITY AS SCHEDULED
- A. Provide an Open Front, Enclosed Base Table, having the following features:
1. NSF Certified
  2. Top is 14-gauge stainless steel type 304 series with galvanized understructure. Body is 18-gauge stainless steel type 430 series. Legs are stainless steel, including 1-1/2” adjustable foot, with 5” Heavy Duty Polyurethane Casters, with brakes.
  3. All TIG welded, with Entire top polished to a satin finish, and sound deadened.
- B. Enclosed base, open front table to be Advanced Tabco, Model EB-SS-366M, or Aero Manufacturing or Select Stainless.
- 64.2 Over shelf, Table mount QUANTITY AS SCHEDULED
- A. Provide a Table Mounted Over shelf having the following features:
1. NSF Certified.
  2. Double deck over shelf 12” x 72”
  3. All TIG welded, 16-gauge 304 stainless upgrade option, polished to a satin finish.
- B. Table Mount Over shelf to be by Advance Tabco, Model OTS-12-72 (TA-99), or Aero Manufacturing or Select Stainless.
- 65.1 Can Opener QUANTITY AS SCHEDULED
- A. Provide a can opener with the following features:

Construction Documents

1. NSF Certified
2. Stainless Steel under clamp model or permanent model options.
3. Stainless steel and aluminum nickel-plated components.

B. Can Opener to be provided by Nemco Food Equipment, Model 56050-1, or Edlund or Browne

66.3 Rack, Pan QUANTITY AS SCHEDULED

A. Provide a Pan Rack, having the following features:

1. NSF Certified.
2. 18-gauge type 304 stainless steel.
3. Mobile multi-purpose rack, able to hold 18" by 26", 18" by 13", and 17" by 25" pans and fry screens.
4. Tray slide are 1" by 1-1/2" extruded aluminum angle heli-arc welded to frame. Bottom load ledge design.
5. 5" standard swivel non-marking casters.

B. Pan Rack to be provided by Channel Manufacturing, Model 401S, or Aero or Select Stainless

67.1 Deleted

68.1 Deleted

69A/B.1 Ice Maker and Bin QUANTITY AS SCHEDULED

A. Provide an Ice Maker with the following features:

1. UL Listed, NSF Certified
2. 3-year parts and labor warranty on Ice Maker, 5-year parts and labor on Evaporator, 5-year part warranty on Compressor.
3. Electrical characteristics as scheduled.
4. R-404A CFC-free Refrigerant.
5. 1,196 lbs per day ice production capacity.
6. 710lb hold capacity.
7. Easy read display.
8. Hinged front door swings out for easy access. Removable water-trough, distribution tube, curtain, and sensing probes for fast and efficient cleaning. Select components made with AlphaSan® antimicrobial.
9. DuraTech Exterior. Stainless finish with clear coat.

B. Ice Maker with Bin to be provided by Manitowoc, Model IDT1200A / D-970, or Hoshizaki or Scottsman

70.1 Deleted

71.1 Table, Work, Back Splash without Undershelf QUANTITY AS SCHEDULED

Construction Documents

- A. Provide a Work Table with Back Splash, w/o Undershef, having the following features:
  - 1. NSF Certified.
  - 2. All TIG welded, with welded areas blended to match adjacent surfaces, to a satin finish, and with stainless steel gussets welded to a stainless-steel support hat channel, seamless, 14-gauge type 304 stainless steel top.
  - 3. Top is sound deadened.
  - 4. 1-5/8" sanitary rolled rim edge on front and square sides, 5" splash, 1" return on rear side.
- B. Work Table with Back Splash to be by Advance Tabco, Model TKSS-304, or Aero Manufacturing or Select Stainless.

72.1 Shelving, Modular Wall System QUANTITY AS SCHEDULED

- A. Provide a modular shelving wall system with the following features:
  - 5. NSF Certified
  - 6. Zinc finish, sealed with MasterSeal
  - 7. Single or Double Shelf Kits options.
  - 8. Included components are Wall Mats (3" by 3" grids), Vertical Wall Uprights (pair), and Wire Shelf Brackets (pair).
- B. Modular Wall Shelving System to be provided by Eagle Group, Model WAL-2-1848, or Advance Tabco or Select Stainless

73.1 Freezer, Reach-In QUANTITY AS SCHEDULED

- A. Provide a Reach-In Freezer, having the following features:
  - 1. Three-year warranty on all parts and an additional 2-year warranty on compressor.
  - 2. Lifetime guaranteed heavy duty all metal working spec door handle and bolt style door locks.
  - 3. R404A refrigerant, NSF compliant.
  - 4. Electrical characteristics as scheduled.
  - 5. Stainless steel front, countertop, & sides. Interior stainless-steel liner and floor with covered corners.
  - 6. Exterior digital temperature display.
  - 7. Foamed in door and panels using Ecomate (zero ODP and zero GWP).
  - 8. Incandescent interior lighting – safety shielded.
- B. Reach-In Freezer to be by True, Model T-23F, or Traulsen, or Victory.

74.1 Refrigerator, Reach-In QUANTITY AS SCHEDULED

- A. Provide a Reach-In Refrigerator, having the following features:
  - 1. Three-year warranty on all parts and an additional 2-year warranty on compressor.
  - 2. Lifetime guaranteed heavy duty all metal working spec door handle and bolt style door locks.
  - 3. 134A refrigerant, NSF compliant.
  - 4. Electrical characteristics as scheduled.

Construction Documents

5. Stainless steel front, countertop, & sides. Interior stainless-steel liner and floor with covered corners.
6. Exterior digital temperature display.
7. Foamed in door and panels using Ecomate (zero ODP and zero GWP).
8. Incandescent interior lighting, safety shielded.

B. Reach-In Refrigerator to be by True, Model T-49, Traulsen, or Victory.

75A.1 Pass-Thru Heated Cabinet QUANTITY AS SCHEDULED

A. Provide a Pass-Thru Heated Cabinet, having the following features:

1. Three-year warranty on all parts and an additional 2-year warranty on compressor.
2. Foamed in door and panels using Ecomate (zero ODP and zero GWP).
3. NSF-4 compliant.
4. Stainless steel door, front & sides exterior with stainless steel side walls, back, floor, door liner & ceiling interior.
5. Electrical characteristics as scheduled.
6. Interior holding temperature of 140°F to 180°F, with heating system controlled by exterior on/off switch, and electronic temperature control.
7. Manually controlled cent located on top of the cabinet.
8. Positive seal self-closing door with 120\* stay open feature.
9. Magnetic door gasket of one-piece construction.

B. Pass-Thru Heated Cabinet to be by True, Model STR2HPT-2S-2S, Traulsen, or Victory.

75B.1 Pass-Thru Heated Cabinet QUANTITY AS SCHEDULED

A. Provide a Pass-Thru Heated Cabinet, having the following features:

1. Three-year warranty on all parts and an additional 2-year warranty on compressor.
2. Foamed in door and panels using Ecomate (zero ODP and zero GWP).
3. NSF-4 compliant.
4. Stainless steel door, front & sides exterior with stainless steel side walls, back, floor, door liner & ceiling interior.
5. Electrical characteristics as scheduled.
6. Interior holding temperature of 140°F to 180°F, with heating system controlled by exterior on/off switch, and electronic temperature control.
7. Manually controlled cent located on top of the cabinet.
8. Positive seal self-closing door with 120\* stay open feature.
9. Magnetic door gasket of one-piece construction.

B. Pass-Thru Heated Cabinet to be by True, Model STR1HPT-1S-1S, Traulsen, or Victory.



Construction Documents

76.1 Pass-Thru Refrigerator QUANTITY AS SCHEDULED

A. Provide a Pass-Thru Refrigerator, having the following features:

9. Three-year warranty on all parts and an additional 2-year warranty on compressor.
10. Lifetime guaranteed heavy duty all metal working spec door handle and bolt style door locks.
11. 134A refrigerant, NSF compliant.
12. Electrical characteristics as scheduled.
13. Stainless steel front, countertop, & sides. Interior stainless-steel liner and floor with covered corners.
14. Exterior digital temperature display.
15. LED interior lighting, safety shielded.
16. Foamed in door and panels using Ecomate (zero ODP and zero GWP).

B. Pass-Thru Refrigerator to be by True, Model STR1RPT-1S-1S, Traulsen, or Victory.

77.1 Staff Lockers QUANTITY AS SCHEDULED

A. Provide Staff Lockers, having the following features:

1. Steel hasp assembly
2. Louvers for ventilation
3. Name/Number plate

B. Staff lockers to be provided by Salsbury Industries

78.1 Deleted

79.5 Shelving, Max iQ Starter System QUANTITY AS SCHEDULED

A. Provide a Max Q Shelving Starter System with the following features:

1. NSF Certified.
2. Microban Antimicrobial Protection.
3. 800 lbs. per shelf capacity.
4. Open grid, removable shelf mat.
5. (4) tier model.

B. Shelving to be provided by Metro, Model MQ2460, MQ2472G, MQ21154G, MQ2172G, MQ2448G, MQ2436G, or Nexel or Global Industrial

80.1 Deleted

Construction Documents

81.1 Water Filtration System QUANTITY AS SCHEDULED

- A. Provide a Water Filtration System with the following features:
  - 1. NSF Certified
  - 2. 1-year carbon lifespan
  - 3. Cold water inlet
  - 4. 13 gal per min peak capacity.
  - 5. 3/4" MNPT Inlet
- B. Water Filtration System to be provided by Antunes, Model VZN-441HC-T5 (9700773), or Cuno or Evepure

82.10 Shelving, Max iQ Starter System QUANTITY AS SCHEDULED

- A. Provide a Max Q Shelving Starter System with the following features:
  - 6. NSF Certified.
  - 7. Microban Antimicrobial Protection.
  - 8. 800 lbs. per shelf capacity.
  - 9. Open grid, removable shelf mat.
  - 10. (4) tier model.
- B. Shelving to be provided by Metro, Model MQ2460, or Nexel or Global Industrial

83.5 Shelving, Max iQ Starter System QUANTITY AS SCHEDULED

- A. Provide a Max Q Shelving Starter System with the following features:
  - 11. NSF Certified.
  - 12. Microban Antimicrobial Protection.
  - 13. 800 lbs. per shelf capacity.
  - 14. Open grid, removable shelf mat.
  - 15. (4) tier model.
- B. Shelving to be provided by Metro, Model MQ2472, or Nexel or Global Industrial

84.1 Shelving, Max iQ Starter System QUANTITY AS SCHEDULED

- A. Provide a Max Q Shelving Starter System with the following features:
  - 16. NSF Certified.
  - 17. Microban Antimicrobial Protection.
  - 18. 800 lbs. per shelf capacity.
  - 19. Open grid, removable shelf mat.
  - 20. (4) tier model.
- B. Shelving to be provided by Metro, Model MQ2448, or Nexel or Global Industrial

Construction Documents

85.1 Cart, Utility

QUANTITY AS SCHEDULED

C. Provide Polymer Utility Cart with the following features:

- 21. NSF Certified.
- 22. Microban Antimicrobial Protection.
- 23. 150 lbs. per shelf capacity.
- 24. Deep ledge to contain spills
- 25. (3) tier model.

D. Utility Cart to be provided by Metro, Model BC2336-24G, or Rubbermaid or Luxor

END OF SECTION 000000



The Healing Place of New Hanover County

Item	MfrName	Model	Category	Page
1	BSI	1 xCUSTOM	TRAY & SILVER	4
2	BSI	1 xDECO-259-N	CAFETERIA, BUFFET SHIELD	6
3	Hatco	3 xHCWBI-4DA	Drop-In, Hot/Cold Wells	10
4	BSI	1 xDECO-302-N	CAFETERIA, BUFFET SHIELD	12
5	BSI	1 x25'-8" CUSTOM	TRAY w. SILVER	16
6	ATLAS METAL INDUSTRIES	3 xPDS-8 1/8 MODULAR	DROP-IN, DISH DISPENSERS,	18
7	BSI	1 xDECO- 106-N	CAFETERIA, BUFFET SHIELD	20
7	BSI	1 xDECO- 106-N	CAFETERIA, BUFFET SHIELD	24
8	Hatco	1 xHCWBI-4DA	Drop-In, Hot/Cold Wells	25
9	TAFCO	1 x35'-8" X 14'-10"	INDOOR COMB REFR/FREEZER,	27
10	SERVEND	1 xSV-150	DISPENSER, ICE/BEVERAGE	30
11	Hoshizaki America	1 xDCM-500BAH-OS	Ice Maker/Dispenser	32
12	ADVANCE TABCO	10 xFDR-1212	FLOOR DRAIN	34
13	SILVER KING	1 xSKMAJ2	DISPENSER, MILK	36
14	FETCO	1 xTBS-2121XTS	ICED TEA BREWER	40
15	FETCO	1 xCBS-52H-20	COFFEE MAKER, INSULATED SERVER,	44
16	FETCO	1 xGR 1.2	COFFEE GRINDER	46
17	APW WYOTT	1 xW4-2	WARMER, FOOD, ELECTRIC	48
18	STAR MANUFACTURING	1 xQCSE2-600H	TOASTER, CONVEYOR	50
19	ADVANCE TABCO	1 xMS-18-24	SHELF, MICROWAVE	52
20	PANASONIC	2 xNE-1054	OVEN, MICROWAVE	53
21	BSI	1 x96-BT-EB	BEVERAGE COUNTER	54
22	DORMONT MANUFACTURING	1 xBRWMAX-S2S	WATER FILTRATION SYSTEM, COFFEE	56
23	BSI	1 x74-SP-EP BREWER FILTRATION	FLAT TOP	58
24	FISHER	1 x8253	FAUCET, SERVICE SINK	60
25	EAGLE GROUP/METAL	1 x321561	MOP HOLDER	61
26	ADVANCE TABCO	1 xFDR-1212	FLOOR DRAIN	63
27	Advance Tabco	1 xPS-18-120	Pot Rack, Wall Mount	65
28	MARS AIR DOORS	1 xEP296-2U*	AIR CURTAIN, UNHEATED	67
29	Advance Tabco	1 xDTS-D60-96R	Dishtable, 'L' Shape, 16 gauge	69
30	ADVANCE TABCO	1 xDTA-79	DISHTABLE, SORTING SHELF	71
31	Champion Industries	1 xDH2000	Warewasher, Door Type, High Temp	73
32	Advance Tabco	1 xDTC-G60-72L	Dishtable, 'L' Shape, 16 gauge	75
33	Advance Tabco	1 xFC-3-2424-24RL	Sink, NSF, 3 comp, 16 gauge	77
34	FISHER	1 x53880	FAUCET, DECK MOUNT	79
34	FISHER	1 x53880	FAUCET, DECK MOUNT	80

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Item	MfrName	Model	Category	Page
35	FISHER	2 x99643	PRE-RINSE FAUCET, BACKSPLASH	81
36	ADVANCE TABCO	3 xFFTG-1272	FLOOR TROUGH	82
37	FISHER	1 x99708	PRE-RINSE FAUCET, BACKSPLASH	84
38	ADVANCE TABCO	5 x7-PS-80	HAND SINK, WALL MOUNT	85
39	METRO	5 xMQ2472G	SHELVING, MAX IQ STARTER SYSTEM	87
40	RUBBERMAID	2 xE2632	32 GAL CONTAINER	89
41	EAGLE GROUP/METAL	4 xWAL-2-1848	SHELVING, MODULAR WALL SYSTEM	101
42	ADVANCE TABCO	3 xKMS-11B-305R	TABLE, PREP W/ SINK	103
43	CAMBRO	2 xIB44148	BIN, INGREDIENT	105
44	ADVANCE TABCO	1 xTKSS-304	TABLE, WORK, 14 GAUGE, BACK	107
45	HOBART US FOODSERVICE	1 x2812	SLICER, FOOD	109
46	Fisher	1 x29262	Hose Reel with Gun	113
47	CAPTIVE AIRE	1 xTBD	HOOD, EXHAUST #1	114
48	CAPTIVE AIRE	1 xTBD	HOOD, EXHAUST #2	116
49	CAPTIVE AIRE	1 xTBD	MCC STARTERS	118
50	CAPTIVE AIRE	1 xTBD	ANSOL FIRE SYSTEM	119
51	Angelo Po America	1 xTBFXA610	Stand, Equipment	120
52	Angelo Po America	1 xFX101G3	Oven-Steamer, Combination, Boilerless,	122
53	CARTER-HOFFMAN	1 xCH1600U	OVEN, SLOW COOK/HOLD	125
54	SOUTHBEND	1 x4725AA-3C (R)	RANGE, RESTAURANT, GAS	127
55	FISHER	2 x2040	FILLER, KETTLE & POT	129
56	ACCUTEMP PRODUCTS	1 xPGF1201A4800-S2	GRIDDLE, GAS W/ STAND	130
57	HENNY PENNY	1 xOFG341.0	FRYER, DEEP FAT, GAS W/FILTER	132
58	SOUTHBEND	1 xBGMTS-40	TILT SKILLET	134
59	ADVANCE TABCO	1 xFFTG-1248	FLOOR TROUGH	136
60	CAPTIVE AIRE	1 xTBD	SUPPLY FAN, ROOF TOP	138
61	CAPTIVE AIRE	1 xTBD	EXHAUST FAN, ROOF TOP	139
61	CAPTIVE AIRE	1 xTBD	EXHAUST FAN, ROOF TOP	140
62	True Manufacturing Co., Inc.	2 xTUC-72	Refrigerator, Undercounter	148
63	Advance Tabco	2 xEB-SS-306M	Table, Enclosed Base, Open Front	150
64	ADVANCE TABCO	2 xOTS-12-72	OVERSHELF, TABLE MOUNT	152
65	NEMCO FOOD EQUIPMENT	1 x56050-1	CAN OPENER	154
66	CHANNEL MANUFACTURING	3 x401S	RACK, PAN	156
67	JOHN BOOS & CO.	1 xBT3S02	TABLE, BAKER'S W/SPLASH	157
68	HOBART US FOODSERVICE	1 xHL600-2STDDEL	MIXER, FLOOR	159
69	Manitowoc Ice	1 xIRT0500A-161	Ice Maker w/ Bin	163

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Item	MfrName	Model	Category	Page
70	WATERSPEC FILTER SYSTEMS	1 xIS-10 TWIN	WATER FILTRATION SYSTEM, ICE	165
71	ADVANCE TABCO	1 xTKSS-304	TABLE, WORK, 14 GAUGE, BACK	166
72	EAGLE GROUP/METAL	1 xWAL-2-1848	SHELVING, MODULAR WALL SYSTEM	168
73	ANGELO PRO AMERICA	1 xBC51MU	CHILLER, BLAST	170
74	True Manufacturing Co., Inc.	1 xT-49F	Freezer, Reach-In	172
75	True Manufacturing Co., Inc.	1 xT-49	Refrigerator, Reach-In	174
76	Hatco	1 xPMG-100	Warewasher, Final Rinse Booster, Gas	176
77	AO SMITH	1 xBTR-400 A	WATER HEATER,, GAS	178
78	Metro	1 xC589-FC	Cabinet, Holding/Proofing	182
79	METRO	5 xMQ2472G	SHELVING, MAX IQ STARTER SYSTEM	184
80	METRO	1 xTTS10NA	SHELVING, HIGH DENSITY TRACK KIT	186
81	Metro	3 xEZ1860NK3-4	Shelving Unit, Starter, Metal, Wire	190
82	Metro	1 xEZ1848NC-4	Shelving Unit, Starter, Metal, Wire	192
83	Salsbury	1 xTBD	STAFF LOCKERS	194

MSHCG

**GENERAL INFORMATION**

Project Name: \_\_\_\_\_  
 Item: \_\_\_\_\_  
 Quantity: \_\_\_\_\_  
 Model: \_\_\_\_\_  
 Length: \_\_\_\_\_

**DESCRIPTION**

Economical and adaptive, Millwork Construction has all the flexibility of Unibody and Contoura for situations where no stainless steel is required.

**GENERAL SPECIFICATION**

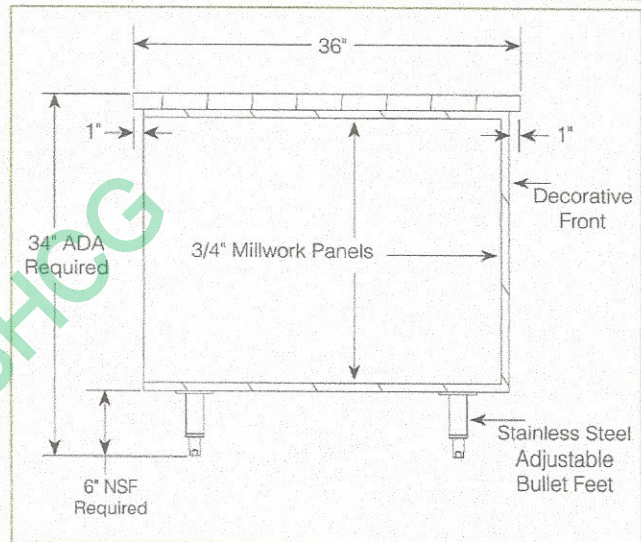
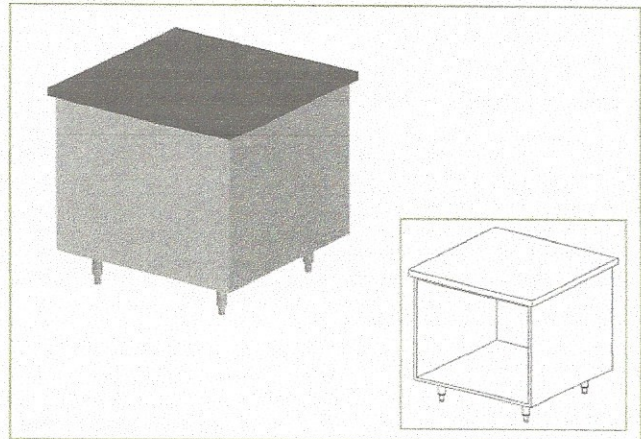
- 3/4" Millwork Panels
- 34" Overall Height (ADA Requires Optional Tray Rest)
- Stainless Steel Adjustable Bullet Feet
- Adjustable, Removable or Fixed Shelves

**ADDITIONAL OPTIONS**

- Casters

**CUSTOM CONSTRUCTION**

*Millwork Construction*



**For Custom Decorative Details see the following detail pages:**

- Tray Slide Options
- Millwork Counter Tops
- Exterior Panel Options

**\* Approval Drawings Required**

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 Specifications subject to change without notice.



Basic frame construction is NSF Certified and UL Listed. The use of different construction materials may affect these certifications.

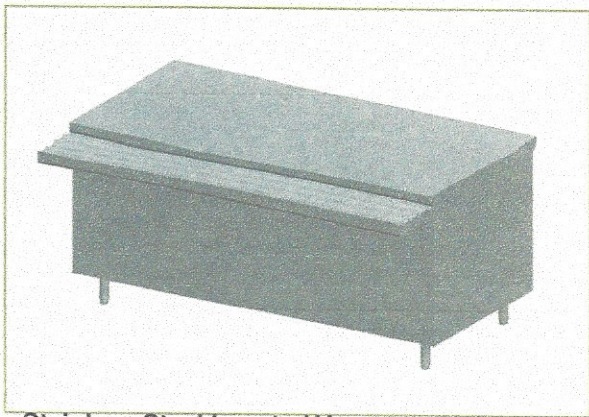


Rv. 5

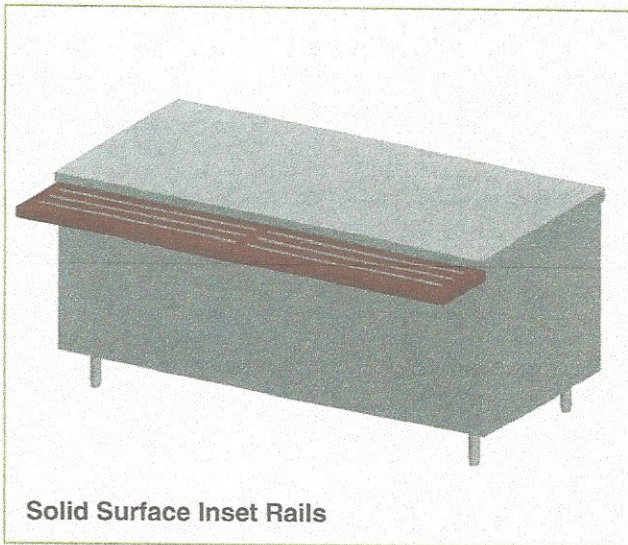


**TRAY SLIDE OPTIONS**

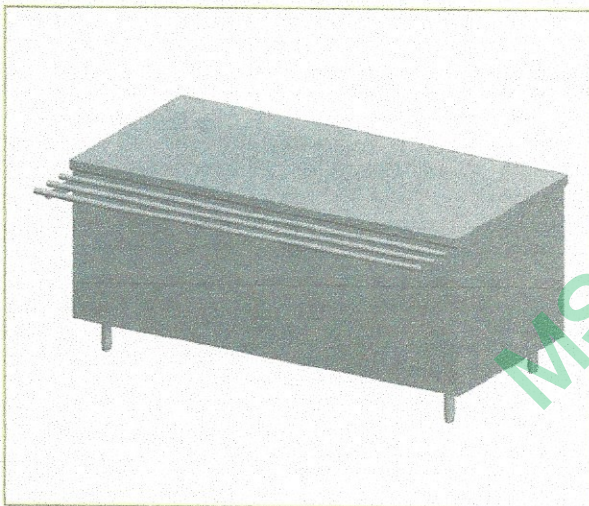
All BSI counter constructions can adapt all available tray slide options. Below are the five standard tray slides.



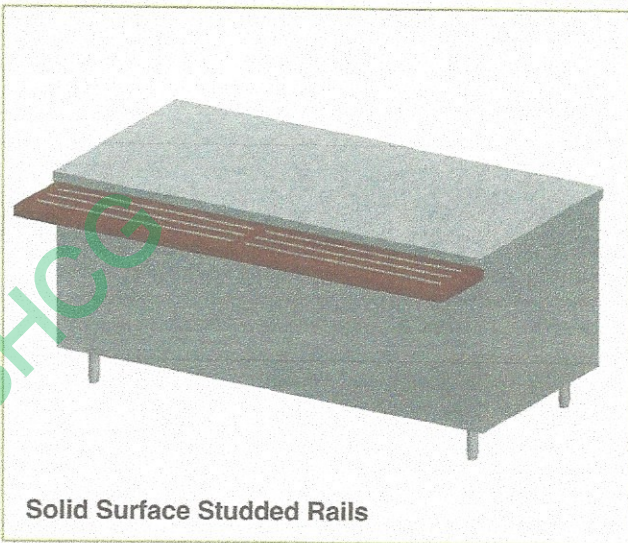
**Stainless Steel Inverted V**



**Solid Surface Inset Rails**



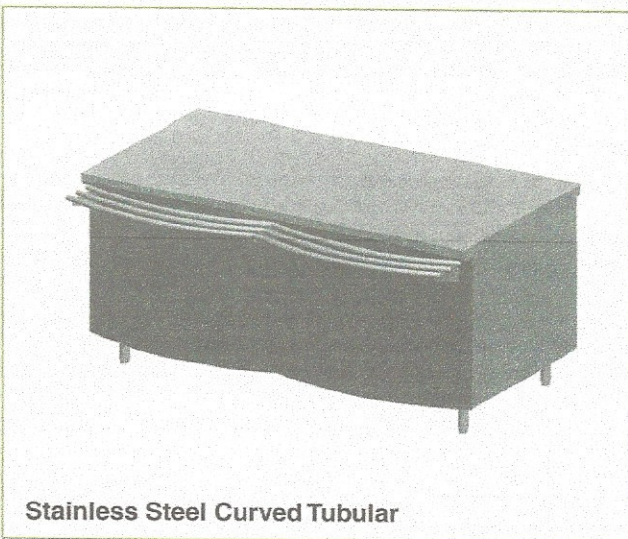
**Stainless Steel Tubular**



**Solid Surface Studded Rails**

**OPTIONS**

- Stainless Steel Inverted V
- Stainless Steel Tubular
- Solid Surface Inset Rails
- Solid Surface Studded Rails
- Stainless Steel Curved Tubular
- Other \_\_\_\_\_



**Stainless Steel Curved Tubular**

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Rv. 5

**GENERAL INFORMATION**

**Project Name:** \_\_\_\_\_  
**Item:** \_\_\_\_\_  
**Quantity:** \_\_\_\_\_  
**Model:** ZG9930  
**Length:** \_\_\_\_\_

**STANDARD NSF LISTED FINISH OPTIONS**

- Brushed Aluminum/SS
- Chrome/SS
- Gloss Black
- Wrinkle Black
- Smoked Copper
- Polished Brass Finish
- Other \_\_\_\_\_

**LIGHT AND WARMER OPTIONS**

- Linear T-5 Fluorescent Unit
- BSI Stealth™ Linear Heat Only Unit
- BSI Stealth™ Linear Heat and Light Combo Unit
- BSI Stealth™ Linear Double Heat and Light Combo Unit
- Hatco® Brand Heat Only Unit
- Hatco® Brand Heat and Light Combo Unit
- Other \_\_\_\_\_

**GLASS OPTIONS**

- 1" Radius Corner (standard)
- Square Corners
- 1/4" Tempered Glass (not for shelves)  
Centerline Max 54"
- 3/8" Tempered Glass (for shelf or span more than 54")  
Centerline Max 66"

**INSTALLATION OPTIONS**

**Above-Counter:** Stainless Steel Counter  
**Under-Counter:** Stainless Steel Counter  
 (Requires Under-Counter Reinforcement & Access)

**Above-Counter:** Millwork Counter

**Under-Counter:** Millwork Counter

See Installation Page for More Details.

**\* Approval Drawings Required**

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 Specifications subject to change without notice.

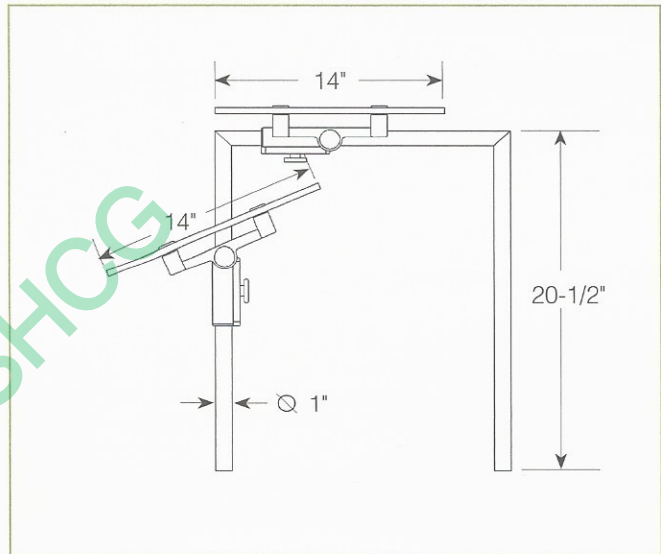


ZGuards can be provided with a UL Listed-light or warmer.

**ZG9930**  
 Single-Sided w/Top Shelf



Shown without end panels.



To meet NSF guidelines, end panels are included on all BSI quotations unless specifically excluded. (See End Panel Page for More Details.)

- SS1: EZ Mount 2" x 8" Flange
- SSU3-H: Heavy-Duty Flange
- SSU3-N: Narrow Flange
- SSU5-H: Heavy-Duty Flange
- SSU5-N: Narrow Flange
- MW1: Heavy-Duty Flange
- MW2: Narrow Flange
- MWU3: Narrow Flange
- MWU4: Compression Installation (not recommended for solid surfaces)
- MWU5: Heavy-Duty Flange

Patent Number 6,588,863 Rv. 5



**2580**

*Fluorescent Slimline™ Light*

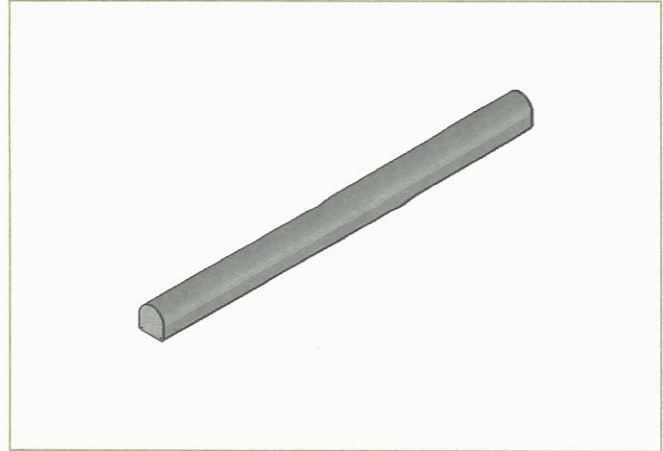
**GENERAL INFORMATION**

**Project Name:** \_\_\_\_\_  
**Item:** \_\_\_\_\_  
**Quantity:** \_\_\_\_\_  
**Model:** 2580 \_\_\_\_\_  
**Length:** \_\_\_\_\_

**DESCRIPTION**

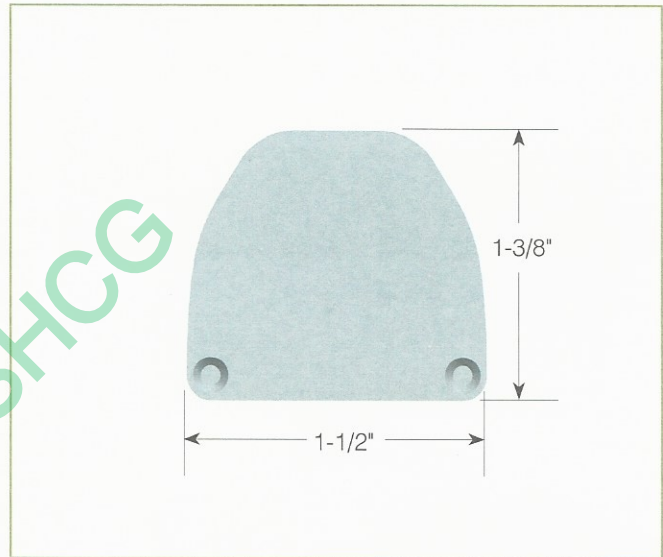
The Slimline™ light is manufactured by BSI, LLC. The light shall consist of an aluminum housing and an inner aluminum holder/reflector.

The light shall include a remote on/off switch and a remote ballast in an enclosure. The light shall be factory-assembled ready for electrical installation.



**GENERAL SPECIFICATION**

Ballast Information	
Operating Voltage:	120 VAC
Frequency:	50/60 HZ
ATHD:	Meets ANSI C82.11-1993
Protection/Output:	Open Lamp Shortened Lamp
Protection/Overcurrent:	Fuse
Protection/Voltage Transients:	MOV (PER ANSI C82.11-1993)
Open Circuit Voltage:	600 V RMS Max
Lamp Starting Mode:	Instant Start



Lamp Amps	
HOUSING LENGTH	MAX. AMPS
All Lengths	0.55
Minimum Housing is 24"	
Maximum Housing is 144"	

Information for 4100K Fluorescent Lamps	
Average Rated Life (hr):	20,000
Base:	Miniature Bi-Pin
Bulb:	T5
Color Rendering Index (CRI)	82
Diameter (in):	0.67
Lamp Starting Mode:	Program Start
Bulb Manufacturer:	Shat-R-Shield

**\* Approval Drawings Required**

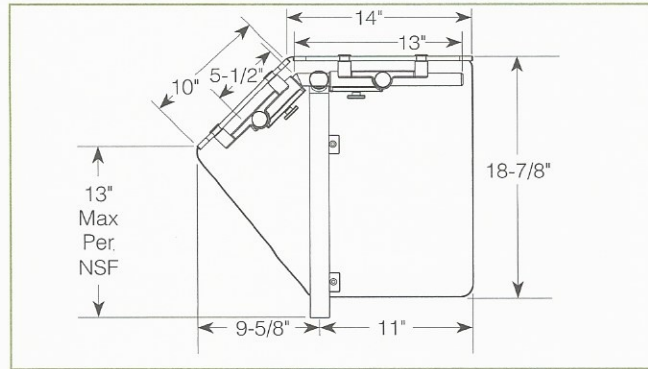
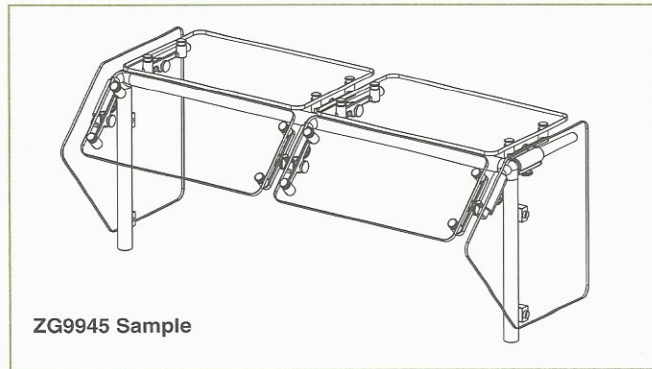
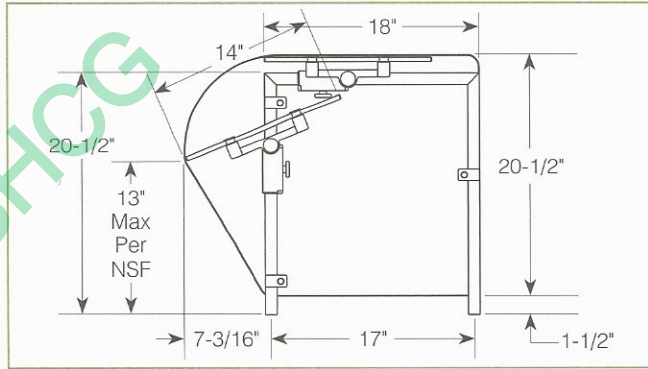
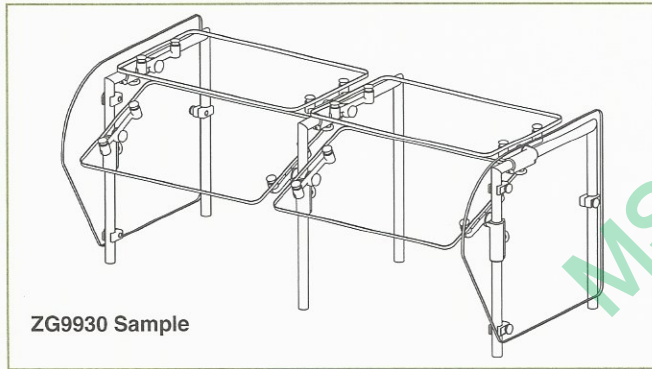
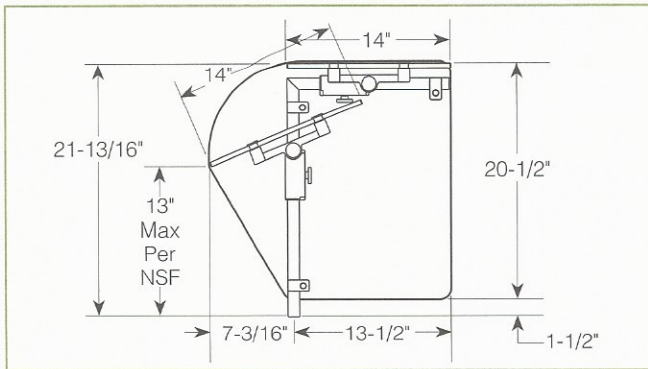
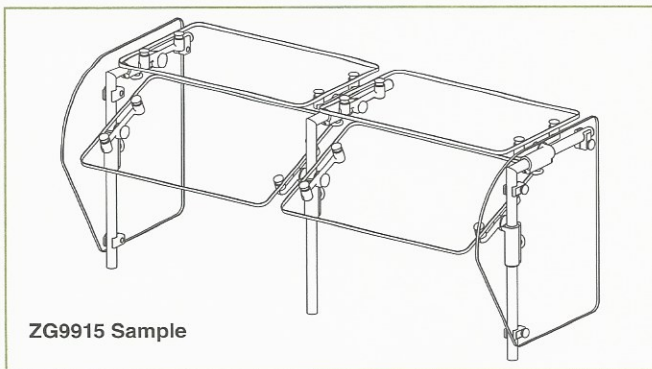
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Rv. 5

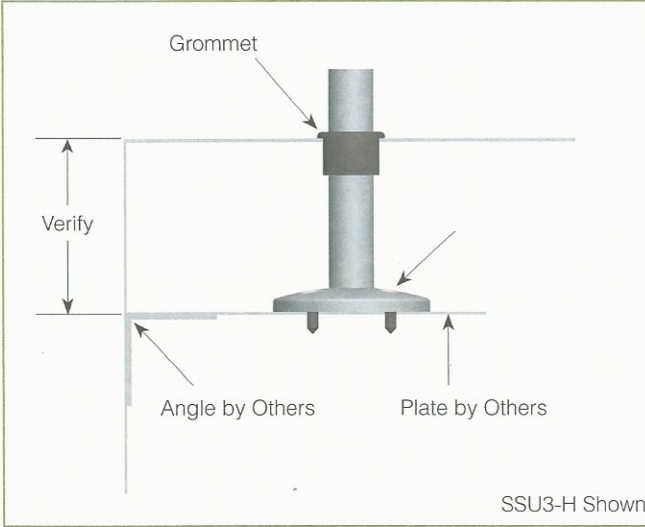
## END PANELS

To meet NSF guidelines, end panels are included on all BSI quotations unless specifically excluded. The following section shows size and location of glass end panels for select ZGuard models. For end panel information relating to additional models please contact the BSI factory at 1.800.622.9595.

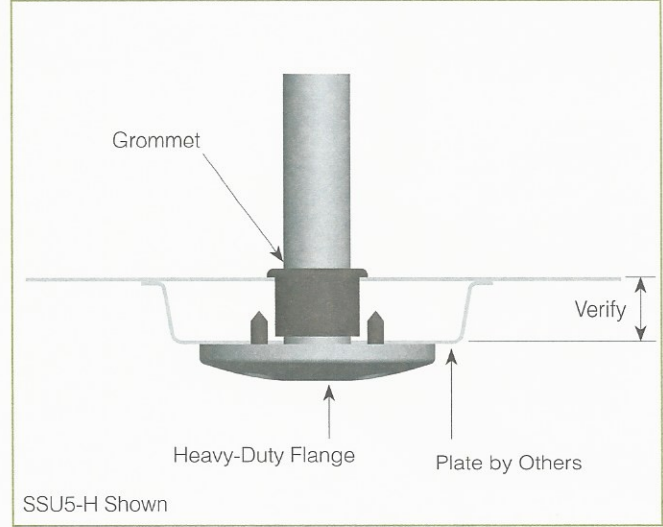


## UNDER-COUNTER INSTALLATION FOR 1" ZGUARD POSTS

**For Stainless Steel Counter**  
(requires under-counter reinforcement and access)  
SSU3: Heavy-Duty Flange (-H) or Narrow Flange (-N)

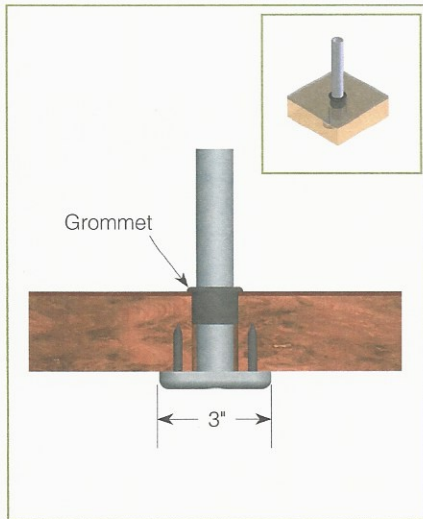


**For Stainless Steel Counter**  
(requires under-counter reinforcement and access)  
SSU5: Heavy-Duty Flange (-H) or Narrow Flange (-N)

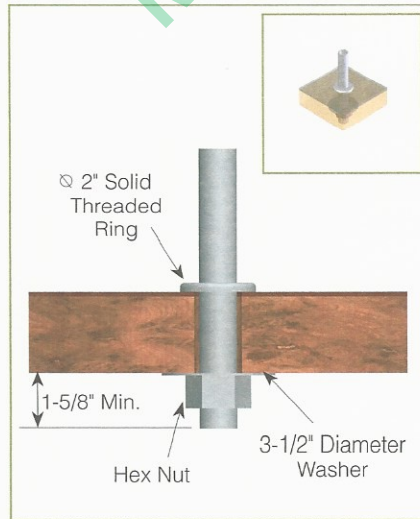


**Verify Counter Thickness or Under-Counter Installation Depth in Inches**

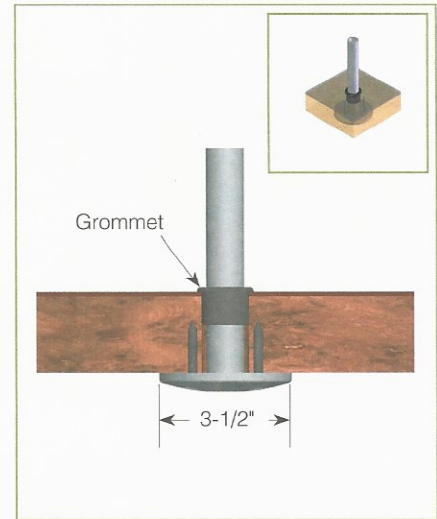
**For Millwork Counter**  
MWU3: Narrow Flange



**For Millwork Counter**  
MWU4: Compression Installation  
(not recommended for solid surfaces)



**For Millwork Counter**  
MWU5: Heavy-Duty Flange



**Verify Counter Thickness or Under-Counter Installation Depth in Inches**



Project \_\_\_\_\_  
 Item # \_\_\_\_\_  
 Quantity \_\_\_\_\_

## Drop-In Hot/Cold Wells

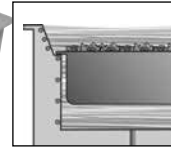
Models: HCWBI-2DA, -3DA, -4DA, -5DA, -6DA

Hatco Drop-In Hot/Cold Wells combine the legendary technology of both the Hatco Heated and Refrigerated Wells into one unit to create the ultimate flexibility in your buffet line or catering needs. You can keep hot foods at safe serving temperatures during the morning hours and then switch to pre-chilled food products at the lunch hour peaks.

### Standard features

- Hot/Cold Combination Drop-In Well can house a variety of pans, full-size, half-size or third-size and available in a two through six pan configuration
- Easy to read and use electronic control assembly and pan support bars
- Cold Mode: Similar to Hatco's CWB Cold Well, including auto-defrost, easy serviceability, optimal insulation and efficient condenser. Includes cold mode pan supports
- Hot Mode: Utilizes the same time-tested FR2 Hydro-Heater (Bain Marie) with "free flow" technology for an efficient and safe operation with a longer life, and includes drain, auto-fill and hot mode frame for pan support
- Adjustable set points to keep your particular food items at optimum temperatures
- Remote control box can be mounted to front counter for easy access (any vertical surface within approximately 5' (1524 mm))
- Matches the Hatco line of Refrigerated and Heated Wells for a fully integrated look
- Allow approximately 60 minutes or more for transition between operating modes of the Drop-In Hot/Cold Well

*Hot Mode: HCWBI-2DA shown with accessory food pans and hot mode pan supports (included), which are designed specifically for easier and safer handling of foods.*



*Cold Mode: HCWBI-2DA shown with accessory food pans and cold pan support bars. Unique angled inside wall design provides easy access and clear views, while allowing cold air to effectively blanket your food product.*



*"COLD - OFF - HOT" three position rocker switch, with digital read-outs for either the hot or cold mode.*

### Options (available at time of purchase only)

- Additional Four Year Parts Only Warranty on the Compressor
- Three-Phase Wiring

### Accessories

- FR2: Flush Hose, Cleaning Brush, Stopper and Adapter
  - 12" (305 mm) Pan Support for Drop-In Refrigerated Wells
  - 20" (508 mm) Pan Support for Drop-In Refrigerated Wells
- Rectangular Full-Size Stainless Steel Food Pans:
- Third-Size (2.5" [64 mm] H)
  - Full-Size (2.5" [64 mm] H)
  - Full-Size (6" [152 mm] H)
  - Half-Size (2.5" [64 mm] H)
  - Full-Size (4" [101 mm] H)



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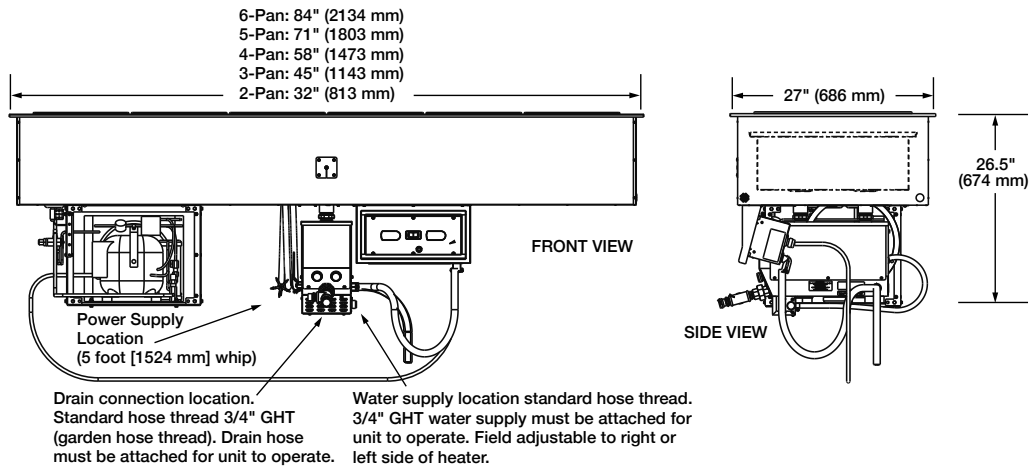
(800) 558-0607 | (414) 671-6350 | www.hatcocorp.com | equipsales@hatcocorp.com | intl@hatcocorp.com



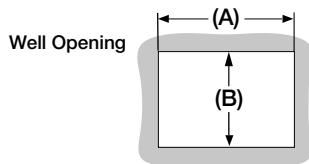
# Drop-In Hot/Cold Wells

Models: HCWBI-2DA, -3DA, -4DA, -5DA, -6DA

## All HCWBI-2DA, -3DA, -4DA, -5DA, -6DA Series



### Cutout Dimensions for Drop-In Hot/Cold Wells



Model	Minimum Width (A)	Maximum Width (A)	Minimum Depth (B)	Maximum Depth (B)
HCWBI-2DA	30.125" (765 mm)	31" (787 mm)	25.19" (640 mm)	26" (660 mm)
HCWBI-3DA	43.125" (1095 mm)	44" (1118 mm)		
HCWBI-4DA	56.125" (1426 mm)	57" (1448 mm)		
HCWBI-5DA	69.125" (1756 mm)	70" (1778 mm)		
HCWBI-6DA	82.125" (2086 mm)	83" (2108 mm)		

## SPECIFICATIONS

### Drop-In Full-Size Insulated Rectangular Models

Model	Dimensions (Width x Depth x Height)	Well Height	Compressor Size	Watts	Volts	Amps		Volts	Amps		Plug	Ship Weight*		
						Single Phase	Three Phase		Single Phase	Three Phase				
HCWBI-2DA	32" x 27" x 26.5" (813 x 686 x 674 mm)	12" (305 mm)	1/4 hp	3000	120/208	14.5	8.4	120/240	-	7.3	Hardwired	242 lbs. (110 kg)		
HCWBI-3DA	45" x 27" x 26.5" (1143 x 686 x 674 mm)								-	7.3		268 lbs. (122 kg)		
HCWBI-4DA	58" x 27" x 26.5" (1473 x 686 x 674 mm)		1/3 hp	4000					19.2	11.2		16.7	9.6	309 lbs. (140 kg)
HCWBI-5DA	71" x 27" x 26.5" (1803 x 686 x 674 mm)		1/2 hp	6000					28.8	16.7		-	14.5	351 lbs. (137 kg)
HCWBI-6DA	84" x 27" x 26.5" (2134 x 686 x 674 mm)								28.8	16.7		-	14.5	358 lbs. (162 kg)

\* Shipping weight includes packaging and is approximate.

### PRODUCT SPECS

#### Drop-In Hot/Cold Wells

The Drop-In Hot/Cold Well shall be a Model ...as manufactured by the Hatco Corporation, Milwaukee, WI 53234 U.S.A., the Drop-In Hot/Cold Heated Well shall be rated at ...watts, ...volts, and be ...inches (millimeters) in overall width and be ...inches (millimeters) in overall depth. It shall consist of stainless and aluminized steel housing, electronic control panel (digital temperature display, drain, auto-fill, power light, and 3-position rocker switch (Hot, Off, and Cold), and pan support bars for full-size pans in cold and hot modes.

COLD MODE: A condensing unit, sight glass, service valves, receiver, and a dryer/ filter. The digital temperature display for the Cold mode will have a set point of 32°F (0°C) and can be adjusted from 10° to 50°F (-12° to 10°C).

HOT MODE: The patented Hatco FR2 (Bain-Marie) shall consist of 1 to 3 stainless steel tubes wrapped with external heating elements. Each tube may be accessed for cleaning purposes. The unit may be emptied easily by a convenient drain and have a low-water cut-off. The digital temperature display for the Hot mode will have a set point of 192°F (89°C) and can be adjusted from 65° to 192°F (18° to 89°C). Accessories may include pan support bars, and stainless steel food pans.

Warranty consists of 24/7 parts and service assistance (U.S. and Canada only)

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**GENERAL INFORMATION**

**Project Name:** \_\_\_\_\_  
**Item:** \_\_\_\_\_  
**Quantity:** \_\_\_\_\_  
**Model:** ZG9930-5  
**Length:** \_\_\_\_\_

**STANDARD NSF LISTED FINISH OPTIONS**

- Brushed Aluminum/SS
- Chrome/SS
- Gloss Black
- Wrinkle Black
- Smoked Copper
- Polished Brass Finish
- Other \_\_\_\_\_

**LIGHT AND WARMER OPTIONS**

- Linear T-5 Fluorescent Unit
- BSI Stealth™ Linear Heat Only Unit
- BSI Stealth™ Linear Heat and Light Combo Unit
- BSI Stealth™ Linear Double Heat and Light Combo Unit
- Hatco® Brand Heat Only Unit
- Hatco® Brand Heat and Light Combo Unit
- Other \_\_\_\_\_

**GLASS OPTIONS**

- 1" Radius Corner (standard)
- Square Corners
- 1/4" Tempered Glass (not for shelves)  
Centerline Max 54"
- 3/8" Tempered Glass (for shelf or span more than 54")  
Centerline Max 66"

**INSTALLATION OPTIONS**

**Above-Counter:** Stainless Steel Counter  
**Under-Counter:** Stainless Steel Counter  
 (Requires Under-Counter Reinforcement & Access)

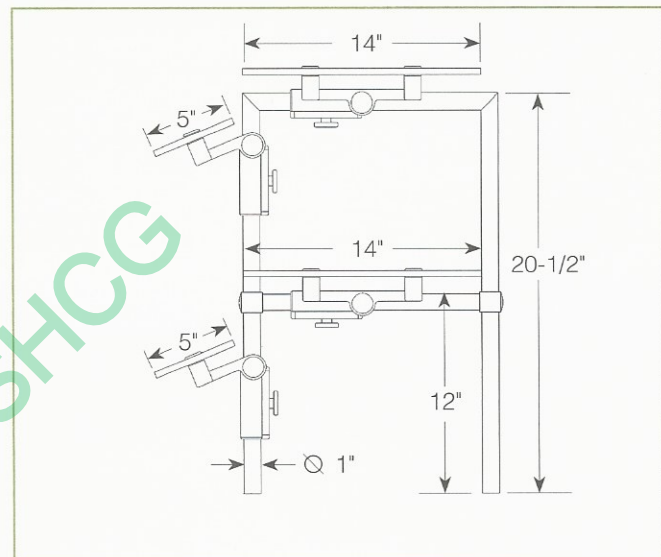
**Above-Counter:** Millwork Counter

**Under-Counter:** Millwork Counter

**ZG9930-5**  
**Two-Tier Display Case**



Shown without end panels.



To meet NSF guidelines, end panels are included on all BSI quotations unless specifically excluded. (See End Panel Page for More Details.)

- SS1: EZ Mount 2" x 8" Flange
- SSU3-H: Heavy-Duty Flange
- SSU3-N: Narrow Flange
- SSU5-H: Heavy-Duty Flange
- SSU5-N: Narrow Flange
- MW1: Heavy-Duty Flange
- MW2: Narrow Flange
- MWU3: Narrow Flange
- MWU4: Compression Installation (not recommended for solid surfaces)
- MWU5: Heavy-Duty Flange

See Installation Page for More Details.

**\* Approval Drawings Required**

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ZGuards can be provided with a UL Listed light or warmer.



Patent Number 6,588,863 Rv. 5



**2580**

*Fluorescent Slimline™ Light*

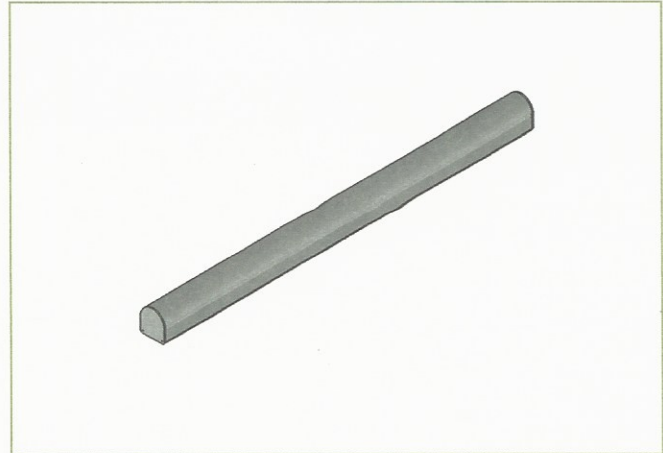
**GENERAL INFORMATION**

**Project Name:** \_\_\_\_\_  
**Item:** \_\_\_\_\_  
**Quantity:** \_\_\_\_\_  
**Model:** \_\_\_\_\_ 2580 \_\_\_\_\_  
**Length:** \_\_\_\_\_

**DESCRIPTION**

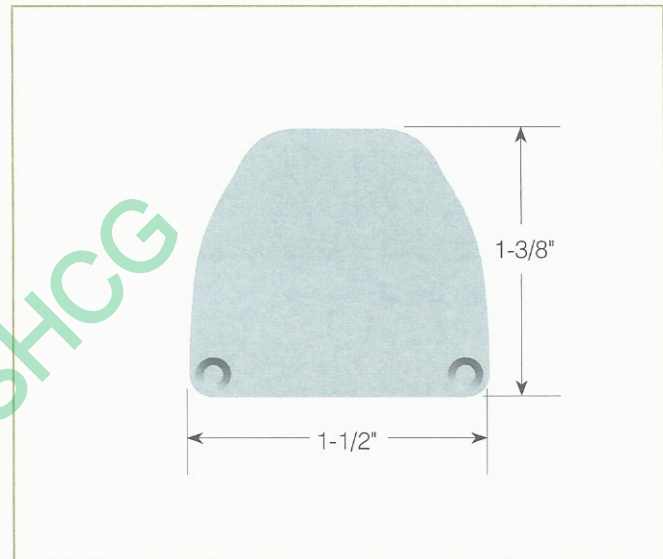
The Slimline™ light is manufactured by BSI, LLC. The light shall consist of an aluminum housing and an inner aluminum holder/reflector.

The light shall include a remote on/off switch and a remote ballast in an enclosure. The light shall be factory-assembled ready for electrical installation.



**GENERAL SPECIFICATION**

Ballast Information	
Operating Voltage:	120 VAC
Frequency:	50/60 HZ
ATHD:	Meets ANSI C82.11-1993
Protection/Output:	Open Lamp Shortened Lamp
Protection/Overcurrent:	Fuse
Protection/Voltage Transients:	MOV (PER ANSI C82.11-1993)
Open Circuit Voltage:	600 V RMS Max
Lamp Starting Mode:	Instant Start



Lamp Amps	
HOUSING LENGTH	MAX. AMPS
All Lengths	0.55
Minimum Housing is 24"	
Maximum Housing is 144"	

Information for 4100K Fluorescent Lamps	
Average Rated Life (hr):	20,000
Base:	Miniature Bi-Pin
Bulb:	T5
Color Rendering Index (CRI)	82
Diameter (in):	0.67
Lamp Starting Mode:	Program Start
Bulb Manufacturer:	Shat-R-Shield

**\* Approval Drawings Required**

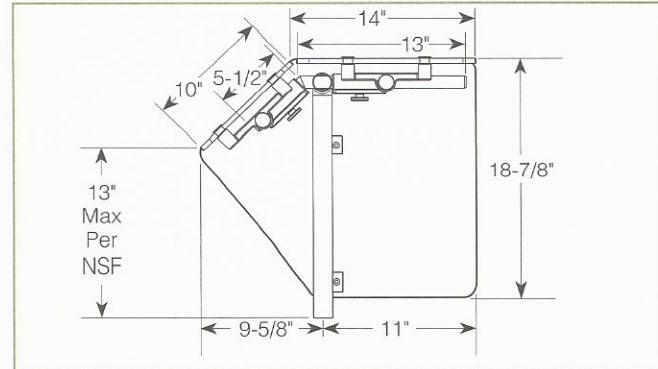
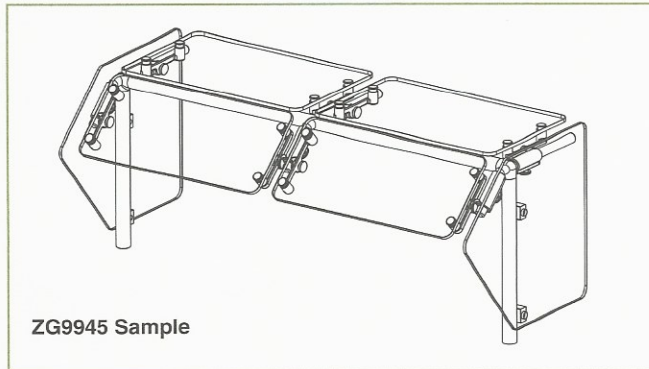
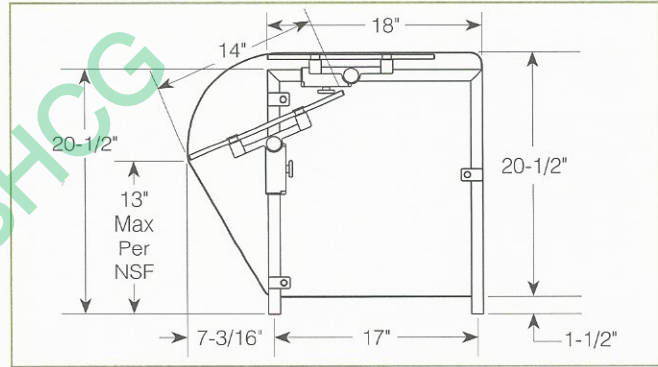
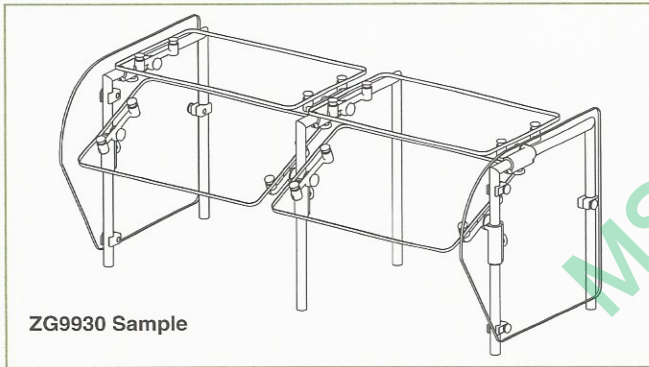
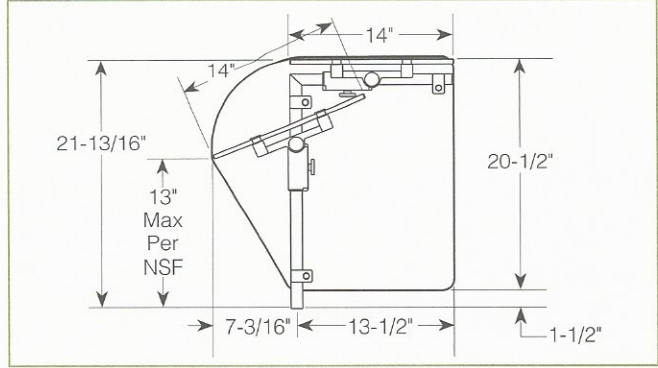
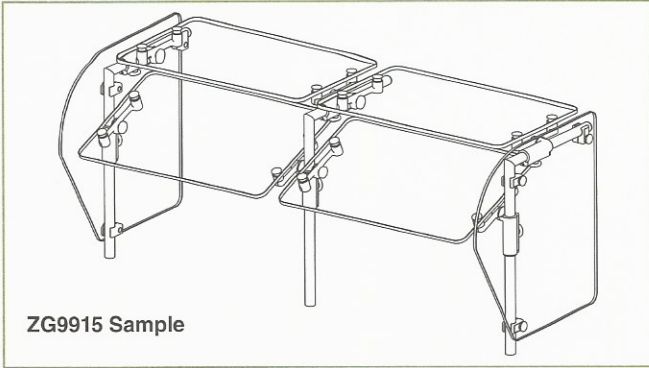
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Rv. 5

## END PANELS

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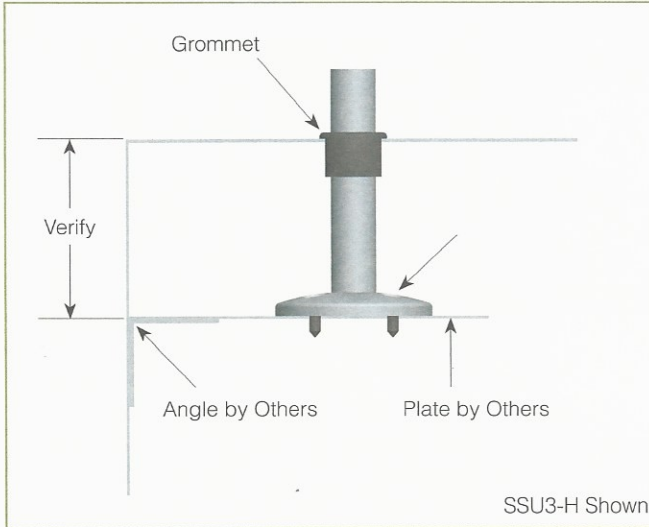
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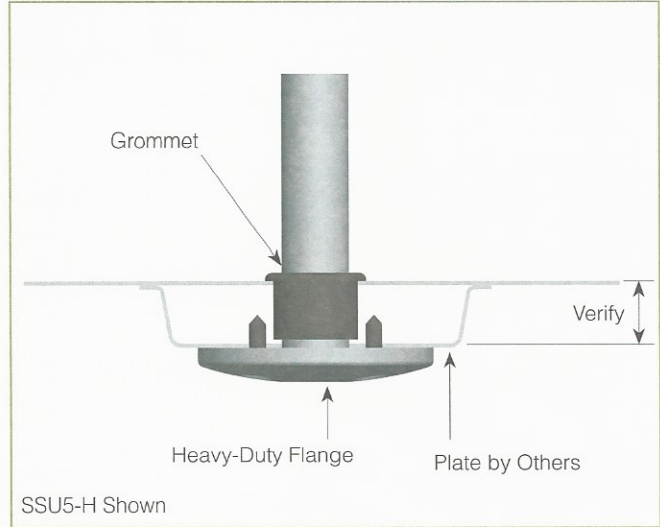
Patent Number 6,588,863 Rv. 5

## UNDER-COUNTER INSTALLATION FOR 1" ZGUARD POSTS

**For Stainless Steel Counter**  
(requires under-counter reinforcement and access)  
SSU3: Heavy-Duty Flange (-H) or Narrow Flange (-N)

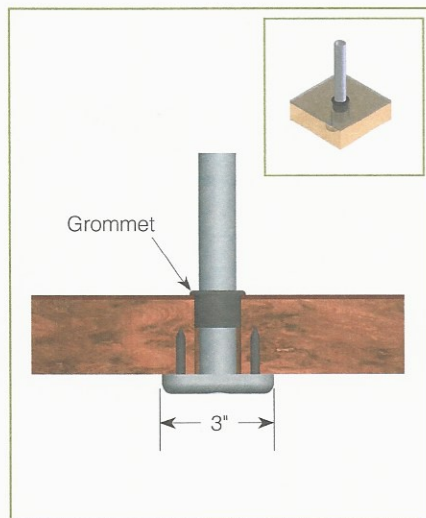


**For Stainless Steel Counter**  
(requires under-counter reinforcement and access)  
SSU5: Heavy-Duty Flange (-H) or Narrow Flange (-N)

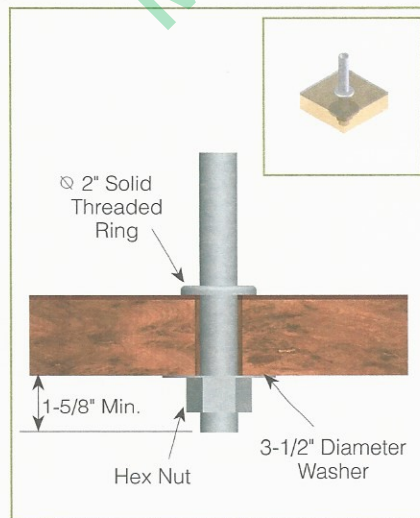


**Verify Counter Thickness or Under-Counter Installation Depth in Inches**

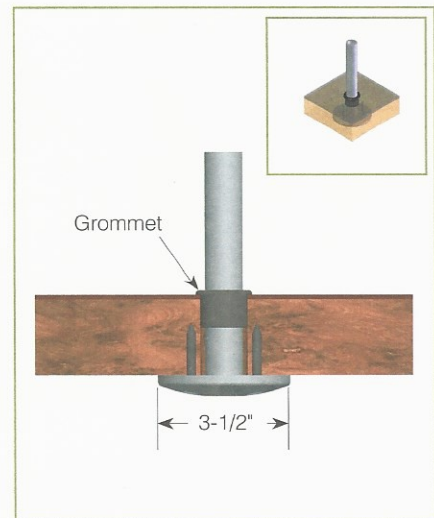
**For Millwork Counter**  
MWU3: Narrow Flange



**For Millwork Counter**  
MWU4: Compression Installation  
(not recommended for solid surfaces)



**For Millwork Counter**  
MWU5: Heavy-Duty Flange



**Verify Counter Thickness or Under-Counter Installation Depth in Inches**

## GENERAL INFORMATION

Project Name: \_\_\_\_\_  
 Item: \_\_\_\_\_  
 Quantity: \_\_\_\_\_  
 Model: \_\_\_\_\_  
 Length: \_\_\_\_\_

## DESCRIPTION

Economical and adaptive, Millwork Construction has all the flexibility of Unibody and Contoura for situations where no stainless steel is required.

## GENERAL SPECIFICATION

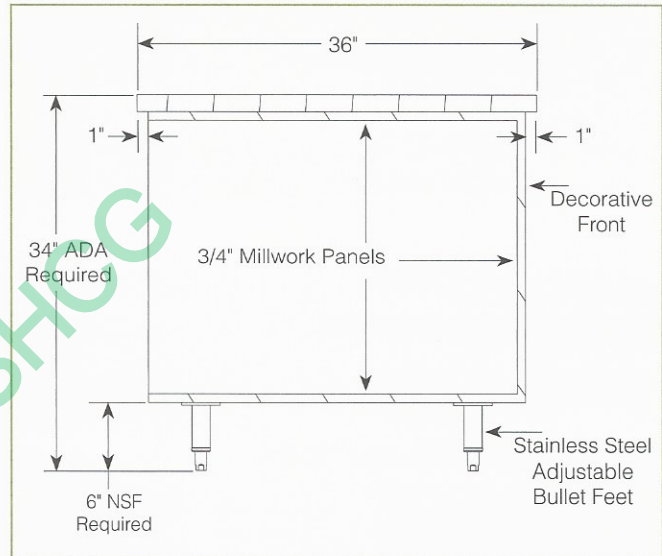
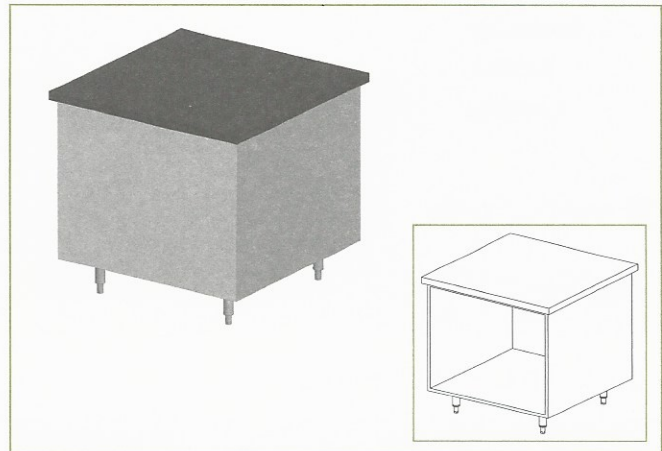
- 3/4" Millwork Panels
- 34" Overall Height (ADA Requires Optional Tray Rest)
- Stainless Steel Adjustable Bullet Feet
- Adjustable, Removable or Fixed Shelves

## ADDITIONAL OPTIONS

- Casters

## CUSTOM CONSTRUCTION

*Millwork Construction*



**For Custom Decorative Details see the following detail pages:**

- Tray Slide Options
- Millwork Counter Tops
- Exterior Panel Options

### \* Approval Drawings Required

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 Specifications subject to change without notice.



Basic frame construction is NSF Certified and UL Listed. The use of different construction materials may affect these certifications.



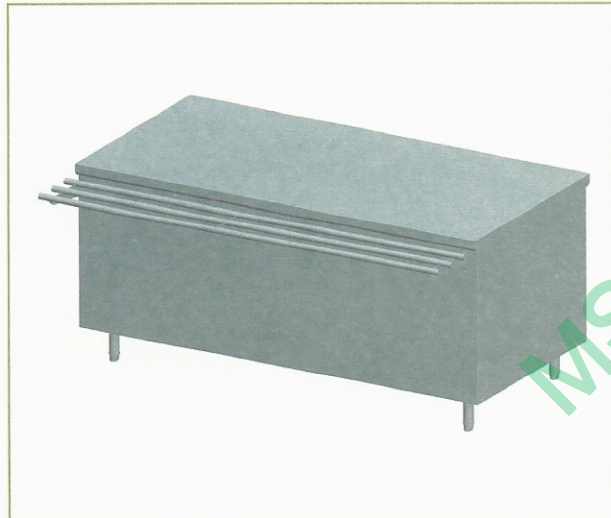
Rv. 5

## TRAY SLIDE OPTIONS

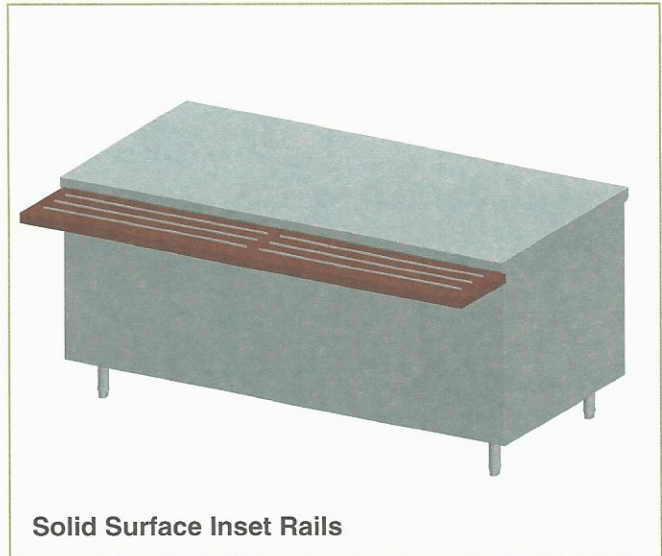
All BSI counter constructions can adapt all available tray slide options. Below are the five standard tray slides.



**Stainless Steel Inverted V**



**Stainless Steel Tubular**



**Solid Surface Inset Rails**



**Solid Surface Studded Rails**



**Stainless Steel Curved Tubular**

## OPTIONS

- Stainless Steel Inverted V
- Stainless Steel Tubular
- Solid Surface Inset Rails
- Solid Surface Studded Rails
- Stainless Steel Curved Tubular
- Other \_\_\_\_\_

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# PLATE DISPENSERS DROP-IN

PD - UNHEATED • PDS - SHIELDED • PDH - HEATED DROP-IN

Project Name \_\_\_\_\_

N°# \_\_\_\_\_ Item N°# \_\_\_\_\_ Quantity \_\_\_\_\_

## SPECIFICATIONS

### CONSTRUCTION:

The model PD, PDS & PDH shall be drop-in self leveling design, the basic unit shall be constructed of series 300 stainless steel.

The counter top flange has three high impact plastic guide posts to align plates, the unit is self supporting using a formed stainless steel top flange welded to vertical channels and bottom disc, a stainless steel platform will be suspended with extension springs to support the stack of plates to be dispensed.

**PDS:** Same construction with an additional outer stainless steel shield, which cover spring mechanism and vertical channel guides.

**PDH:** Same construction with the addition of a base mounted heating element a side mounted thermostat, pilot light and on-off switch located in the top flange, a six foot 120V NEMA 5-15P cordset.

**SELF LEVELING:** The spring mechanism is easy to adjust a combination of extension springs will be provided for field adjusting to the required dispensing height.



MODEL PD - 81/8

- PD
- PDS
- PDH

FOR HIGH VOLUME PLATE DISPENSING  
FOR CAFETERIA AND TRAY MAKE-UP AREA

### OPTIONS AND ACCESSORIES

CONSULT THE FACTORY FOR SPECIAL REQUIREMENTS

- Special voltage \_\_\_\_\_
- Special height \_\_\_\_\_
- Stainless steel trays to convert PD-12 to cup dispenser

**“ALL PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE”**



*a subsidiary of Mercury Aircraft*  
1135 NW 159 Dr., Miami, Florida 33169  
Tel: (305) 625-2451 or (800) 762-7565 • Fax: (305) 623-0475

# PLATE DISPENSERS DROP-IN

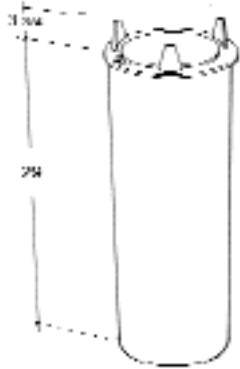
PD - UNHEATED • PDS - SHIELDED • PDH - HEATED DROP-IN

## STANDARD FEATURES:

- FIELD ADJUSTABLE
- CAPACITY UP TO (72) PLATES OR (36) BOWLS  
\*Capacity may vary depending on plate or bowl manufacturer
- UNDER COUNTER CLEARANCE, REQUIRES 27-1/2" TO 29"

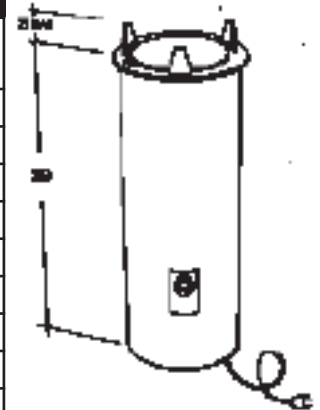
## SELF-LEVELING PLATE DISPENSER

UNHEATED DROP-IN OPEN TUBE					
MODEL	MAXIMUM PLATE SIZE	OUTSIDE FLANGE DIAMETER	CUT-OUT DIAMETER	SHIPPING WT. (lbs.)	✓
PD-5	5"	8-3/8"	7-3/4"	12 lbs.	
PD-5-3/4	5-3/4"	9-1/8"	8-1/2"	13 lbs.	
PD-6-1/2	6-1/2"	9-7/8"	9-1/4"	14 lbs.	
PD-7-1/4	7-1/4"	10-5/8"	10"	16 lbs.	
PD-8-1/8	8-1/8"	11-1/2"	10-7/8"	18 lbs.	
PD-9-1/8	9-1/8"	12-1/2"	11-7/8"	20 lbs.	
PD-10-1/8	10-1/8"	13-1/2"	12-7/8"	23 lbs.	
PD-12	12"	15-3/8"	14-3/4"	25 lbs.	
PD-14-1/2	14-1/2"	17-7/8"	17-1/4"	37 lbs.	



UNHEATED DROP-IN SHIELDED TUBE					
MODEL	MAXIMUM PLATE SIZE	OUTSIDE FLANGE DIAMETER	CUT-OUT DIAMETER	SHIPPING WT. (lbs.)	✓
PDS-5	5"	8-3/8"	7-3/4"	17 lbs.	
PDS-5-3/4	5-3/4"	9-1/8"	8-1/2"	19 lbs.	
PDS-6-1/2	6-1/2"	9-7/8"	9-1/4"	21 lbs.	
PDS-7-1/4	7-1/4"	10-5/8"	10"	23 lbs.	
PDS-8-1/8	8-1/8"	11-1/2"	10-7/8"	25 lbs.	
PDS-9-1/8	9-1/8"	12-1/2"	11-7/8"	27 lbs.	
PDS-10-1/8	10-1/8"	13-1/2"	12-7/8"	31 lbs.	
PDS-12	12"	15-3/8"	14-3/4"	36 lbs.	
PDS-14-1/2	14-1/2"	17-7/8"	17-1/4"	45 lbs.	

HEATED DROP-IN SHIELDED TUBE							
MODEL	ELEC @ 120V IPH		MAXIMUM PLATE SIZE	OUTSIDE FLANGE DIAMETER	CUT-OUT DIAMETER	SHIPPING WT. (lbs.)	✓
	WATTS	AMPS					
PDH-5	210	1.8	5"	8-3/8"	7-3/4"	17 lbs.	
PDH-5-3/4	240	2.0	5-3/4"	9-1/8"	8-1/2"	19 lbs.	
PDH-6-1/2	270	2.3	6-1/2"	9-7/8"	9-1/4"	21 lbs.	
PDH-7-1/4	300	2.5	7-1/4"	10-5/8"	10"	23 lbs.	
PDH-8-1/8	330	2.8	8-1/8"	11-1/2"	10-7/8"	25 lbs.	
PDH-9-1/8	380	3.2	9-1/8"	12-1/2"	11-7/8"	27 lbs.	
PDH-10-1/8	420	3.5	10-1/8"	13-1/2"	12-7/8"	31 lbs.	
PDH-12	500	4.2	12"	15-3/8"	14-3/4"	36 lbs.	
PDH-14-1/2	550	4.6	14-1/2"	17-7/8"	17-1/4"	45 lbs.	



a subsidiary of Mercury Aircraft  
1135 NW 159 Dr., Miami, Florida 33169  
Tel: (305) 625-2451 or (800) 762-7565 • Fax: (305) 623-0475

10/07-SC

**GENERAL INFORMATION**

**Project Name:** \_\_\_\_\_  
**Item:** \_\_\_\_\_  
**Quantity:** \_\_\_\_\_  
**Model:** ZG9930-5  
**Length:** \_\_\_\_\_

**STANDARD NSF LISTED FINISH OPTIONS**

- Brushed Aluminum/SS
- Chrome/SS
- Gloss Black
- Wrinkle Black
- Smoked Copper
- Polished Brass Finish
- Other \_\_\_\_\_

**LIGHT AND WARMER OPTIONS**

- Linear T-5 Fluorescent Unit
- BSI Stealth™ Linear Heat Only Unit
- BSI Stealth™ Linear Heat and Light Combo Unit
- BSI Stealth™ Linear Double Heat and Light Combo Unit
- Hatco® Brand Heat Only Unit
- Hatco® Brand Heat and Light Combo Unit
- Other \_\_\_\_\_

**GLASS OPTIONS**

- 1" Radius Corner (standard)
- Square Corners
- 1/4" Tempered Glass (not for shelves)  
Centerline Max 54"
- 3/8" Tempered Glass (for shelf or span more than 54")  
Centerline Max 66"

**INSTALLATION OPTIONS**

**Above-Counter:** Stainless Steel Counter  
**Under-Counter:** Stainless Steel Counter  
 (Requires Under-Counter Reinforcement & Access)

**Above-Counter:** Millwork Counter

**Under-Counter:** Millwork Counter

**See Installation Page for More Details.**

**\* Approval Drawings Required**

Printed in the U.S.A. (January 2013) BSI, LLC  
 Specifications subject to change without notice.



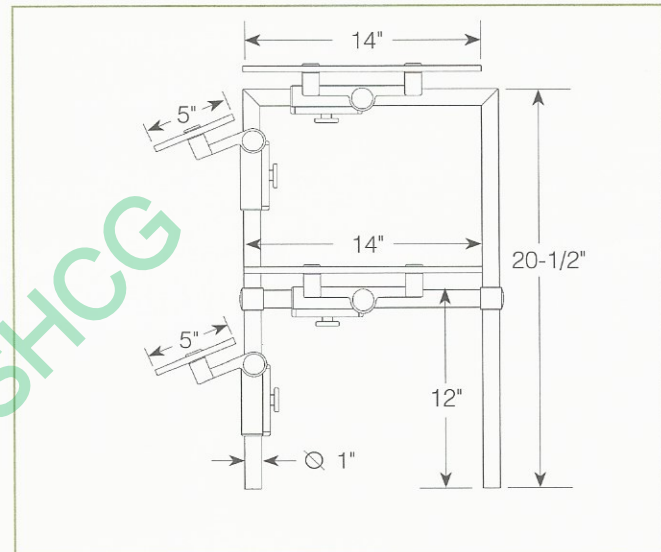
ZGuards can be provided with a UL Listed light or warmer.



**ZG9930-5**  
**Two-Tier Display Case**



Shown without end panels.



To meet NSF guidelines, end panels are included on all BSI quotations unless specifically excluded. (See End Panel Page for More Details.)

- SS1: EZ Mount 2" x 8" Flange
- SSU3-H: Heavy-Duty Flange
- SSU3-N: Narrow Flange
- SSU5-H: Heavy-Duty Flange
- SSU5-N: Narrow Flange
- MW1: Heavy-Duty Flange
- MW2: Narrow Flange
- MWU3: Narrow Flange
- MWU4: Compression Installation (not recommended for solid surfaces)
- MWU5: Heavy-Duty Flange

Patent Number 6,588,863 Rv. 5



**GENERAL INFORMATION**

Project Name: \_\_\_\_\_  
 Item: \_\_\_\_\_  
 Quantity: \_\_\_\_\_  
 Model: \_\_\_\_\_ 2580 \_\_\_\_\_  
 Length: \_\_\_\_\_

**DESCRIPTION**

The Slimline™ light is manufactured by BSI, LLC. The light shall consist of an aluminum housing and an inner aluminum holder/reflector.

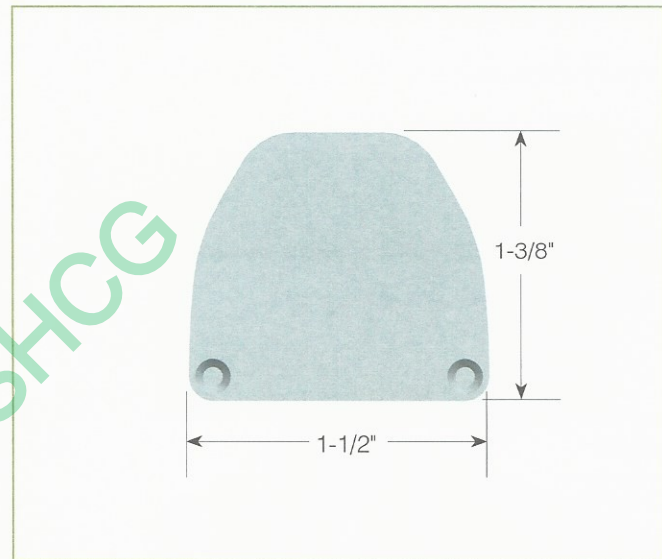
The light shall include a remote on/off switch and a remote ballast in an enclosure. The light shall be factory-assembled ready for electrical installation.

**GENERAL SPECIFICATION**

Ballast Information	
Operating Voltage:	120 VAC
Frequency:	50/60 HZ
ATHD:	Meets ANSI C82.11-1993
Protection/Output:	Open Lamp Shortened Lamp
Protection/Overcurrent:	Fuse
Protection/Voltage Transients:	MOV (PER ANSI C82.11-1993)
Open Circuit Voltage:	600 V RMS Max
Lamp Starting Mode:	Instant Start

Lamp Amps	
HOUSING LENGTH	MAX. AMPS
All Lengths	0.55
Minimum Housing is 24"	
Maximum Housing is 144"	

**2580**  
*Fluorescent Slimline™ Light*



Information for 4100K Fluorescent Lamps	
Average Rated Life (hr):	20,000
Base:	Miniature Bi-Pin
Bulb:	T5
Color Rendering Index (CRI)	82
Diameter (in):	0.67
Lamp Starting Mode:	Program Start
Bulb Manufacturer:	Shat-R-Shield

**\* Approval Drawings Required**

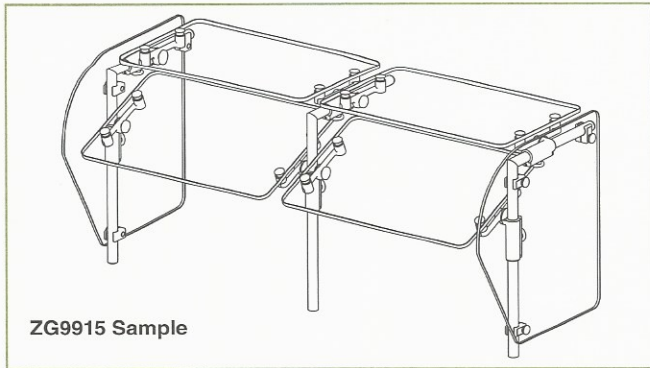
Printed in the U.S.A. (January 2013) BSI, LLC  
 Specifications subject to change without notice.



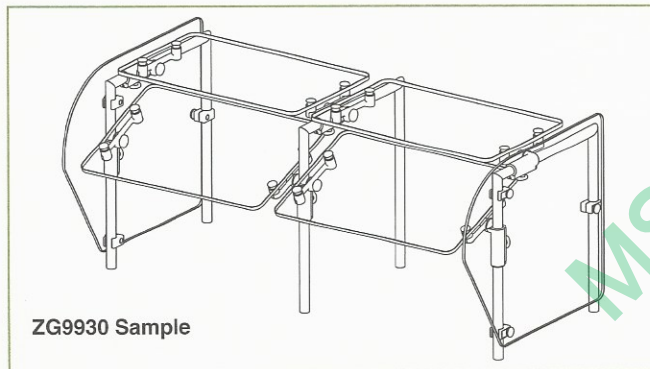
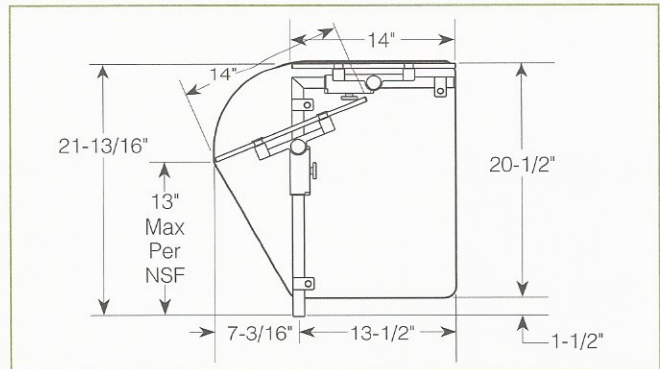
Rv. 5

**END PANELS**

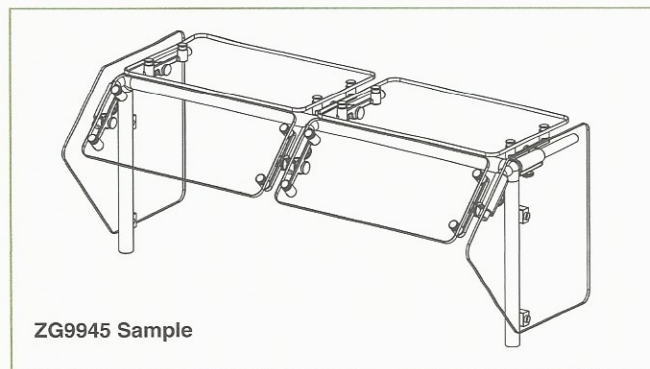
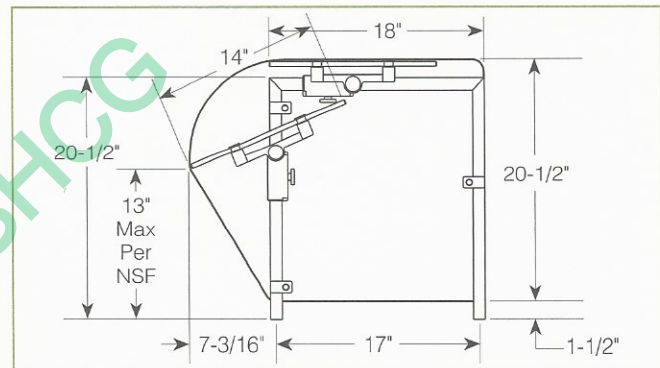
To meet NSF guidelines, end panels are included on all BSI quotations unless specifically excluded. The following section shows size and location of glass end panels for select ZGuard models. For end panel information relating to additional models please contact the BSI factory at 1.800.622.9595.



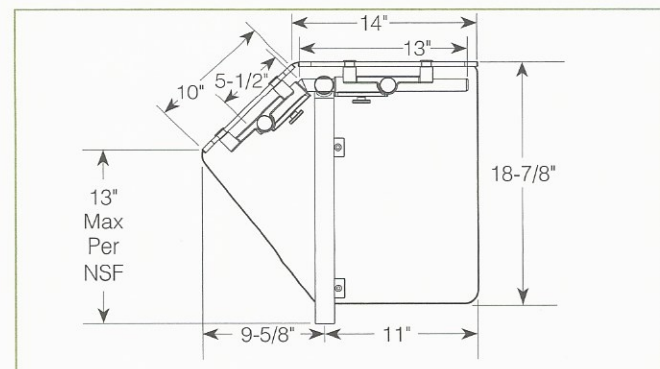
ZG9915 Sample



ZG9930 Sample

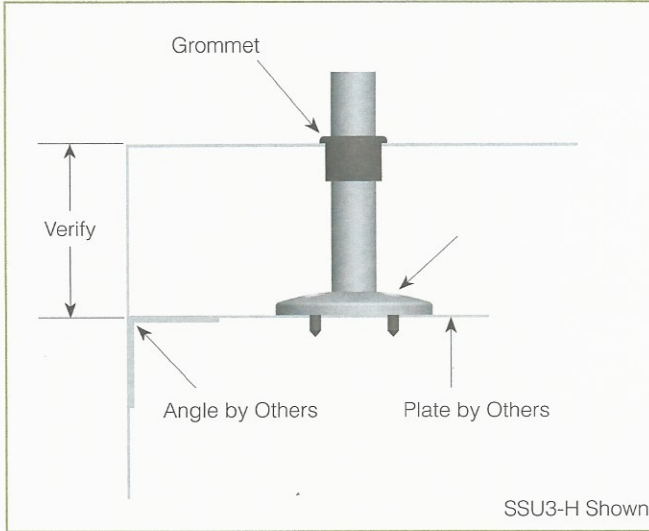


ZG9945 Sample

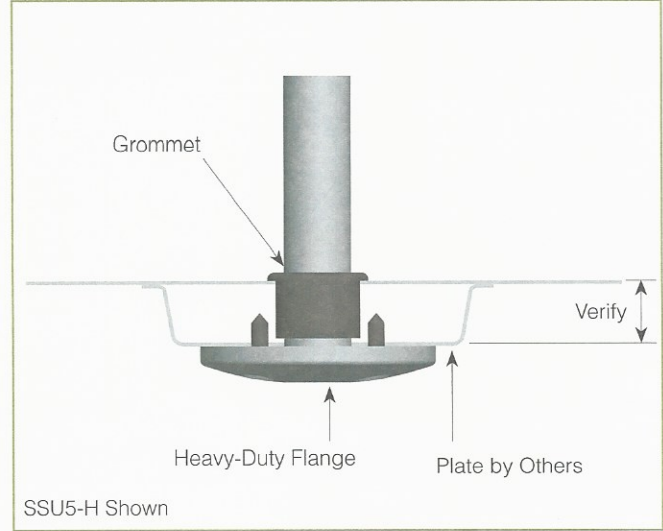


**UNDER-COUNTER INSTALLATION FOR 1" ZGUARD POSTS**

**For Stainless Steel Counter**  
 (requires under-counter reinforcement and access)  
**SSU3: Heavy-Duty Flange (-H) or Narrow Flange (-N)**

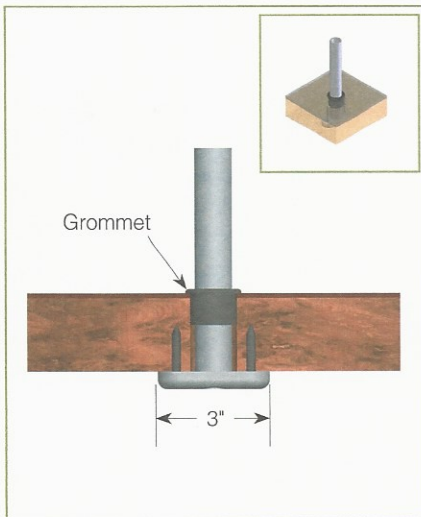


**For Stainless Steel Counter**  
 (requires under-counter reinforcement and access)  
**SSU5: Heavy-Duty Flange (-H) or Narrow Flange (-N)**

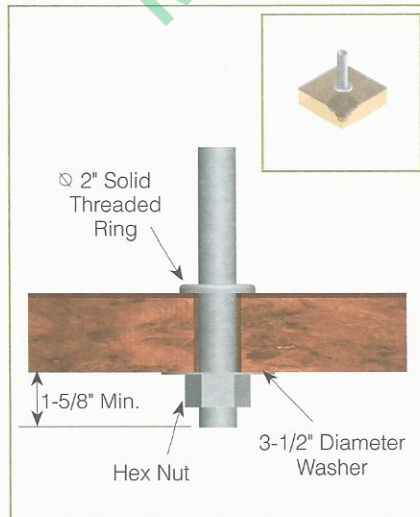


**Verify Counter Thickness or Under-Counter Installation Depth in Inches**

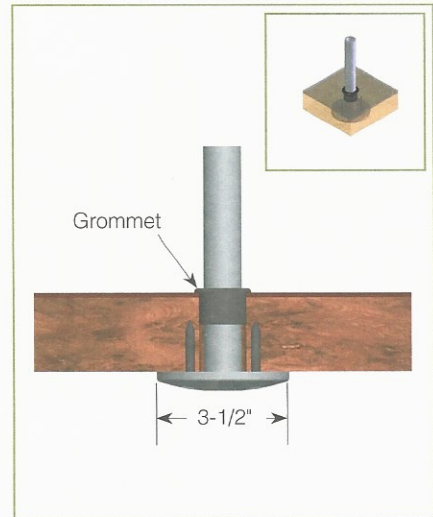
**For Millwork Counter**  
**MWU3: Narrow Flange**



**For Millwork Counter**  
**MWU4: Compression Installation**  
 (not recommended for solid surfaces)



**For Millwork Counter**  
**MWU5: Heavy-Duty Flange**



**Verify Counter Thickness or Under-Counter Installation Depth in Inches**

No PDF Spec Sheet available for LTI DECO- 106-N.

MSHCG



Project \_\_\_\_\_

Item # \_\_\_\_\_

Quantity \_\_\_\_\_

## Drop-In Hot/Cold Wells

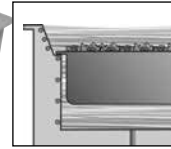
Models: HCWBI-2DA, -3DA, -4DA, -5DA, -6DA

Hatco Drop-In Hot/Cold Wells combine the legendary technology of both the Hatco Heated and Refrigerated Wells into one unit to create the ultimate flexibility in your buffet line or catering needs. You can keep hot foods at safe serving temperatures during the morning hours and then switch to pre-chilled food products at the lunch hour peaks.

### Standard features

- Hot/Cold Combination Drop-In Well can house a variety of pans, full-size, half-size or third-size and available in a two through six pan configuration
- Easy to read and use electronic control assembly and pan support bars
- Cold Mode: Similar to Hatco's CWB Cold Well, including auto-defrost, easy serviceability, optimal insulation and efficient condenser. Includes cold mode pan supports
- Hot Mode: Utilizes the same time-tested FR2 Hydro-Heater (Bain Marie) with "free flow" technology for an efficient and safe operation with a longer life, and includes drain, auto-fill and hot mode frame for pan support
- Adjustable set points to keep your particular food items at optimum temperatures
- Remote control box can be mounted to front counter for easy access (any vertical surface within approximately 5' (1524 mm))
- Matches the Hatco line of Refrigerated and Heated Wells for a fully integrated look
- Allow approximately 60 minutes or more for transition between operating modes of the Drop-In Hot/Cold Well

*Hot Mode: HCWBI-2DA shown with accessory food pans and hot mode pan supports (included), which are designed specifically for easier and safer handling of foods.*



*Cold Mode: HCWBI-2DA shown with accessory food pans and cold pan support bars. Unique angled inside wall design provides easy access and clear views, while allowing cold air to effectively blanket your food product.*



*"COLD - OFF - HOT" three position rocker switch, with digital read-outs for either the hot or cold mode.*

### Options (available at time of purchase only)

- Additional Four Year Parts Only Warranty on the Compressor
- Three-Phase Wiring

### Accessories

- FR2: Flush Hose, Cleaning Brush, Stopper and Adapter
  - 12" (305 mm) Pan Support for Drop-In Refrigerated Wells
  - 20" (508 mm) Pan Support for Drop-In Refrigerated Wells
- Rectangular Full-Size Stainless Steel Food Pans:
- Third-Size (2.5" [64 mm] H)
  - Full-Size (2.5" [64 mm] H)
  - Full-Size (4" [101 mm] H)
  - Full-Size (6" [152 mm] H)



HATCO CORPORATION | P.O. Box 340500 Milwaukee, WI 53234-0500 U.S.A.

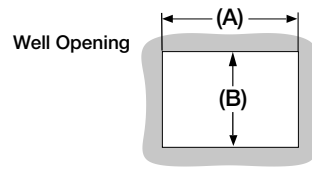
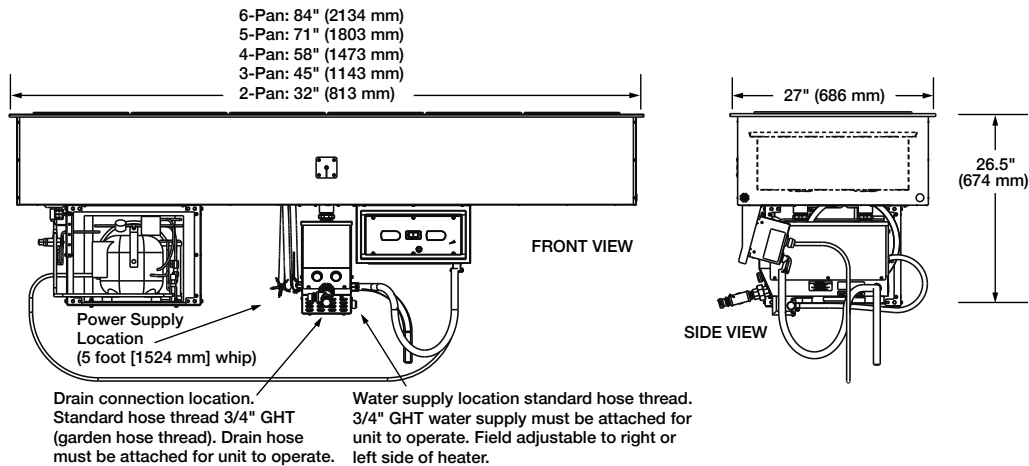
(800) 558-0607 | (414) 671-6350 | www.hatcocorp.com | equipmentsales@hatcocorp.com | intl@hatcocorp.com



# Drop-In Hot/Cold Wells

Models: HCWBI-2DA, -3DA, -4DA, -5DA, -6DA

## All HCWBI-2DA, -3DA, -4DA, -5DA, -6DA Series



### Cutout Dimensions for Drop-In Hot/Cold Wells

Model	Minimum Width (A)	Maximum Width (A)	Minimum Depth (B)	Maximum Depth (B)
HCWBI-2DA	30.125" (765 mm)	31" (787 mm)	25.19" (640 mm)	26" (660 mm)
HCWBI-3DA	43.125" (1095 mm)	44" (1118 mm)		
HCWBI-4DA	56.125" (1426 mm)	57" (1448 mm)		
HCWBI-5DA	69.125" (1756 mm)	70" (1778 mm)		
HCWBI-6DA	82.125" (2086 mm)	83" (2108 mm)		

### SPECIFICATIONS Drop-In Full-Size Insulated Rectangular Models

Model	Dimensions (Width x Depth x Height)	Well Height	Compressor Size	Watts	Volts	Amps		Volts	Amps		Plug	Ship Weight*		
						Single Phase	Three Phase		Single Phase	Three Phase				
HCWBI-2DA	32" x 27" x 26.5" (813 x 686 x 674 mm)	12" (305 mm)	1/4 hp	3000	120/208	14.5	8.4	120/240	-	7.3	Hardwired	242 lbs. (110 kg)		
HCWBI-3DA	45" x 27" x 26.5" (1143 x 686 x 674 mm)								-	7.3		268 lbs. (122 kg)		
HCWBI-4DA	58" x 27" x 26.5" (1473 x 686 x 674 mm)		1/3 hp	4000					19.2	11.2		16.7	9.6	309 lbs. (140 kg)
HCWBI-5DA	71" x 27" x 26.5" (1803 x 686 x 674 mm)		1/2 hp	6000					28.8	16.7		-	14.5	351 lbs. (137 kg)
HCWBI-6DA	84" x 27" x 26.5" (2134 x 686 x 674 mm)								28.8	16.7		-	14.5	358 lbs. (162 kg)

\* Shipping weight includes packaging and is approximate.

### PRODUCT SPECS Drop-In Hot/Cold Wells

The Drop-In Hot/Cold Well shall be a Model ...as manufactured by the Hatco Corporation, Milwaukee, WI 53234 U.S.A., the Drop-In Hot/Cold Heated Well shall be rated at ...watts, ...volts, and be ...inches (millimeters) in overall width and be ...inches (millimeters) in overall depth. It shall consist of stainless and aluminized steel housing, electronic control panel (digital temperature display, drain, auto-fill, power light, and 3-position rocker switch (Hot, Off, and Cold), and pan support bars for full-size pans in cold and hot modes.

COLD MODE: A condensing unit, sight glass, service valves, receiver, and a dryer/ filter. The digital temperature display for the Cold mode will have a set point of 32°F (0°C) and can be adjusted from 10° to 50°F (-12° to 10°C).

HOT MODE: The patented Hatco FR2 (Bain-Marie) shall consist of 1 to 3 stainless steel tubes wrapped with external heating elements. Each tube may be accessed for cleaning purposes. The unit may be emptied easily by a convenient drain and have a low-water cut-off. The digital temperature display for the Hot mode will have a set point of 192°F (89°C) and can be adjusted from 65° to 192°F (18° to 89°C). Accessories may include pan support bars, and stainless steel food pans.

Warranty consists of 24/7 parts and service assistance (U.S. and Canada only)

HATCO CORPORATION | P.O. Box 340500 Milwaukee, WI 53234-0500 U.S.A.  
 (800) 558-0607 | (414) 671-6350 | www.hatcocorp.com | equipsales@hatcocorp.com | intl@hatcocorp.com



# QUOTATION

1101 Graham Street · PO Box 269 · Hyde, PA 16843  
Phone: (814) 765-9615 · Fax: (814) 765-5410  
Toll Free: (800) 233-1954  
www.walkins.com

To:	Holland Associates PO Box 2675 Matthews, NC 28106	Date:	29-October-2018 Last Revision: 29-October-2018
Attn:	Mike Holland	Quote #	092914
Phone:	704-841-4446	Quoted By:	Angelina Doloroso
Fax:	704-841-4447	F.O.B.	Hyde, PA
Email:	hollandassoc@hotmail.com		
Job Name:	The Healing Place of New Hanover County		

### Indoor Freezer/Cooler (Item #9)

Freezer with Floor, Cooler (35°F) w/out Floor w/ PVC Screed  
 Insulation: 4 inches foamed-in-place urethane (X) Class 1  
 Approximate overall size: 35' 6 1/2" x 14' 11 1/4" x 8' 6 1/2"(H) as per attached approval drawing  
 O.D. Freezer : 17' 3 1/2" x 14' 11 1/4" x 8' 6 1/2"(H)  
 Cooler (35°F) : 18' 3" x 14' 11 1/4" x 8' 6 1/2"(H)

### Finishes

Interior & Exterior - 26ga Embossed Galvalume  
 Interior Floor - 18ga. SS Floor w/ 3/4" plywood underlay to withhold approx. 1000lbs per sq.ft. uniformly distributed w/ no given point load on a seam

### Entrance Doors:

#### Compt 1 - door 1 (Interior & Exterior of Door & Frame: 26ga Embossed Galvalume)

34" x 77" RHH freezer door - includes W-94 hydraulic door closer, (3) W-59 polished hinges, Norfab 14" x 24" heated viewport, W-29NC latch, 3' 0"(H) 5-Bar Tread kickplates int & ext door & frame, Weiss 24DT-SP-LT digital therm/switch, Kason K1825 PRP & VXS100 (LED)

#### Compt 2 - door 2 (Interior & Exterior of Door & Frame: 26ga Embossed Galvalume)

34" x 77" LHH cooler door - includes W-94 hydraulic door closer, (3) W-59 polished hinges, Norfab 14" x 24" viewport, W-29NC latch, Locking Hasp, 3' 0"(H) 5-Bar Tread kickplates int & ext door & frame, Weiss 24DT-SP-LT digital therm/switch, Kason K1825 PRP & VXS100 (LED)

### Accessories:

- (1) Interior 34" x 27" 12ga Smooth SS Type 304 2B Ramp
- (1) Ceiling Hanger Clip kit for 35' 6 1/2" span . Estimated ceiling weight per clip = 39.9 lbs
- (x) Closure Panels- 26ga Embossed Galvalume on Exposed Section of (1) 35' 6-1/2"H Wall (2'H) **\*Please Verify**
- (x) Non-skid Strips 2"x36" (every 6")
- (2) 3" x 3" x 8'-1/2H Angle Trim Strips- 26ga Embossed Galvalume **\*Please Verify**
- (4) 48" LED Lights (shipped loose) (field installed) ~*(2) in each compt.*

### Refrigeration Equipment:

- (1) QTY RFO500L4S-EA 208-230/3/60 Scroll Air Cooled Condensing Unit (17,690 BTUH @ -20 SST, +95 Amb, R404A) with PSC Condensing Motors, Standard Tafco Options and Features
- (1) QTY RL6E182DDAA 208-230/1/60 Net Gen All-Temp Electric Defrost Cooler Unit with Dual

**NOTE: This quotation is based on our understanding of the information you furnished us. Please check your quotation carefully. Anything not listed will not be furnished.**





P.O. Box 269, Graham Street, Hyde, Pennsylvania 16843  
 Tel: (814) 765-9615 · Fax: (814) 765-5410

Speed EC Motors, Balanced Port Expansion Valve, Liquid Line Solenoid (Mounted), and Mechanical Room Thermostat (Mounted)

- (1) QTY RFH250E44-EA 208-230/3/60 Full Hermetic Air Cooled Condensing Unit (19,070 BTUH @ +25 SST, +95 Amb, R404A) with PSC Condensing Motors, Standard Tafco Options and Features
- (1) QTY RL6A195ADAA 115/1/60 Next Gen All-Temp Air Defrost Cooler Unit with Dual Speed EC Motors, Balanced Port Expansion Valve, Liquid Line Solenoid (Mounted), and Mechanical Room Thermostat (Mounted)

Subtotal F.O.B. Hyde, PA

**OPTIONS:**

- \* Five Year Compressor Warranties
- \* Door raised/undercut for tile

**Lead Time:** Consult factory

QUOTATION VALID FOR 60 DAYS


**Notes & Exceptions**

**Please verify quotation, information provided unclear and incomplete-pricing subject to change. Tafco's standard construction, sizes, and refrigeration, for exact custom size, please contact factory for additional charge.**

Tafco 4" thick cooler wall and ceiling panels have an R-value of 29 and are EISA 2007 compliant.  
 Tafco 4" thick freezer wall and ceiling panels have an R-value of 32.48 and are EISA 2007 compliant.  
 Tafco panel insulation is CFC/HCFC free, Class one, fire rated, foamed-in-place rigid polyurethane insulation.

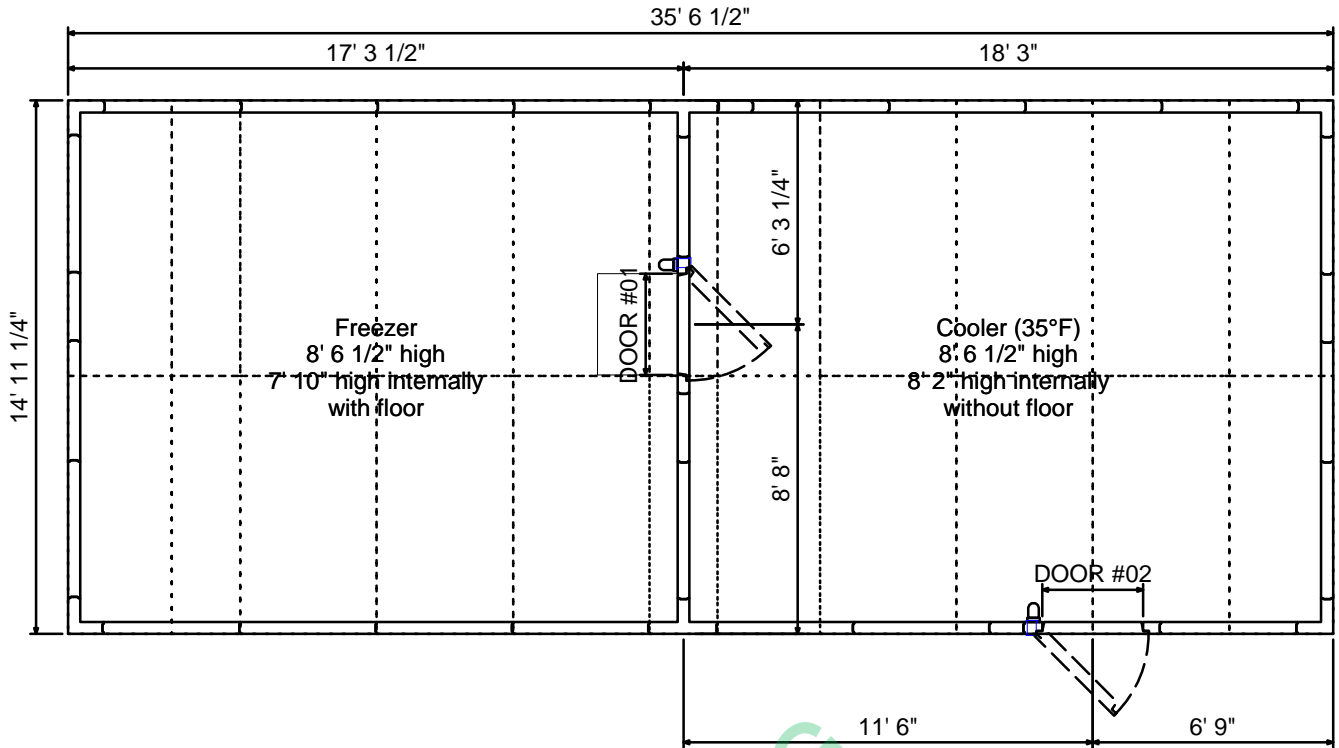
Mean Temperature for Freezer 20°	
K-Factor = .1232	R-Factor = 8.12 per in.
R-Factor 2" panel = 16.2	U-Factor 2" = 0.061
R-Factor 4" panel = 32.5	U-Factor 4" = 0.031
R-Factor 5" panel = 40.6	U-Factor 5" = 0.025
R-Factor 6" panel = 48.7	U-Factor 6" = 0.021

Mean Temperature for Cooler 55°	
K-Factor = .1375	R-Factor = 7.26 per in.
R-Factor 2" panel = 14.52	U-Factor 2" = 0.069
R-Factor 4" panel = 29.04	U-Factor 4" = 0.035
R-Factor 5" panel = 36.3	U-Factor 5" = 0.027
R-Factor 6" panel = 43.6	U-Factor 6" = 0.023

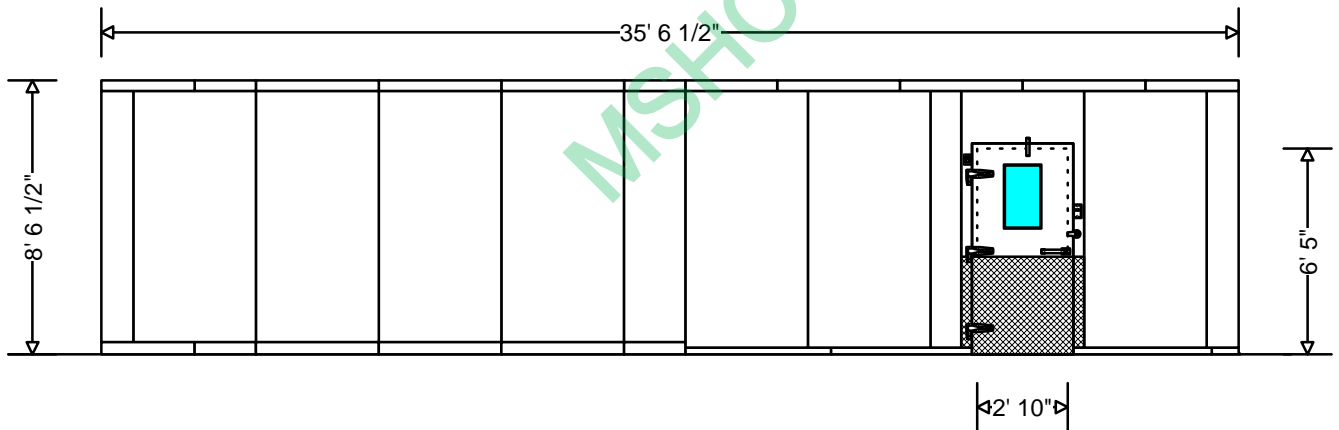
 **WARNING:** CALIFORNIA PROP 65 - This product may expose you to chemicals including Lead, Chromium (hexavalent compounds) and Phthalates (DEHP) which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

Revision	Date	Name	Comments
0	10/29/2018	Angelina Doloroso	Project created





Plan View



Elevation View

Checked by:

Customer Approval \_\_\_\_\_



## SV-150 • SV-175 • SV-200 • SV-250 Ice/Beverage Dispenser



SV-250 with IB1090C  
Ice Machine



SV-150



SV-175



SV-200

Servend's new SV Series features a no hassle one-piece structural base, recessed coldplate inlets for more line space behind the splash panel, and a modular design; all resulting in a more durable machine dispensing consistent, quality drinks.

### Standard Features

- One-piece ABS base provides a solid foundation as well as adding structural rigidity to the dispenser.
- Enhanced agitation and drive system provides consistent ice dispense and ease of serviceability.
- Patented Rocking Chute™ simplifies ice dispensing and storage.
- Multi-port flex manifold adds carb/noncarb flexibility. Fast flavor change-overs reduce service complexity.



ISO 9001:2000  
Quality System  
Certified

2100 Future Drive  
Sellersburg, IN 47172 USA

Tel: 812.246.7000  
Fax: 812.246.7024

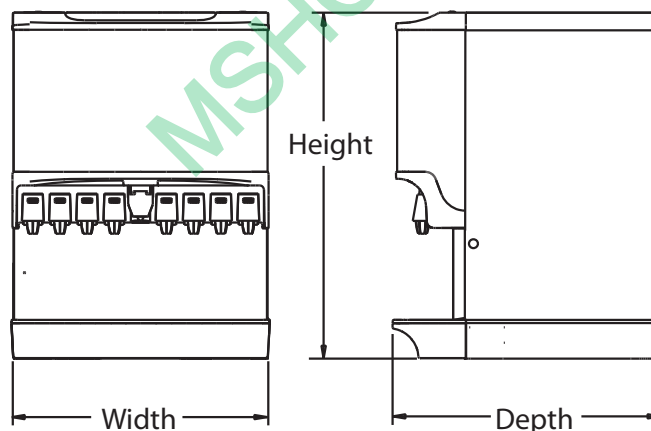
[www.manitowocbeverage.com/us](http://www.manitowocbeverage.com/us)



SV-150 • SV-175 • SV-200 • SV-250 Ice/Beverage Dispenser

## Specifications

	SV-150	SV-175	SV-200	SV-250
Standard Features	Lighted merchandiser, Quench graphics, key switch, leg kit, and drain kit.			
Approx. Shipping Weights	250 lbs. / 113 kgs.	277 lbs. / 126 kgs.	304 lbs. / 138 kgs.	335 lbs. / 152 kgs.
Approximate Countertop Weight (w/o ice)	198 lbs. / 90 kgs.	223 lbs. / 101 kgs.	235 lbs. / 107 kgs.	260 lbs. / 118 kgs.
Ice Storage Capacity	Up to 150 lbs. / 68 kgs.	Up to 175 lbs. / 80 kgs.	Up to 200 lbs. / 91 kgs.	Up to 250 lbs. / 114 kgs.
Electrical Requirements	Dispenser: 120V/60Hz/2.8FLA. 220V/50Hz/1 also available.			
Drain	Single 0.75" (1.91 cm) PVC (N.P.T.) drain fitting extends from drain pan. Units can be drained from the bottom or back of unit.			
Number of Valves	6	8	8 or 10	
Ice Machine Compatibility	Manual fill or top-mount with compatible ice machines. Contact MBE for adapter kit requirements for top-mounted ice machine applications.			
Manifold	6 valve 2-1-1-2	8 valve 3-1-1-1-2	8 valve 3-1-1-1-2 / 10 valve 3-1-2-1-3	
Options	Flomatic 464 beverage valves. Both 424 and 464 available in sanitary lever, push button, portion control, and autofill valve. Other valves available. Contact MBE for details. Other options: regulators, installation kits, and side splash panels, Americans with Disabilities Act (ADA) compliant selection touchpads.			



	SV-150	SV-175	SV-200	SV-250
Width	23.00"	25.00"	30.00"	30.00"
	58.42 cm	63.50 cm	76.20 cm	76.20 cm
Depth	31.13"	31.13"	31.13"	31.13"
	79.07 cm	79.07 cm	79.07 cm	79.07 cm
Height*	34.88"	34.88"	34.88"	40.88"
	88.60 cm	88.60 cm	88.60 cm	103.80 cm

\*Height dimension without full lid.  
Add 0.50" (1.27 cm) for full lid.

2100 Future Drive  
Sellersburg, IN 47172 USA

Tel: 812.246.7000  
Fax: 812.246.7024  
[www.manitowocbeverage.com/us](http://www.manitowocbeverage.com/us)





# DCM-500B\_H-OS

**OPTI-SERVE SERIES  
SANITARY CUBELET ICE MACHINE/DISPENSER**




DCM-500B\_H-OS  
11/03/17  
Item # 13147


Item #: \_\_\_\_\_  
Project: \_\_\_\_\_  
Qty: \_\_\_\_\_  
AIA#: \_\_\_\_\_

- W x D x H**  
26" x 22<sup>1/2</sup>" x 40"
- SD-450**  
26<sup>1/4</sup>" x 22" x 32<sup>1/2</sup>"
- SD-500**  
25<sup>9/10</sup>" x 22" x 32<sup>3/4</sup>"



## Features

- ▶ Durable stainless steel exterior
- ▶ Advanced CleanCycle24™ design 
- ▶ Stainless steel auger with greaseless bearing

- Up to 618 lbs. of ice production per 24 hours
- Built-in storage capacity of 1.3ft<sup>3</sup>/40 lbs.\*
- Every 12 hours, unit performs 20 minute purge to rid itself of impurities
- Corrosion resistant stainless steel exterior
- Easy to chew, cubelet ice
- Self-contained design reduces opportunities for cross contamination
- Protected by H-GUARD Plus Antimicrobial Agent 
- Dispenses ice and water
- R-404A Refrigerant

### Warranty:

3 Year Parts & Labor on entire machine.  
5 Year Parts on Compressor; air-cooled condenser coil.  
Valid in United States, Canada, Puerto Rico and U.S. Territories. Contact factory for warranty in other countries.  
\*Rated in accordance with AHRI Standard 820(I-P). Capacity based on 100% of total volume x 30 lb/ft<sup>3</sup> average density of ice.

**DCM-500BAH-OS**  
Air-Cooled  
Shown with optional  
SD-450 Stand

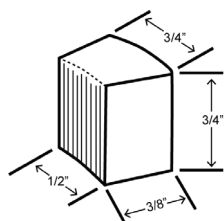
**DCM-500BWH-OS**  
Water-Cooled

*\*Hands-free sensor designed for use with opaque containers. Not intended for outdoor use - avoid placement in direct sunlight.*



Condenser	Model	ICE PRODUCTION			WATER USAGE			ELECTRICAL			Heat Rejection BTU/hr.	Shipping Weight	ENERGY STAR®
		Air / Water Temp Lbs. per 24 hours 70°/ 50°F	90°/ 70°F	Type of Ice (Hardness Rating)	Potable Gal. per 100 lbs. 90°/ 70°F	Condenser Gal. per 100 lbs. 90°/ 70°F	kWh Used per 100 lbs. 90°/ 70°F	Max. Fuse Size or HACR Circuit Breaker	Amperage	Voltage			
Air-Cooled	DCM-500BAH-OS	618	450	Cubelet (88)	12.0	N/A	5.62	20A	12.9A	115V/60/1	7,000	253 lbs.	
Water-Cooled	DCM-500BWH-OS	590	512	Cubelet (88)	12.0	112	4.48	20A	12.6A	115V/60/1	6,000	253 lbs.	

### Cubelet Dimensions\*



\* approximate size in inches, image not to scale

### Operating Limits

- Ambient Temp Range 45 - 100°F
- Water Temp Range 45 - 90°F
- Water Pressure 10 - 113 PSIG
- Voltage Range 104 - 127V

### Service

- Allow 6" (15 cm) clearance at rear and sides for proper air circulation and ease of maintenance/ service should they be required. Allow 24" (61 cm) clearance at top to allow for removal of the auger.

*Not intended for outdoor use - avoid placement in direct sunlight.*

### Plumbing

- Icemaker Water Supply Line: Minimum 1/4" Nominal ID Copper Water Tubing or Equivalent
- Icemaker Drain Line: Minimum 3/4" Nominal ID Hard Pipe or Equivalent

#### Water-Cooled Model (Lines Must Be Independent of Icemaker)

- Condenser Water Supply Line: Minimum 1/4" Nominal ID Copper Water Tubing or Equivalent
- Condenser Drain/Return Line: Minimum 1/4" Nominal ID Hard Pipe (open drain system) or Copper Water Tubing (closed loop system) or Equivalent



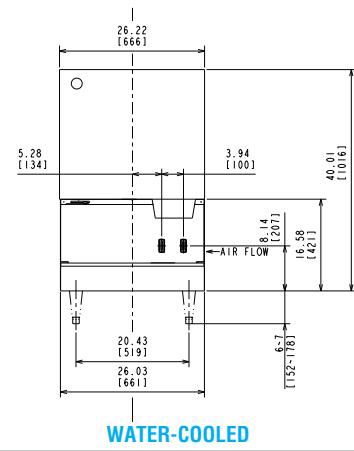
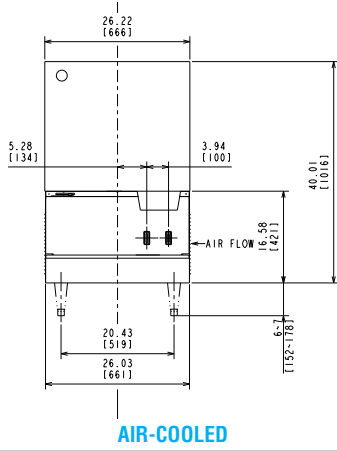
# DCM-500B\_H-OS

## OPTI-SERVE SERIES SANITARY CUBELET ICE MACHINE/DISPENSER



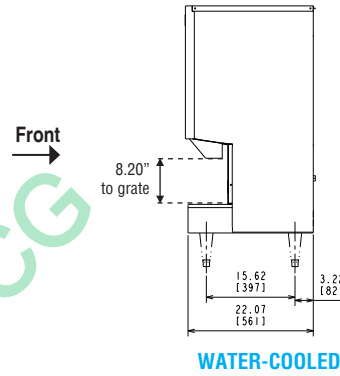
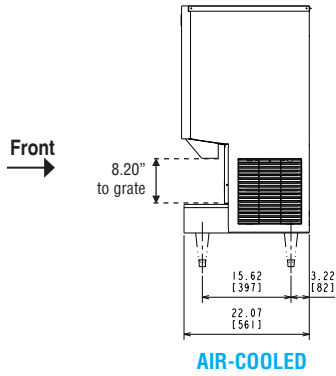
DCM-500B\_H-OS  
11/03/17  
Item # 13147

FRONT VIEW

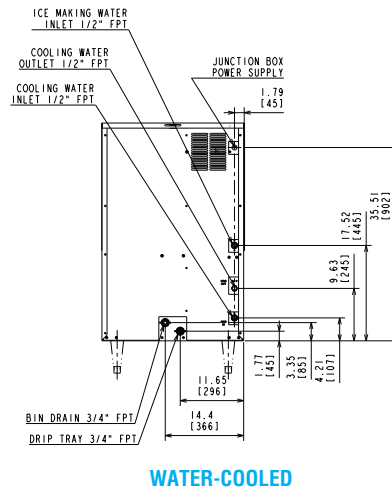
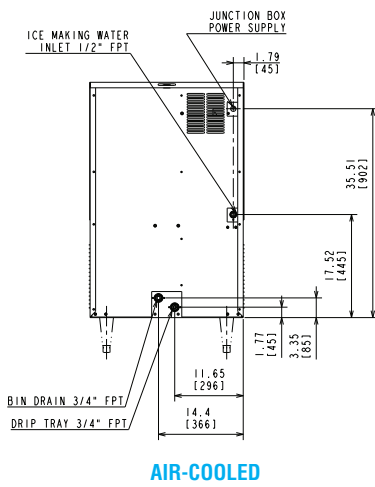


inch  
[mm]

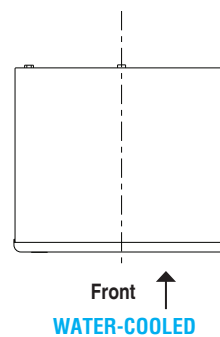
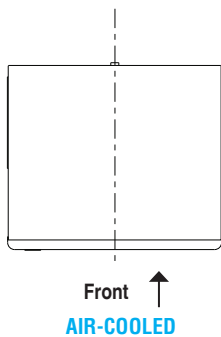
SIDE VIEW



REAR VIEW



TOP VIEW



MSHCG

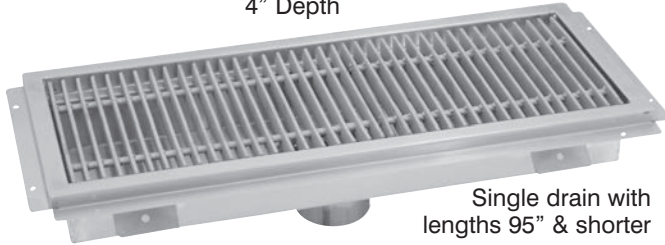


STAINLESS STEEL

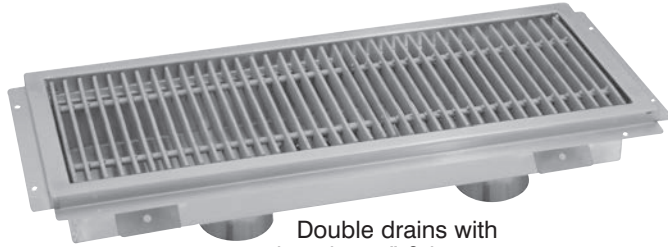
# FLOOR TROUGHS & FLOOR DRAINS

## Floor Troughs

4" Depth



Single drain with lengths 95" & shorter



Double drains with lengths 96" & longer



Item #: \_\_\_\_\_ Qty #: \_\_\_\_\_

Model #: \_\_\_\_\_

Project #: \_\_\_\_\_

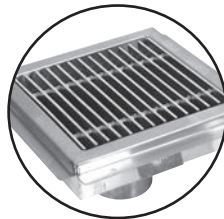


Cut-Out View of Anti-Splash

**FT-1**  
Optional Anti-Splash Guard  
(Per ft. Factory installed)

## Floor Drain

4" Depth



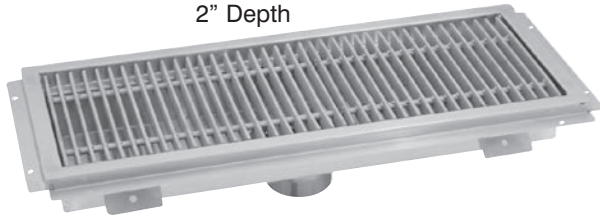
**FD-1**  
Optional Stainless Steel Grate for Floor Drains



**FT-2**  
Stainless Steel Strainer Basket with Handle (Included with all Floor Troughs, Water Receptacles & Floor Drains)

## Floor Water Receptacles

2" Depth



### OPTIONAL ACCESSORIES

Model #	Qty
FT-1 Anti-Splash Guard per ft.	
FT-2 Replacement Strainer Basket	
FD-1 Floor Drain Stainless Steel Grate	

### FEATURES:

- Waste receptacle will accommodate up to a 4" waste pipe. Includes 4" O.D. - 3" Long Plumbing Sleeve.
- Removable perforated stainless steel strainer basket with handle provided.
- Pitched towards waste.
- Includes "Subway Style" grating from 3/16" x 1" solid "304" stainless steel bar or fiberglass. (Not included with Floor Drains. Use Model FD-1) Grating is spaced 9/16" (Inside clearance) between bars to prevent casters from getting trapped.
- Troughs 96" or larger in length made with two (2) drains.
- Custom sizes available. Consult factory.

### CONSTRUCTION:

- All TIG welded.
- All external corners welded and polished to a satin finish.

### MECHANICAL:

- Creased design to ensure proper drainage.
- Perimeter flange mounts directly to sub floor.
- 3/4" vertical step designed to accommodate floor tile installation.

### MATERIAL:

- 14 gauge "304" type stainless steel polished stainless steel grating.
- Fiberglass grating: Gray fiberglass composite. Light weight, skid and corrosion resistant.



**Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.**

For Orders & Customer Service:

Email: customer@advancetabco.com or Fax: 631-242-6900

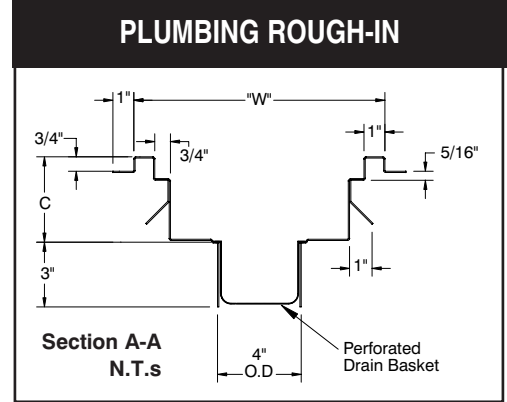
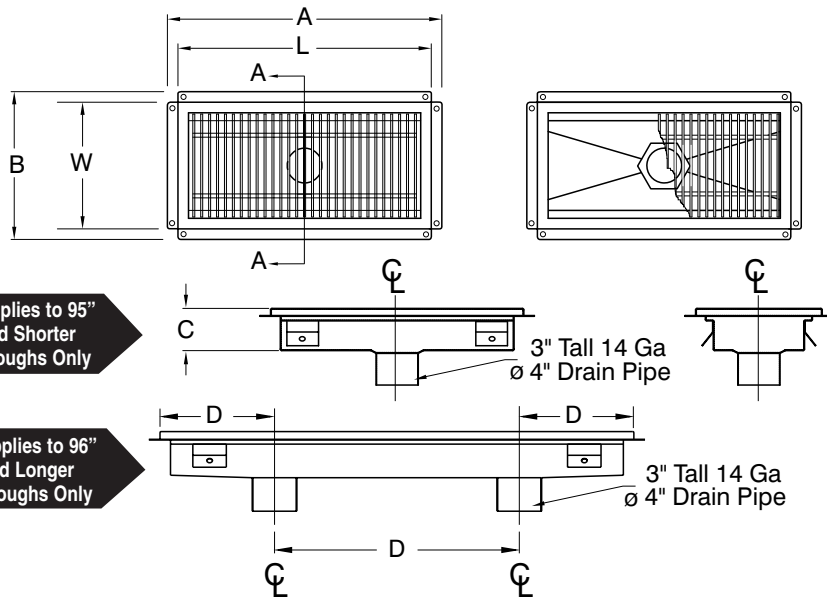
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Email: smartfab@advancetabco.com or Fax: 631-586-2933

# DIMENSIONS and SPECIFICATIONS

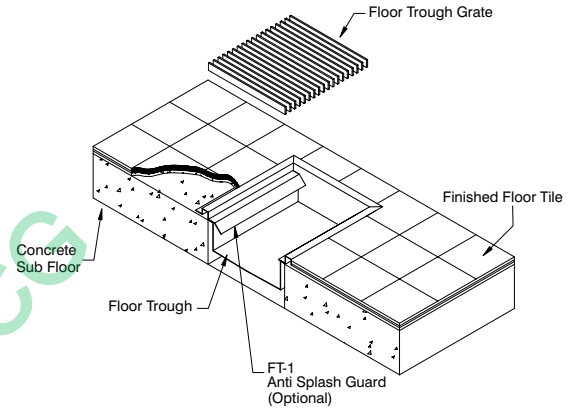
ALL DIMENSIONS ARE TYPICAL

TOL ± .500"



## FLOOR TROUGHS

Stainless Steel Grating	Wt.	Fiberglass Grating	Wt.	L	W	A	B	C	D
FTG-1224	46 lbs.	FFTG-1224	34 lbs.	24"	12"	26"	14"	4"	-
FTG-1230	56 lbs.	FFTG-1230	37 lbs.	30"	12"	32"	14"	4"	-
FTG-1236	66 lbs.	FFTG-1236	40 lbs.	36"	12"	38"	14"	4"	-
FTG-1242	76 lbs.	FFTG-1242	43 lbs.	42"	12"	44"	14"	4"	-
FTG-1248	86 lbs.	FFTG-1248	46 lbs.	48"	12"	50"	14"	4"	-
FTG-1254	96 lbs.	FFTG-1254	49 lbs.	54"	12"	56"	14"	4"	-
FTG-1260	106 lbs.	FFTG-1260	52 lbs.	60"	12"	62"	14"	4"	-
FTG-1272	116 lbs.	FFTG-1272	55 lbs.	72"	12"	74"	14"	4"	-
FTG-1284	126 lbs.	FFTG-1284	81 lbs.	84"	12"	86"	14"	4"	-
FTG-1296*	146 lbs.	FFTG-1296	90 lbs.	96"	12"	98"	14"	4"	32"
FTG-12108*	166 lbs.	FFTG-12108	99 lbs.	108"	12"	110"	14"	4"	36"
FTG-12120*	180 lbs.	FFTG-12120	108 lbs.	120"	12"	122"	14"	4"	40"
FTG-1824	62 lbs.	FFTG-1824	43 lbs.	24"	18"	26"	20"	4"	-
FTG-1830	74 lbs.	FFTG-1830	47 lbs.	30"	18"	32"	20"	4"	-
FTG-1836	86 lbs.	FFTG-1836	54 lbs.	36"	18"	38"	20"	4"	-
FTG-1842	98 lbs.	FFTG-1842	61 lbs.	42"	18"	44"	20"	4"	-
FTG-1848	110 lbs.	FFTG-1848	69 lbs.	48"	18"	50"	20"	4"	-
FTG-1854	122 lbs.	FFTG-1854	76 lbs.	54"	18"	56"	20"	4"	-
FTG-1860	134 lbs.	FFTG-1860	83 lbs.	60"	18"	62"	20"	4"	-
FTG-1872	146 lbs.	FFTG-1872	90 lbs.	72"	18"	74"	20"	4"	-
FTG-1884	165 lbs.	FFTG-1884	111 lbs.	84"	18"	86"	20"	4"	-
FTG-1896*	187 lbs.	FFTG-1896	125 lbs.	96"	18"	98"	20"	4"	32"
FTG-18108*	208 lbs.	FFTG-18108	138 lbs.	108"	18"	110"	20"	4"	36"
FTG-18120*	229 lbs.	FFTG-18120	150 lbs.	120"	18"	122"	20"	4"	40"
FTG-2424	69 lbs.	FFTG-2424	52 lbs.	24"	24"	26"	26"	4"	-
FTG-2430	81 lbs.	FFTG-2430	59 lbs.	30"	24"	32"	26"	4"	-
FTG-2436	104 lbs.	FFTG-2436	68 lbs.	36"	24"	38"	26"	4"	-
FTG-2442	118 lbs.	FFTG-2442	75 lbs.	42"	24"	44"	26"	4"	-
FTG-2448	131 lbs.	FFTG-2448	83 lbs.	48"	24"	50"	26"	4"	-
FTG-2454	145 lbs.	FFTG-2454	95 lbs.	54"	24"	56"	26"	4"	-
FTG-2460	162 lbs.	FFTG-2460	102 lbs.	60"	24"	62"	26"	4"	-
FTG-2472	195 lbs.	FFTG-2472	119 lbs.	72"	24"	74"	26"	4"	-
FTG-2484	218 lbs.	FFTG-2484	137 lbs.	84"	24"	86"	26"	4"	-
FTG-2496*	243 lbs.	FFTG-2496	153 lbs.	96"	24"	98"	26"	4"	32"
FTG-24108*	274 lbs.	FFTG-24108	168 lbs.	108"	24"	110"	26"	4"	36"
FTG-24120*	310 lbs.	FFTG-24120	188 lbs.	120"	24"	122"	26"	4"	40"



## FLOOR DRAINS

Model #	Length	Width	A	B	C	Wt.
FDR-1212	12"	12"	14"	14"	4"	26 lbs.

## FLOOR WATER RECEPTACLES

(2" Depth)

Model #	Length	Width	A	B	C	Wt.
FRG-24	24"	12"	26"	14"	2"	44 lbs.
FRG-36	36"	12"	38"	14"	2"	63 lbs.
FRG-48	48"	12"	50"	14"	2"	82 lbs.

**CUSTOM SIZES AVAILABLE!**

\*Troughs 96" or larger in length made with two (2) drains.



SUPERIOR COOLING

## QUALITY DISPENSE



Majestic 3

- Accommodates three, five and six gallon bags
- Accommodates up to six gallon bag-n-box
- Easy to use dripless operation for optimum sanitation
- Constant cooling at the pinch point
- Hands-free operation



Majestic 1



Majestic 2

**SILVER KING**  
WE'VE GOT REFRIGERATION DOWN COLD.™



**MODELS**  
SKMAJ1  
SKMAJ2  
SKMAJ3

- Stainless steel exterior and interior
- Temperature indicator on door front. Adjustable temperature control.
- Door: Heavy duty hinges. Easily removable door gasket for ease in cleaning.
- Dispenser valve: Spring loaded lift type valve for dripless operation and optimum sanitation.
- Electrical: Standard 115 volt, 60 Hz, single phase. Also available in 230 volt, 50Hz, single phase.
- Listings: UL (US and Canada), NSF International
- Warranty: One year parts and labor. Five year warranty on compressor.



Specifications subject to change without notice.

MODEL	DESCRIPTION	EXTERIOR DIMENSIONS			COMPRESSOR	AMPS	WEIGHT
		LENGTH	DEPTH	HEIGHT			
<b>C4 SERIES: Includes 6 gallon crate(s) and platform(s)</b>							
SKMAJ1/C4	Single valve, accommodates 3, 5 and 6 gallon	15 1/2"	17 1/8"	39 1/2"	1/10 hp	1.2	80 lbs
SKMAJ2/C4	Double valve, accommodates 3, 5 and 6 gallon	26 1/2"	17 1/8"	39 1/2"	1/10 hp	1.3	110 lbs
SKMAJ3/C4	Triple valve, accommodates 3, 5 and 6 gallon	37 1/2"	17 1/8"	39 1/2"	1/6 hp	1.6	140 lbs
<b>C3 SERIES: With shipboard legs; includes 6 gallon crate(s) and platform(s)</b>							
SKMAJ1/C3	Single valve, accommodates 3, 5 or 6 gallon	15 1/2"	17 1/8"	39 1/2"	1/10 hp	1.2	80 lbs
SKMAJ2/C3	Double valve, accommodates 3, 5 or 6 gallon	26 1/2"	17 1/8"	39 1/2"	1/10 hp	1.3	110 lbs
SKMAJ3/C3	Triple valve, accommodates 3, 5 or 6 gallon	37 1/2"	17 1/8"	39 1/2"	1/6 hp	1.6	140 lbs

**ACCESSORIES**



Milk crate for 3, 5 or 6 gallon bags  
Item # 35904



Platform for bag-n-box  
Item # 63959



3 gallon dispenser can  
Item # 62642



5 gallon dispenser can  
Item # 60224

Not Pictured:  
Tubes 10 1/4"  
Item # 20323



Application: Milk in bag (3, 5 or 6 gallon)



Application: Bag-n-box milk



Application: Bag-n-box milk

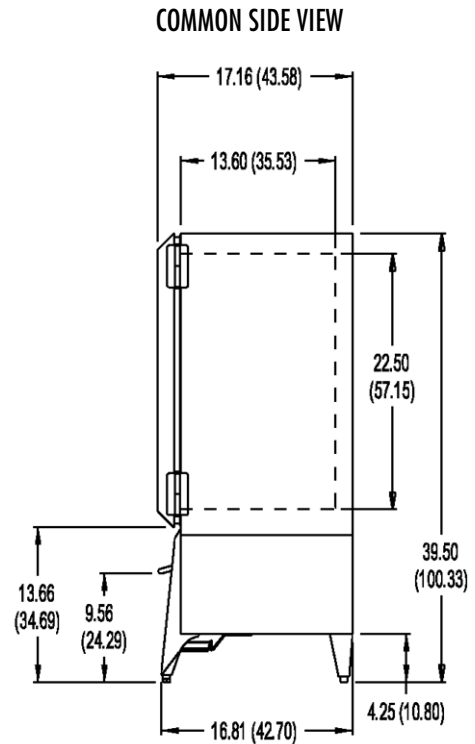
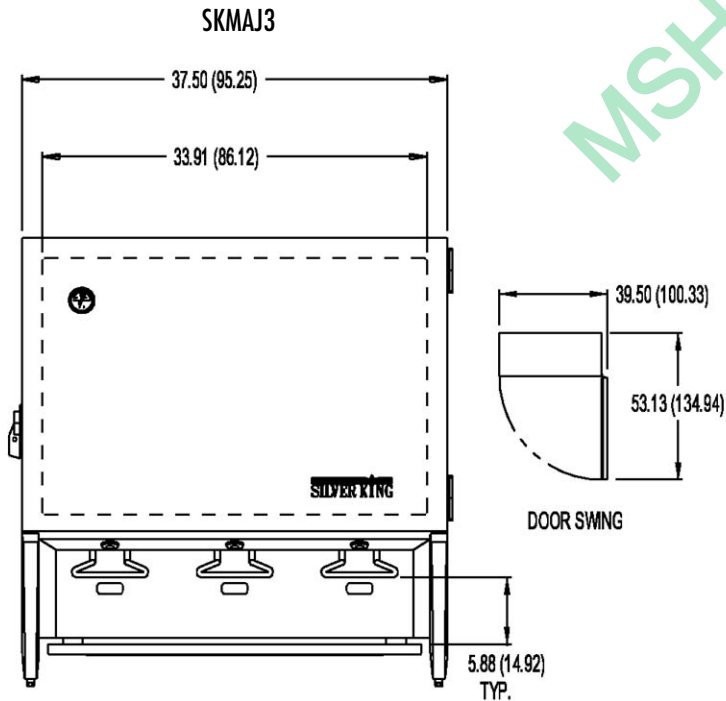
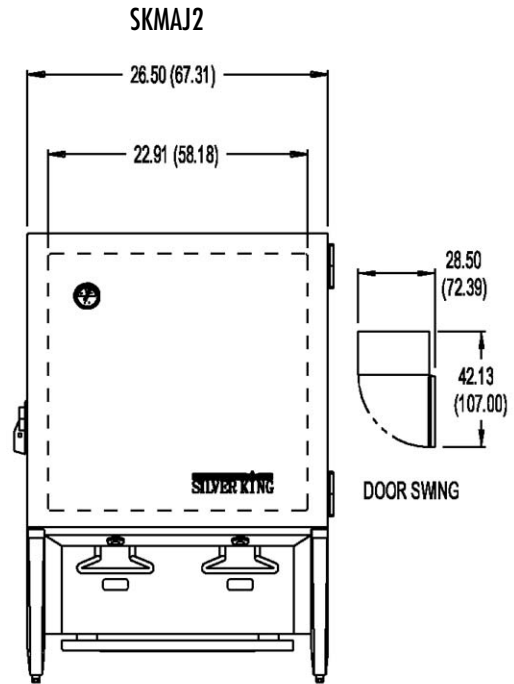
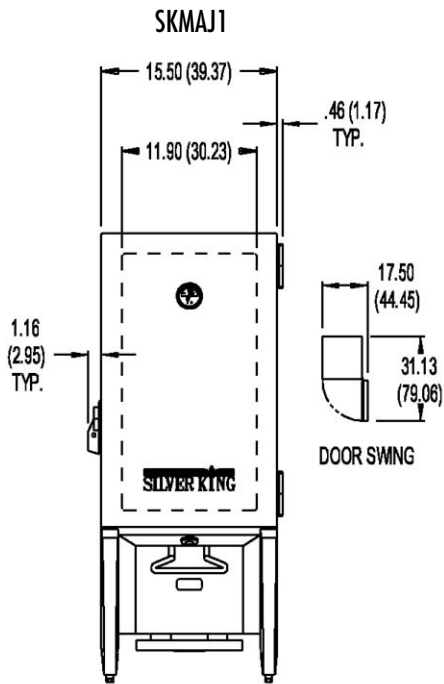
shipboard legs



Application: 5 gallon dispenser can (sold as accessory)

MSHCG

Dimensions in inches and centimeters  
All drawings shown with standard legs



**SILVER KING**  
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1600 Xenium Lane North  
Minneapolis, MN 55441-3787  
Phone (763) 923-2441  
Fax (763) 553-1209  
www.silverking.com

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# EXTRACTOR ICED TEA BREWER

## TBS-2121 Touchscreen Series

3.5 Gallon Twin Brewer



Brew the most flavorful and refreshing iced teas with the **TBS-2121** Twin 3.5 Gallon Iced Tea Brewer from FETCO. Precision brew controls, modern style and expert craftsmanship come together to provide a complete iced beverage solution for the operator and an extraordinary taste experience for their customers.

Brewer shown with 2ea. 3.5 Gallon Iced Tea Dispenser (ITD-2135) sold separately.



**Touchscreen Simplicity**  
A simple touch is all it takes to experience full control over the brew cycle.



**Functional Design**  
New features and exclusive designs provide an extraordinary tea service experience for both operators and consumers.



**Style**  
Modern European style elevates your iced tea service with an attractive, inviting self-serve atmosphere.



**Solid Construction**  
FETCO's reputation is second to none for precision craftsmanship and everlasting durability.

**FETCO**  
DRIVEN TO INNOVATION

# EXTRACTOR® TBS-2121 Twin 3.5 Gallon Iced Tea Brewer

The EXTRACTOR TBS-2121 Twin 3.5 Gallon Touchscreen Iced Tea Brewer is the latest high-quality product offering from FETCO. It combines the simplicity of a touchscreen with new features like the innovative “intelligent” brew basket for quick, efficient operation and for producing the most flavorful taste profiles from your teas.

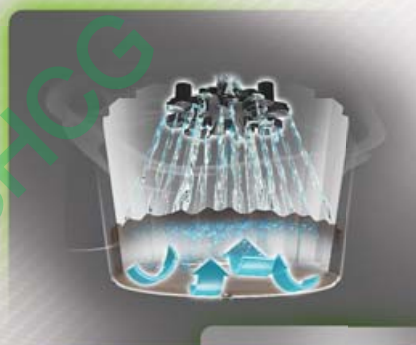
## User Friendly Operation

- Access all controls via an inviting touchscreen interface display that blends intuitive icons with dynamic time and volume data.
- Efficiently navigate set-up, programming, diagnostics and daily brewing modes.
- Customize the start screen to tie your equipment and product offerings into a consistent brand message.
- Create and display up to nine recipe names for easy access and reference.



## Extract, Brew and Steep

- FETCO’s patented Cascading Spray Dome water delivery system provides excellent coverage for loose leaf or prepackaged tea and will never clog!
- Dual dilution spouts positioned above the container dispense water directly from the inlet. The right-side spout can also deliver liquid sweetener (if so equipped).
- Program the exact steep time for precise control over flavor extraction.



## Product Views

Front



Side



Back



Isometric





### Intelligent Design

- Brew Side Sensors automatically detect which side brewing will occur and displays the matching recipes on the touchscreen.
- Adjustable Orifice and Filter Screen System features a drain cap that removes for easy changing of up to 7 different orifice sizes and filter screen mesh patterns.
- Expandable Dispenser Base with front-to-back guide rails keep dispensers properly aligned with brew basket.



### Space Savings

- Slim profile brewer takes up minimal counter space.
- Slim profile dispensers can be filled and placed in any area to make an instant serving station.
- Optional dispenser station add-on platforms are available in single and dual sizes for the right amount of dispenser space you need.

### Accessories & Options

#### Dispenser Platforms



13"W for ITD Dispensers  
1102.00197.00



7.5"W for ITD Dispensers  
1102.00202.00



13"W Universal Dispenser Platform  
1102.00205.00



7.5"W Universal Dispenser Platform  
1102.00206.00

#### Brew Basket and Inserts



Brew Basket for TBS-2121  
15" Dia. x 5 1/2" D  
#B013000B2

#### Optional Graphics



#D064W112



Handle I.D. Insert  
Blue: 1023.00180.00



Handle I.D. Insert  
Red: 1023.00190.00



Handle I.D. Insert  
Green: 1023.00191.00



Handle I.D. Insert  
Orange: 1023.00192.00

## Water Specification

Water Inlet 1/4" Male Flare Fitting	Minimum Flow Rate 1.5 gpm [5.7 lpm]	Water Pressure 35-50 psig [241-345 kPa]
--	--	--

## Electrical Configuration

Configuration Code	Heater Configuration	Voltage	Phase	Wires	KW	Electrical Connection	Max Amp Draw	Gallon [Liter]/Hour
US / CANADA T212101	1 x 1680 W	120	1	2+G	1.7	NEMA 5-15P/5-20P-C	14.0	12.0 [46] <sup>(1)</sup>
WITH LIQUID SWEETENER INFUSION PUMP (AVAILABLE IN US MARKET ONLY) T212211	1 x 1680 W	120	1	2+G	1.8	NEMA 5-20P	14.5	12.0 [46] <sup>(1)</sup>

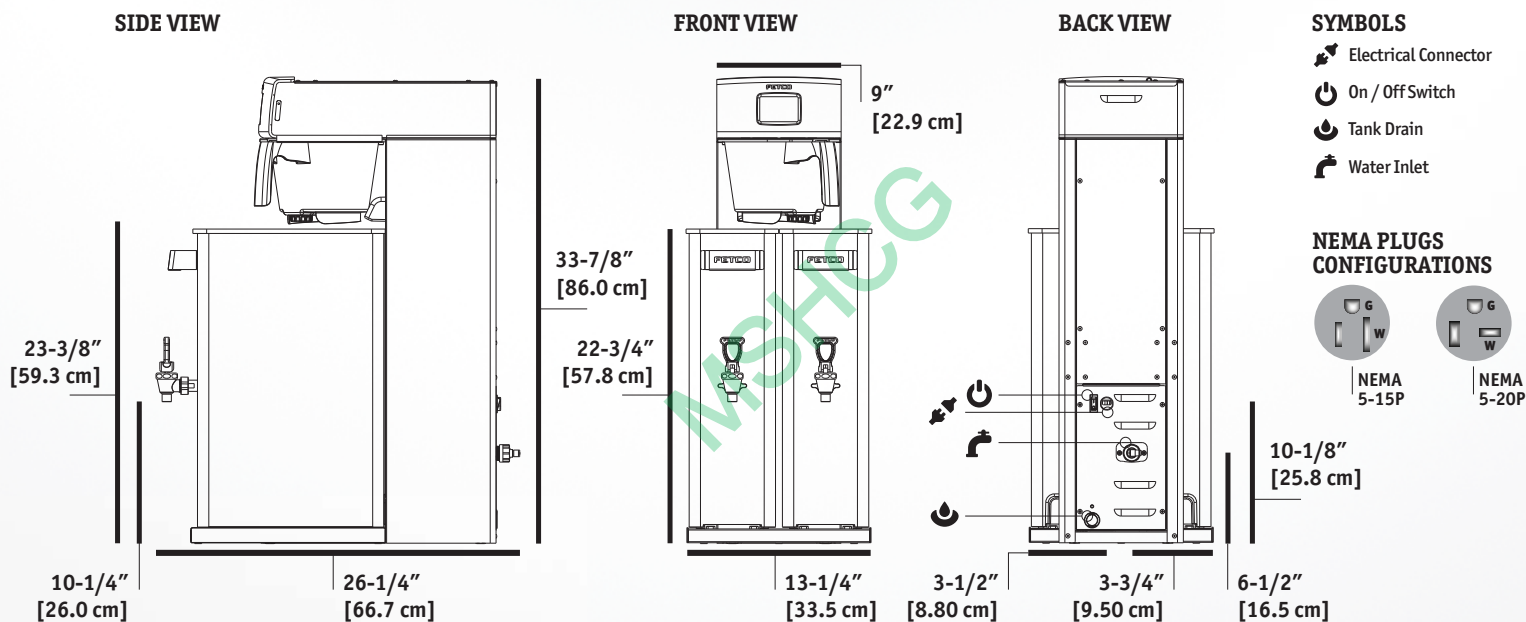
(1) Based on standard factory settings: 5.5 minute brew time; 0% prewet; 200°F water.

## Measurements

Model TBS-2121	Height 34" [87 cm]	Width 13 1/2" [25.4 cm]	Depth 26 1/4" [67 cm]	Empty Weight 35 lbs [15.9 kg]	Filled Weight 44 lbs [20 kg]	Shipping Weight 46 lbs [21 kg]
TBS-2121-S <sup>(2)</sup>	34" [87 cm]	13 1/2" [25.4 cm]	26 1/4" [67 cm]	40 lbs [18.1 kg]	60 lbs [28 kg]	51 lbs [24 kg]

(2) With Liquid Sweetener Infusion Pump.

## Dimensional Views



## Cups per Hour\*

8oz.	288
12oz.	192
16oz.	144
20oz.	115

## Compatible Dispensers

ITD-2135  
3.5G Iced Tea Dispenser  
(#D064)

ITD-2135  
3.5G Iced Tea Dispenser  
with Iced Tea Color Graphic  
(#D064W112)



Product DIMS:  
Height: 21 1/2" [55 cm]  
Width: 6 3/4" [18 cm]  
Depth: 16 3/4" [43 cm]  
Weight:  
Empty: 9 lbs [4.1 kg]  
Filled: 34 lbs [16 kg]

## Paper Filters

#F001  
15" x 5 1/2" Paper Filter



\* Approximate based on maximum power setting.

Patents: 6,148,717 & 6,565,906 & 6,576,282. Other Patents pending.



FETCO® is an active member of



# FETCO

fetco.com

847.719.3000  
1.800.338.2699 USA

847.719.3001

Food Equipment Technologies Co.  
600 Rose Road  
Lake Zurich, IL 60047  
USA

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CE11026

# HANDLE OPERATED COFFEE BREWER

## CBS-5000 Series

### CBS-52H-20

Twin 2.0 Gallon Brewer



The CBS-5000 Series was designed for simplicity. The Handle Operated Series brewers save the operator time and effort by delivering quick and consistent results from your pre-programmed coffee recipe. It is the reliable choice for serving high-volumes of single batch coffee all day long.



**Handle operation — a quick start!**

Simply twist the handle to begin the brew cycle and in minutes your perfectly brewed coffee is ready to serve.



**Manual water faucet.**

Safely dispense hot water away from steam and brew basket.



**Set it and forget it.**

Program your recipe once and this brewer delivers consistent and repeatable results.

Shown with 2.0 Gallon LUXUS® Thermal Dispensers (L3D-20)

**FETCO®**  
TRUSTED | RELIABLE | QUALITY



## Water Specification

Water Inlet  
3/8" male flare fitting

Minimum Flow Rate  
1 1/4 gpm [4.71 lpm]

Water Pressure  
20-75 psig [138-517 kPa]

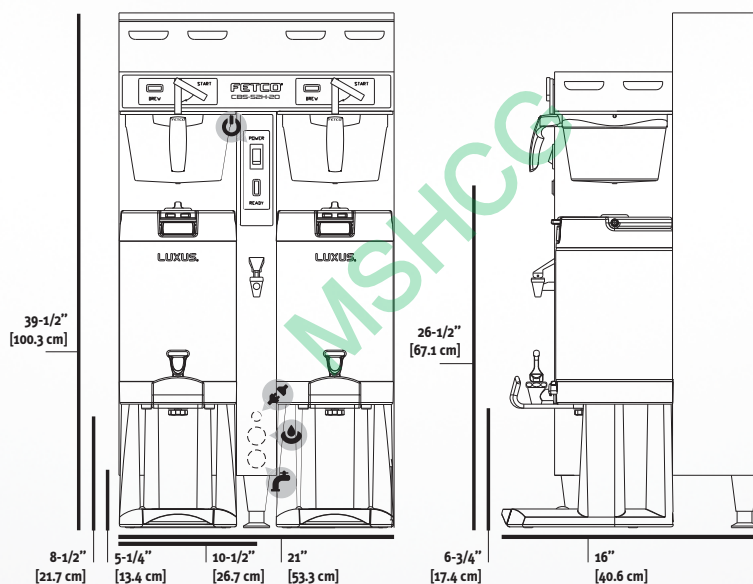
## Electrical Configuration

Configuration Code	Heater Configuration	Voltage	Phase	Wires	KW	Electrical Connection	Max Amp Draw	Gallon [Liter] /Hour
<b>US &amp; CANADA</b>								
C53016	2 x 3.0 kW	120/208-240	1	3+G	4.6-6.1	Terminal Block	22.0-25.4	14.0-20.0 [53.0-75.7] <sup>(1)</sup>
C53026	2 x 4.0 kW	120/208-240	1	3+G	6.1-8.1	Terminal Block	29.3-33.8	20.0-26.0 [75.7-98.4] <sup>(1)</sup>
C53036 <sup>(2)</sup>	3 x 3.0 kW	120/208-240	3	4+G	7.0-9.1	Terminal Block	19.4-22.4	22.0-30.0 [83.3-113.6] <sup>(1)</sup>
C53046 <sup>(2)</sup>	3 x 4.0 kW	120/208-240	3	4+G	9.1-12.1	Terminal Block	25.6-29.6	33.0-40.0 [113.6-151.4] <sup>(1)</sup>
C53186 <sup>(2)</sup>	3 x 4.0 kW	440-480	3	3+G	10.3-12.1	Terminal Block	13.6-14.8	34.0-40.0 [128.7-151.4] <sup>(1)</sup>
<b>INTERNATIONAL</b>								
C53076 <sup>(2)</sup>	3 x 3.0 kW	220-240/380-415	3	4+G	7.8-9.1	Terminal Block	11.8-12.9	26.0-30.0 [98.4-113.6] <sup>(1)</sup>
C53086 <sup>(2)</sup>	3 x 4.0 kW	220-240/380-415	3	4+G	10.3-12.1	Terminal Block	15.7-17.1	34.0-40.0 [128.7-151.4] <sup>(1)</sup>
C53096	2 x 3.0 kW	220-240	1	2+G	5.1-6.1	Terminal Block	23.3-24.4	18.0-20.0 [68.1-75.7] <sup>(1)</sup>
C53106	2 x 4.0 kW	220-240	1	2+G	6.8-8.1	Terminal Block	30.9-33.8	24.0-26.0 [90.8-98.4] <sup>(1)</sup>

(1) Based on standard factory settings: 4.0 minute brew time; 0% prewet; 200°F water.  
(2) Requires 3 phase Electrical Power System (Z056).

## Measurements

Height 39 1/2" [100.3 cm]	Width 21" [53.3 cm]	Depth 16" [40.6 cm]	Empty Weight 87 lbs [39.5 kg]	Filled Weight 150 lbs [68.0 kg]	Shipping Weight 100 lbs [45.4 kg]	Shipping Dimensions: 38" x 23" x 24" [96.5 x 58.4 x 61.0 cm]
------------------------------	------------------------	------------------------	----------------------------------	------------------------------------	--------------------------------------	---



## Compatible Dispensers

2.0 Gallon LUXUS® Thermal Server (L3S-20)  
2.0 Gallon LUXUS® Thermal Dispenser (L3D-20)

D053  
D050

## Customize Your Brewer

Single Serving Station for L3S-15/20 Server  
Twin Serving Station for L3S-15/20 Server  
Triple Serving Station for L3S-15/20 Server  
Identifier Plates, Acrylic

A097  
A098  
A099  
A069

## Cups per Hour\*

8oz. **475** 12oz. **317** 16oz. **238** 20oz. **190**

\* Approximate based on maximum power setting.

## Paper Coffee Filters

15" x 5.5" (500/Case)

F001

## Information

fetco.com

847.719.3000  
1.800.338.2699 USA  
847.719.3001

Food Equipment Technologies Co.  
600 Rose Road  
Lake Zurich, IL 60047  
USA

# GRINDER SERIES

## GR Series

### GR 1.2 | GR 1.3

#### Single Hopper



The **GR 1** single hopper coffee grinder is portion controlled so you grind only the amount you need. Grind a small, medium or large batch with the touch of a button. The GR 1's powerful .74 Hp motor and precision slice grinding discs help deliver uniform grind profiles. Grind directly into the brew basket to make grinding and brewing coffee quick and easy.

Grinder shown is GR 1.3. Model GR 1.2 also available.



**Control Panel** is programmable and serviceable from the front.



**Hopper** has a generous 15-pound capacity, which means less time filling it.



**Grinder Platform** holds all FETCO® EXTRACTOR® and 5000 series brew baskets. Grind directly into filter paper for larger models.

**FETCO**  
DRIVEN TO INNOVATION

### Electrical Configuration

Configuration Code	Voltage	Motor Power	Phase	Wires	KW	Max Amp Draw	Hopper Capacity Pounds [Kilos]	Grind Medium Ounces[Grams]/Minute
<b>DOMESTIC &amp; CANADA</b>								
G01012	120	0.74Hp	1	2+G	0.5	5.7	1x15 [6.8]	18 [510]
G01013	120	0.74Hp	1	2+G	0.5	5.7	1x15 [6.8]	18 [510]
<b>EXPORT</b>								
G01022	200-240	0.74Hp	1	2+G	0.7-0.8	5.7-6.3	1x15 [6.8]	18 [510]
G01023	200-240	0.74Hp	1	2+G	0.7-0.8	5.7-6.3	1x15 [6.8]	18 [510]

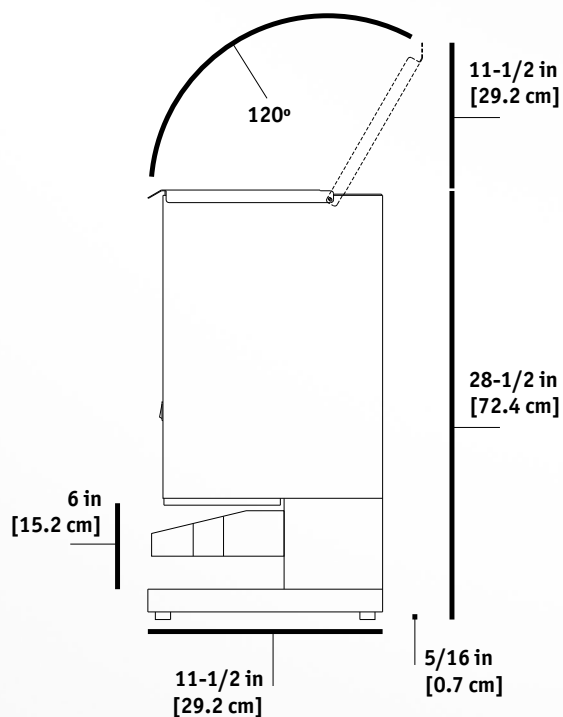
### Important

Brew basket sold separately.

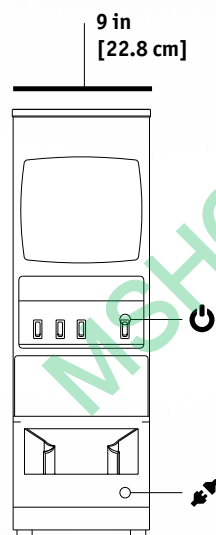
### Measurements

Height 28½ in [72.4 cm]	Width 9 in [22.8 cm]	Depth 11½ in [29.2 cm]	Empty Weight 50 lbs [22.6 kg]	Shipping Weight 72 lbs [32.6 kg]
----------------------------	-------------------------	---------------------------	----------------------------------	-------------------------------------

#### SIDE VIEW



#### BACK VIEW



#### SYMBOLS

- Electrical Connector
- On / Off Switch

FETCO® is an active member of



### Information

[fetco.com](http://fetco.com)

847.719.3000  
180.338.2699 USA  
 847.719.3001

Food Equipment Technologies Co.  
600 Rose Road  
Lake Zurich, IL 60047  
USA



# Dual 4 Quart Warmer

Model: □ W4-2

PRODUCT:

QUANTITY:

ITEM #:

## Designed Smart

- The W4-2 dual 4 qt. warmer is compact, portable, easy to maintain and inexpensive.
- Great for kitchens, buffets, counters, and dining rooms.
- With dual capabilities in one package, the W4-2 can be used wet or dry to keep moist foods (stews, soups, vegetables, etc.) at ideal serving temperature.

## Built Solid

- Constructed with heavy-duty stainless steel for excellent durability.
- Inside liner made with stainless steel.
- Steel “element support” stabilizes heating elements and reflects heat toward food.

## Reliability backed by APW Wyott’s Warranty

- APW Wyott warming equipment is backed by a 1-year parts and labor warranty, including our “Enhanced Warranty” service that replaces new units with certain product issues through the convenience of direct factory shipments.
- Certified by the following agencies:



MODEL W4-2 DUAL 4 QUART WARMER

## APW Wyott Design Features

- 8 qt. capacity; (2) 4 qt.
- Compact, portable
- Easy to maintain
- Heavy gauge stainless steel construction
- Individual infinite controls

See reverse side for product specifications.



APW Wyott Foodservice Equipment Company · 729 Third Ave., Dallas, TX 75226  
(800) 527-2100 · (214) 421-7366 · Fax (214) 565-0976 · www.apwwyott.com · info@apwwyott.com

Rev. 4/1/2006



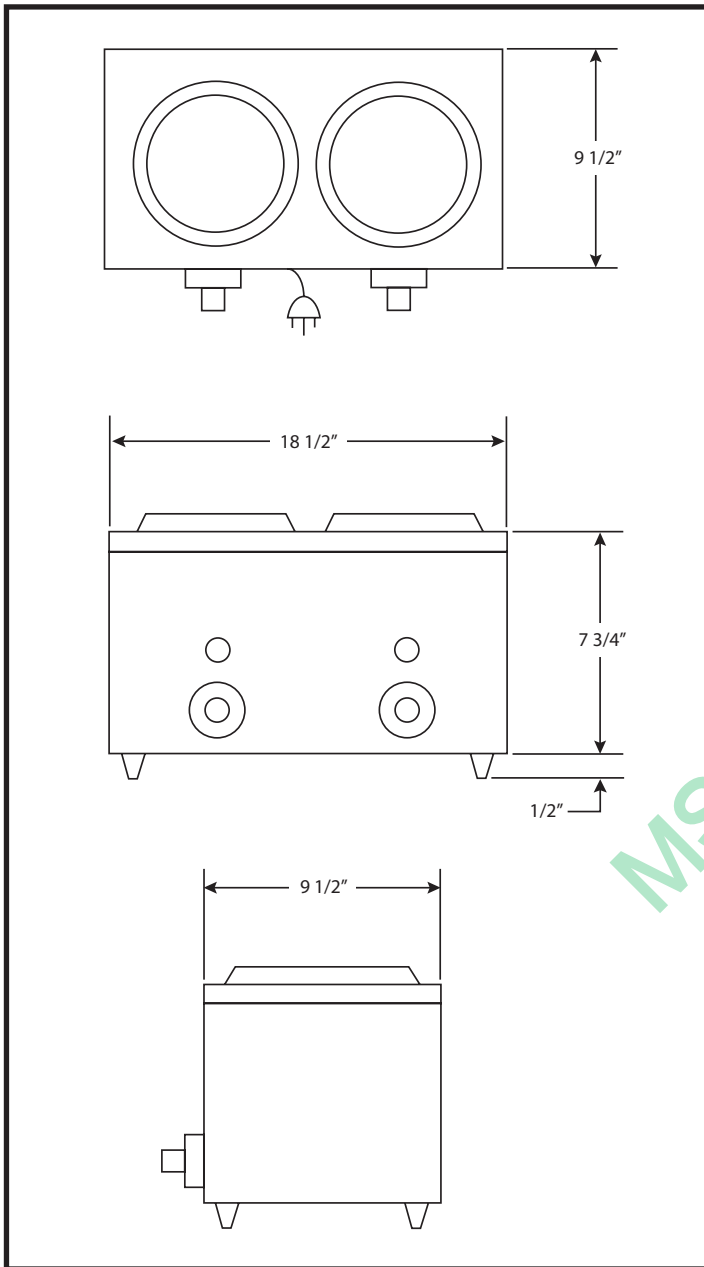
# Dual 4 Quart Warmer

Model:  W4-2

PRODUCT:

QUANTITY:

ITEM #:



## PRODUCT SPECIFICATIONS

### Construction:

Heavy-duty stainless steel construction.

### Dimensions:

8 1/4"H x 18 1/2"W x 9 1/2" D  
(21 cm x 47 cm x 24.1 cm)

### Electrical Information:

Each unit is equipped with a 60", three wire grounded power cord which terminates with a standard three pronged male plug. The W4-2 uses a NEMA 5-15P plug.

### Electrical Specifications:

120V, 800W, 6.7 Amps

### Capacity:

8 qts. (7.6 L)

### Shipping Information:

10 lbs. (4.5 kg)

F.O.B./ Dallas, TX 75226

\*APW Wyott reserves the right to modify specifications or discontinue models without incurring obligation.



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Rev. 4/1/2006  
# 1508



# QCSe2 SERIES CONVEYOR TOASTERS WITH ELECTRONIC CONTROLS

## QCSe Features/Benefits:

- Holman's easy to use electronic control panel takes the guesswork out of temperature and speed control settings for your bread products. The electronic control is pre-programmed from the factory with 4 channel settings for toast, bagels, English muffins and other. Change products on the go with the touch of a button any time during the operation.
- Single order feature allows darker or lighter for one time product orders without the need to change program settings.
- Super energy efficiencies with programmable feature allowing the operator to set stand by feature automatically from 1/2 hour to 8 hours: This feature will automatically reduce power by as much as 100% (power reduction can be reduced in 10% increments) if ` toaster is not in use after a preprogrammed set time.
- Customize your settings for your specific product needs with our easy programmable electronic control. Once the control is programmed the setting will automatically default to the last saved setting.
- Large LED display provides for easier reading of settings.
- Patented forced convection keeps the toaster cool to the touch and extends the life of critical components. The forced convection increases productivity by re-circulating pre-heated air into the toasting chamber.
- Quartz infrared heaters provide faster, more consistent heating than traditional heating elements and responds quickly to the electronic control.
- Productivity -  
QCSe2-300H with a 3" high opening produces 300 slices per hour  
QCSe2-500 produces 500 slices per hour.  
QCSe2-600H with a 3" high opening produces 600 slices per hour.  
QCSe2-800 produces 800 slices per hour
- Compact - requires only 14-5/8" of counter space and our patented forced convection system allows the unit to be placed against a wall. Other toasters have louvers requiring additional counter space.
- Extended conveyor belt for easy loading and large warming area for higher production.
- Heated holding area to keep toast at the perfect temperature.
- 24 hours 7 days a week technical support by Holman technicians.

## Applications:

Holman's new QCSe2 is the ultimate in conveyor toasters with touch pad electronic controls for consistent toasting and easy operation. This state of the art toaster is designed for a variety of bread products such as bagels, English muffins, toast, buns and more. Electronic controls are perfect for foodservice operations and restaurants with inexperienced staff. Mistakes are minimal with preset channels for consistent toasting. The innovative cost reduction features can provide significant energy savings and longer component life with a simple touch of a button.

## Quality Construction:

Holman designs every toaster to stand up to the most rigorous foodservice demands. Stainless steel construction for long lasting durability. Heavy-duty motor, drive chain and conveyor speed control for superior reliability. Conveyor belt tension system for smooth and quiet operation. High performance Quartz Infrared Heaters for superior toasting performance and reliability. Units are easy to disassemble with one-piece cover for cleaning and service. Toasters are furnished with 1" adjustable legs and 4' cord.

## Warranty:

Holman's conveyor toasters are covered by a one-year parts and labor warranty.

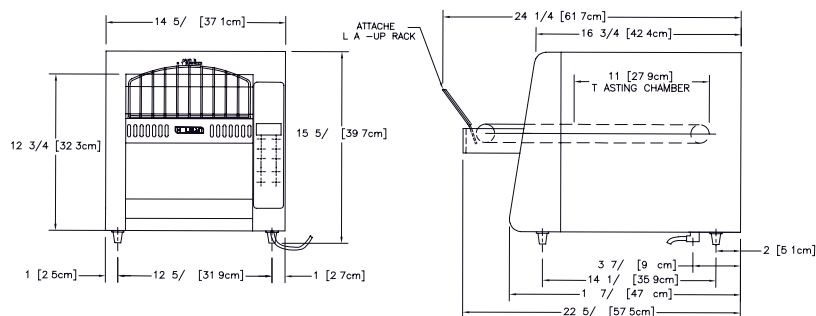


Model QCSe2-500





## QCSe2 SERIES CONVEYOR TOASTERS WITH ELECTRONIC CONTROLS



### Performance Data

Model No.	Production Capacities	Product Openings
QCSe2-300H	300 slices per hour	3"
QCSe2-500	500 slices per hour	1-1/2"
QCSe2-600H	600 slices per hour	3"
QCSe2-800	800 slices per hour	1-1/2"

### Specifications

Model No.	Dimensions			Shipping Weight lbs. (kg)	Shipping Carton		
	Width Inches (cm)	Depth Inches (cm)	Height Inches (cm)		Width Inches (cm)	Depth Inches (cm)	Height Inches (cm)
QCSe2-300H	14-5/8 (37.1)	22-3/8 (56.8)	15-5/8 (39.7)	64 (140.8)	20-1/2 (52.0)	19-1/2 (49.5)	26 (66.0)
QCSe2-500	14-5/8 (37.1)	22-3/8 (56.8)	15-5/8 (39.7)	64 (140.8)	20-1/2 (52.0)	19-1/2 (49.5)	26 (66.0)
QCSe2-600H	14-5/8 (37.1)	22-3/8 (56.8)	15-5/8 (39.7)	64 (140.8)	20-1/2 (52.0)	19-1/2 (49.5)	26 (66.0)
QCSe2-800	14-5/8 (37.1)	22-3/8 (56.8)	15-5/8 (39.7)	64 (140.8)	20-1/2 (52.0)	19-1/2 (49.5)	26 (66.0)

### Electrical Data

Model No.	Volts	HZ 1 Phase	Amps	Watts	Heating Elements <sup>1</sup>		NEMA
					Above Belt	Below Belt	
QCSe2-300H	120	60	14.1	1700	3	3	5-15P
QCSe2-500	120	60	14.1	1700	3	3	5-15P
QCSe2-600H	208	60	13.4	2800	2	2	6-20P
	240	60	11.6	2800	2	2	6-20P
	220	50	12.7	2800	2	2	Not supplied with plug
QCSe2-800	208	60	13.4	2800	2	2	6-20P
	240	60	11.6	2800	2	2	6-20P
	220	50	12.7	2800	2	2	Not supplied with plug

<sup>1</sup> Can be supplied with metal sheathed heaters (no additional charge), however production will be reduced.

### Typical Specifications

Conveyor toasters are constructed of corrosion resistant stainless steel. Supplied with heavy-duty motor, drive chain and fast heat up quartz infrared heaters. A conveyor belt tension system is supplied for a smooth, quiet operation. Units are supplied with digital programming for variable speed control, top and bottom heat control, power saver and high limit switch. Extended conveyor belt, crumb tray, heated holding area and full width burn guard are standard. Unit has a one-piece cover for easy access with 1" adjustable legs and a 4' cord. Units are listed with UL, CUL and are UL certified to NSF4. Printed in the U.S.A.



STAINLESS STEEL  
**MICROWAVE  
SHELVES**



**Wall Mounted**

Item #: \_\_\_\_\_ Qty #: \_\_\_\_\_  
 Model #: \_\_\_\_\_  
 Project #: \_\_\_\_\_

Model #	Size W x L	Approx. Wt.	Approx. Cu. Ft.
MS-18-24	18" x 24"	27 lbs.	5
MS-20-30	20" x 30"	36 lbs.	5
MS-24-24	24" x 24"	32 lbs.	5
MS-24-36	24" x 36"	38 lbs.	7

**CONSTRUCTION:**

All TIG welded.  
 Exposed surfaces polished to a satin finish.

**MATERIAL:**

18 gauge stainless steel.

**OPTIONAL TABLE MOUNTED UNITS:**

Mounted on tubular supports and fastened to the top with expanding tubular connectors.  
 Please use OTS Series Shelving and add TA-102 for 24" x 24" extension for table mounted version.

**FOR TABLE MOUNTED MICROWAVE SHELF:**

Model #	
MST-24-24	
MST-24-36	



MST Series



TA-102

**TABLE MOUNTED SHELF WITH MICROWAVE EXTENSION**

Use **OTS Shelving** and add **TA-102** for Microwave 24" x 24" extension. Specify Right or Left.

**OPTIONAL:**

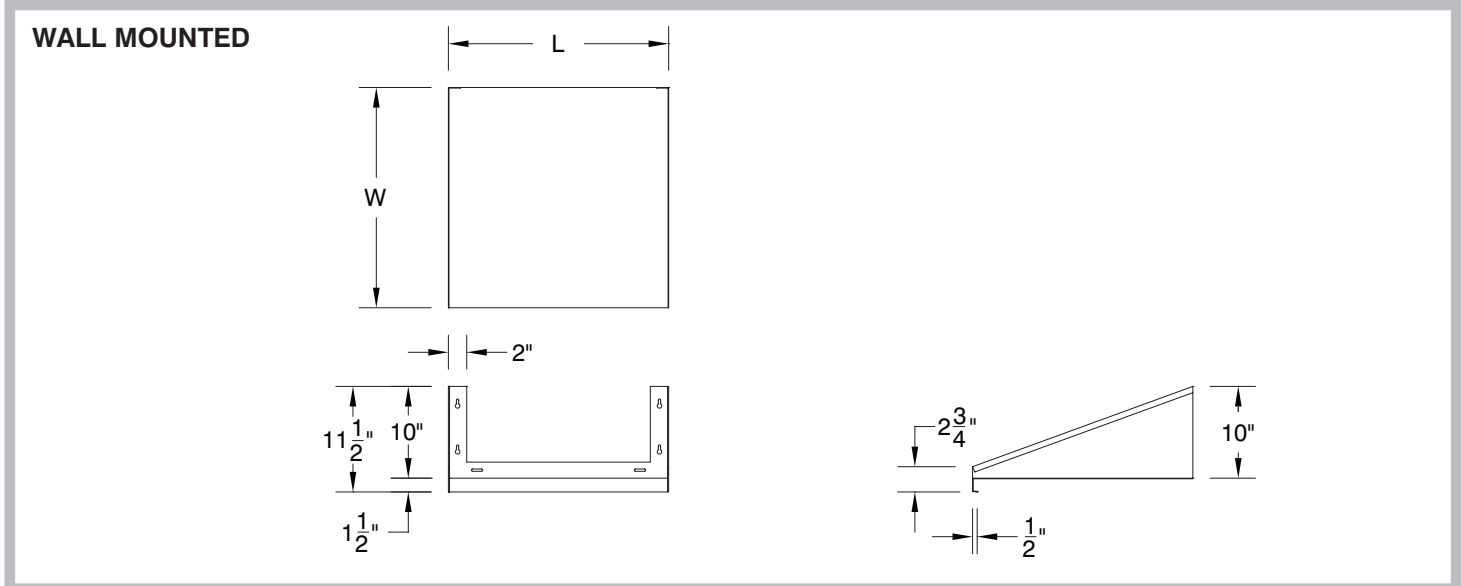
2" Hole with Grommet  
 For Appliance Cord  
**TA-108**



**DETAILS and SPECIFICATIONS**

TOL ± .500"

ALL DIMENSIONS ARE TYPICAL



Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.

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 Email: customer@advancetabco.com or Fax: 631-242-6900

For Smart Fabrication™ Quotes:  
 Email: smartfab@advancetabco.com or Fax: 631-586-2933




# NE-1054

## 1000 Watt\* Commercial Microwave Oven



### Technical Specifications

<b>Power source:</b> 120V, 60Hz, Single phase
<b>Receptacle required:</b> NEMA 5-15 R or NEMA 5-20 R 
<b>Frequency:</b> 2,450MHz
<b>Required power:</b> 13.4A
<b>Output:</b> 1000 watts*
<b>Outer dimensions:</b> 20 <sup>1</sup> / <sub>8</sub> " w x 16 <sup>7</sup> / <sub>16</sub> " d x 12" h
<b>Cavity dimensions:</b> 13" w x 13" d x 8 <sup>1</sup> / <sub>16</sub> " h
<b>Net weight:</b> 34 lbs.
<b>Shipping weight:</b> 39 lbs.
<b>Shipping box size:</b> 24" w x 18 <sup>3</sup> / <sub>4</sub> " d x 14 <sup>3</sup> / <sub>4</sub> " h, 3.8 cu. ft.
<b>Timer:</b> 99 Minutes, 99 Seconds
<b>Memory Capability:</b> 20 Programs

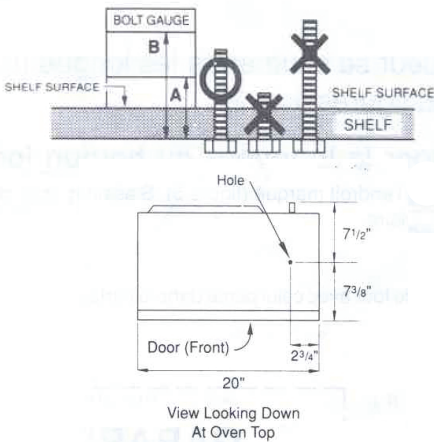
### To specify a Panasonic Commercial Microwave Oven

The NE-1054 Commercial Microwave Oven meets or exceeds all safety performance and sanitation standards set for commercial food service microwave ovens by UL, DHHS, FCC and NSF.

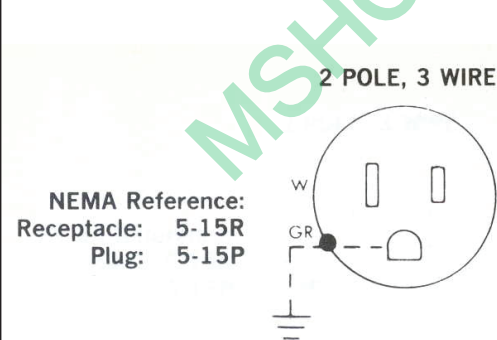
Plus, oven shall have output power 1000 Watts\*, stainless steel front, bottom energy feed, 10 programmable memory pads, Braille keypad, 20-memory capability, double quantity key, 6 power levels, 2- and 3-stage cooking, programmable lock, unique "quick pick" preset times and self-diagnostics, Chef/Test Kitchen technical support and 3 year limited warranty.

*\*I.E.C. 60705 Test Procedure. Specifications subject to change without notice.*

### Security/Anti-Theft Option



### Receptacle Required

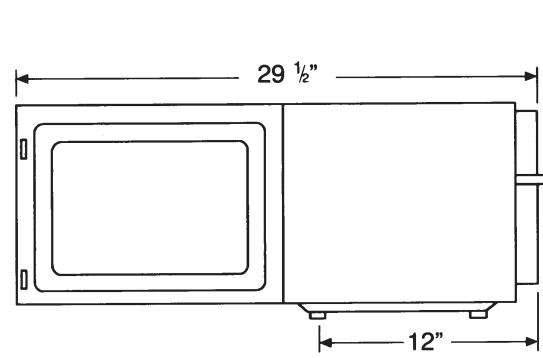
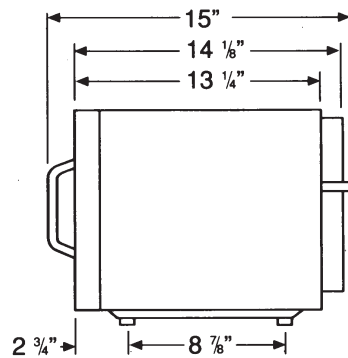
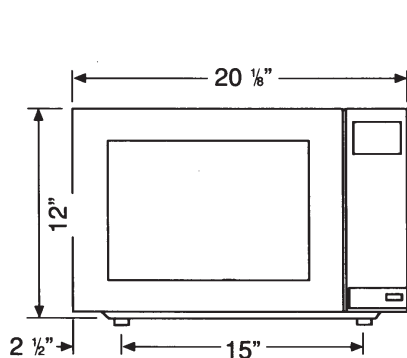


### ADA Compliance

§4.28.2 ((CFR) – 28CFR Part 36)  
"For Alarms".

§4.27 "For controls and operating mechanisms".

Braille controls.



**Panasonic Appliance & Commercial Group**  
Division of Matsushita Electric Corporation of America  
Executive Offices:  
One Panasonic Way, Panazip 4A-1, Secaucus, NJ 07094  
Toll Free: 1-888-350-9590  
www.panasonic.com/cmo



# Beverage Table



36-BT Beverage Table shown.

Item: \_\_\_\_\_

Quantity: \_\_\_\_\_

Project: \_\_\_\_\_

Date: \_\_\_\_\_

## MODELS

	length
<input type="checkbox"/> 28-BT	28 <sup>3</sup> / <sub>8</sub> "
<input type="checkbox"/> 36-BT	36 <sup>3</sup> / <sub>8</sub> "
<input type="checkbox"/> 50-BT	50 <sup>3</sup> / <sub>8</sub> "
<input type="checkbox"/> 60-BT	60 <sup>3</sup> / <sub>8</sub> "
<input type="checkbox"/> 66-BT	66 <sup>3</sup> / <sub>8</sub> "
<input type="checkbox"/> 74-BT	74 <sup>3</sup> / <sub>8</sub> "
<input type="checkbox"/> 84-BT	84 <sup>3</sup> / <sub>8</sub> "
<input type="checkbox"/> 96-BT	96 <sup>3</sup> / <sub>8</sub> "
<input type="checkbox"/> 144-BT	144 <sup>3</sup> / <sub>8</sub> "

### Top:

- 36" Counter Top Height
- Other Height (specify \_\_\_\_\_)
- Top Extensions (width \_\_\_\_\_)
- Top Extensions (length \_\_\_\_\_)
- Drop-Ins (specify \_\_\_\_\_)
- Drain Trough length (specify \_\_\_\_\_)

### Tray Slide:

- Stainless Steel
- Solid "V" ridge
- Flat Surface
- Solid Surface
- Corian® (specify \_\_\_\_\_)
- Powder Coated brackets (specify RAL #)
- 34" Tray Slide Height
- Other Slide Height \_\_\_\_\_

### Above the Top:

- Overshelf
- Sloped Front Protector
- Curved Front Protector
- Other Style Protector (specify \_\_\_\_\_)
- Buffet Shield Single Service
- Buffet Shield Double Service
- Lift-up Hinge for shield
- 2 tier Display Shelf, single service
- 2 tier Display Shelf, double service
- 3 tier Display Shelf, single service
- 3 tier Display Shelf, double service
- Curved Glass for Display Shelf
- Powder Coated finish (specify RAL #)
- Fluorescent Lights

### Base Options:

- Enclosed Base (specify EB after model #)
- Cam Operated Line-up Locks
- Hinged Doors
- Fiberglass Door Panels
- End Drop Shelf
- Custom Color (specify RAL #)
- 5" Diameter Casters
- Stainless Steel Legs
- Cashier Station
- Other \_\_\_\_\_

### Cutting Board:

- 8" wide Stainless Steel
- 8" wide Richlite® composite
- Other width \_\_\_\_\_

- ▶ Versatile counters, add the options you need!
- ▶ Durable, colorful, molded fiberglass
- ▶ East to clean, low maintenance

### Electrical Options:

- Convenience outlet, flush
- Convenience outlet, pedestal
- Daisy chain
- Load center

### Other Options:

- Canopy (specify style & color)
- Over-structure with signage & lights (specify \_\_\_\_\_)
- Theme Package
  - School Bus
  - Train
  - Space Shuttle
  - Covered Wagon
  - Circus Train
  - Other (specify)

**LOW TEMP**  
INDUSTRIES, INC.



P.O. Box 795 • Jonesboro, GA 30237  
Tel: 770.478.8803 • Fax: 770.471.3715  
www.lowtempind.com • colorpoint@lowtempind.com



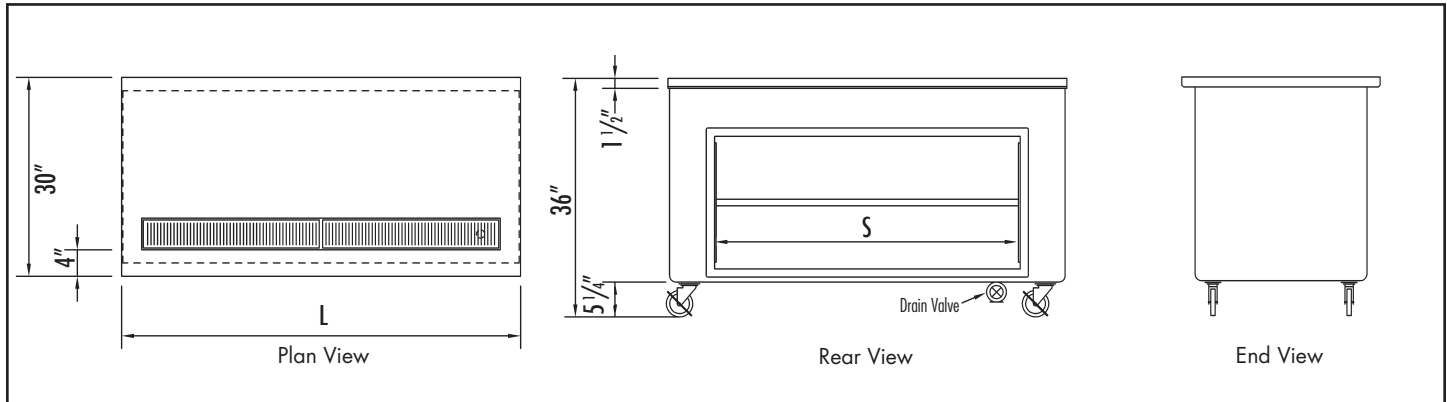
# Beverage Table

Item: \_\_\_\_\_

Quantity: \_\_\_\_\_

Project: \_\_\_\_\_

Date: \_\_\_\_\_



MODEL	L	S	APPROX. SHIP WEIGHT
28-BT	28 3/8"	N/A	205 lbs.
36-BT	36 3/8"	15"	220 lbs.
50-BT	50 3/8"	36"	260 lbs.
60-BT	60 3/8"	46"	300 lbs.
66-BT	66 3/8"	46"	320 lbs.
74-BT	74 3/8"	(2) 28"	340 lbs.
84-BT	84 3/8"	28" & 36"	360 lbs.
96-BT	96 3/8"	28" & 46"	380 lbs.
144-BT	144 3/8"	(2) 46"	750 lbs.

**TOP:** Top to be 30" wide and fabricated from a minimum of 14 ga. stainless steel with square turn-down on all sides and corners fully welded, ground and polished. Top to have #4 satin finish and with all edges having a #7 hi-lite finish.

**BODY:** Body to be seamless molded fiberglass (F.R.P.) with smooth exterior surfaces and rounded corners. To be constructed by a hand lay-up process with four layers of 1.5 oz continuous strand fiberglass mat, plus a 24 oz layer of woven roving on the bottom for added strength. Fiberglass to be flame retardant per specification ASTM E-162 having a flame spread of 25 or

less. Body interior to be reinforced at each end with 4" wide, 12 gauge galvanized channels welded to form integral "U" frame for maximum stress relief.

Rear of body to have an open storage base made from 18-gauge stainless steel. Liner to have removable top panels to allow for service access.

**CASTERS:** 4" diameter, ball bearing, swivel type casters to be non-marking and with brakes on all wheels. Casters to be mounted thru two 12 gauge channels for extra rigidity.

**DRAIN TROUGH:** 14 ga. stainless steel drain trough welded into top and fitted with a removable stainless steel anti-splash grid. Trough to slope to 1" open brass drain and extend to shut off valve located below base.

We reserve the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions or replacement for previously purchased equipment.

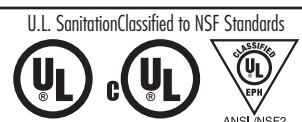
All equipment to be built in accordance with the Underwriters Laboratories, Inc. and the National Sanitation Foundation, Inc. standards and shall bear the Underwriters Laboratories, Inc. listing label for safety and the Underwriters Laboratories classification label for sanitation.

05/2006

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## For Foodservice Applications

Job Name \_\_\_\_\_

Contractor \_\_\_\_\_

Job Location \_\_\_\_\_

Approval \_\_\_\_\_

Engineer \_\_\_\_\_

Contractor's P.O. No. \_\_\_\_\_

Approval \_\_\_\_\_

Representative \_\_\_\_\_

# LEAD FREE\*

## Series Brew Max Brew Station Filtration Systems

Flow Rate:

**Brew Max-S2: Maximum 0.5 GPM (1.9 LPM)**

**Brew Max-S2L: Maximum 1 GPM (3.8 LPM)**

Hydro-Safe Brew Max systems have been specifically engineered to address and correct multiple water related problems for brew stations. Incorporating both high end coconut shell carbon filtration with OneFlow® media for scale control, these systems deliver superior filtration while providing advanced scale protection. Advanced carbon filtration for the reduction of lead, cyst and VOC in addition to chlorine taste and odor providing a superior consistent quality beverage.

### Applications

- Coffee Brewers
- Tea Machines
- Soda Machines

### Features

- Increases brew machine life, performance and quality
- Reduces scale build-up
- Reduces lead, cyst, VOC's, sediment, chlorine taste and odor
- Reduces maintenance and system downtime
- Consistent quality and better tasting drinks
- In/Out valves allow for easy filter service
- Pressure gauges and flush kit included
- Easy to install
- Simple filter replacement

### System Specifications

Maximum Pressure: 125psi/8.6 bar

Maximum Temperature: 100°F/38°C

pH 6.5 to 8.5

Hardness (maximum for systems containing OneFlow) 75 grains (1282 ppm CaCO<sub>3</sub>)

Chlorine < 2ppm

Iron (maximum) 0.3 mg/l

Manganese (maximum) 0.05 mg/l

Copper (for systems containing OneFlow) < 0.1 mg/l

Oil & H<sub>2</sub>S- None allowed

Polyphosphate (for systems containing OneFlow)- None allowed

Silica (maximum for systems containing OneFlow) 10ppm

For all other feed water quality requirements abide by the current USEPA Safe Drinking Water Act standards.

# Hydro-Safe®



Brew Max-S2



Brew Max-S2L



Brew Max Systems are Tested and Certified by WQA to NSF/ANSI Standard 42 and 53 for the reduction of claims specified on the Performance Data Sheet & NSF/ANSI 372 for "lead free" compliance.

**Please note:** Cartridge capacities are estimates and may be less depending on incoming water quality.

**Note:** Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

\*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.

# WATTS®

## System Specifications cont.

Inlet/Outlet Connections: 3/8" NPT

## OneFlow® Application Practices

**Note:** Systems using OneFlow technology prevent hardness related scale formation inside the plumbing system at influent hardness levels of 75 grains per gallon of calcium carbonate and less. Due to variances in water chemistry certain aesthetic conditions external of the plumbing system may not be attained. New copper lines need to be passivated before placing unit into service. Copper usually originates from new copper plumbing upstream of the OneFlow system. All new copper plumbing before the system should be allowed to passivate by operating under normal conditions for a period of 4 weeks prior to starting the system up. This will allow the copper surfaces to be fully flushed and develop a natural protective surface. To further minimize any problem with excess copper, avoid applying excess flux on the inner surfaces of the pipe and use a low-corrosivity water soluble flux listed under the ASTM B813 standard. OneFlow is not for use on closed loop systems.

System Model	Ordering Code	Max Flow Rate	Connection Size
Brew Max-S2	BRWMAX-S2S	0.5 GPM (1.9 LPM)	3/8" NPT
Brew Max-S2L	BRWMAX-S2L	1 GPM (3.8 LPM)	3/8" NPT

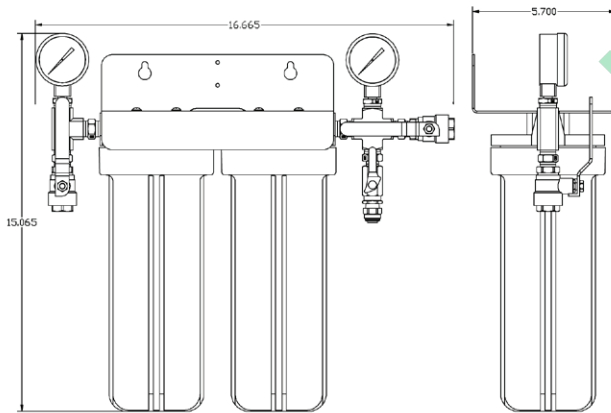
## Filter Cartridge Life Span

Filter cartridges should be changed at end of filter life, due to lack of filtering performance, or whenever a 15 psi pressure drop or greater is experienced during normal operation, whichever comes first.

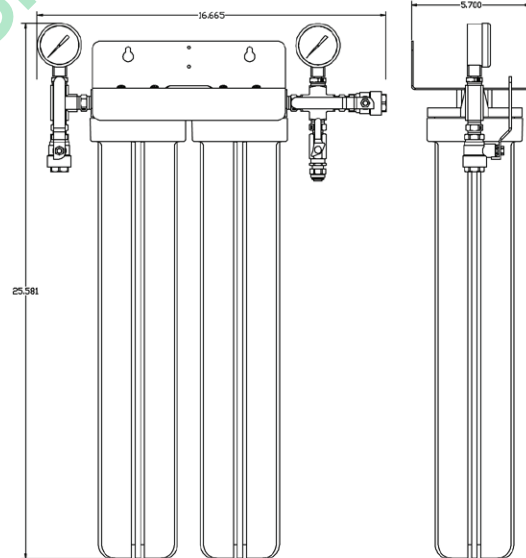
System Replacement Filters			
System Model	Filter Ordering Code	Frequency	Description
Brew Max-S2	BRWMAX-S2S-PM		All Filters for System Maintenance
	BRWMAXR-S-CB	6 Months	10" Coconut Shell Carbon Block
	DOR-OF110RM	12 Months	10" OneFlow Anti-Scale Cartridge
	STMAXR-S-ACSC	6 Months	10" Phosphate Scale Control (Option)
Brew Max-S2L	BRWMAX-S2L-PM		All Filters for System Maintenance
	BRWMAXR-L-CB	6 Months	20" Coconut Shell Carbon Block
	DOR-OF120RM	12 Months	20" OneFlow Anti-Scale Cartridge
	STMAXR-L-ACSC	6 Months	20" Phosphate Scale Control (Option)

## System Diagrams

Brew Max-S2



Brew Max-S2L



**Note:** Allow 3" of clearance at bottom of system for removal of filter bowls for filter cartridge replacement



A Watts Water Technologies Company



Tel: (800) 264-1183 • Fax: (724) 733-4808 • [foodservice.watts.com](http://foodservice.watts.com)



# Solid Top Food Table

Item: \_\_\_\_\_

Quantity: \_\_\_\_\_

Project: \_\_\_\_\_

Date: \_\_\_\_\_



ST-66 shown with 8" stainless cutting board, double display shelves and 12" stainless tray slide (32" O.F.)

## MODELS

- 28-ST      28 3/8"
- 36-ST      36 3/8"
- 50-ST      50 3/8"
- 60-ST      60 3/8"
- 66-ST      66 3/8"
- 74-ST      74 3/8"
- 84-ST      84 3/8"
- 96-ST      96 3/8"
- 144-ST     144 3/8"

### Top:

- 36" Counter Top Height
- Other Height (specify \_\_\_\_\_)
- Top Extensions (width \_\_\_\_\_)
- Top Extensions (length \_\_\_\_\_)
- 7 qt. Soup Well
- 11 qt. Soup Well
- Bread Loaf Divider Pan
- Drop-Ins (specify \_\_\_\_\_)

### Tray Slide:

- Stainless Steel
- Solid "V" ridge
- Flat Surface
- Tubular
- Solid Surface
- Corian® (specify \_\_\_\_\_)
- Powder Coated brackets (specify RAL #)
- 34" Tray Slide Height
- Other Slide Height \_\_\_\_\_

### Above the Top:

- Overshelf
- Sloped Front Protector
- Curved Front Protector
- Other Style Protector (specify \_\_\_\_\_)
- Buffet Shield Single Service
- Buffet Shield Double Service
- Lift-up Hinge for shield
- 2 tier Display Shelf, single service
- 2 tier Display Shelf, double service
- 3 tier Display Shelf, single service
- 3 tier Display Shelf, double service
- Curved Glass for Display Shelf
- Powder Coated finish (specify RAL #)
- Fluorescent Lights

### Base Options:

- Enclosed Base (specify EB after model #)
- Cam Operated Line-up Locks
- Hinged Doors
- Fiberglass Door Panels
- End Drop Shelf
- Custom Color (specify RAL #)
- 5" Diameter Casters
- Stainless Steel Legs
- Cashier Station
- Other \_\_\_\_\_

### Cutting Board:

- 8" wide Stainless Steel
- 8" wide Richlite® composite
- Other width \_\_\_\_\_

- ▶ Most versatile counters, add the options you need!
- ▶ Durable, colorful, molded fiberglass
- ▶ East to clean, low maintenance
- ▶ 12' (144-ST) unit can be made into a complete reimbursable line.

### Electrical Options:

- Convenience outlet, flush
- Convenience outlet, pedestal
- Daisy chain
- Load center

### Other Options:

- Canopy (specify style & color)
- Over-structure with signage & lights (specify \_\_\_\_\_)
- Theme Package
  - School Bus
  - Train
  - Space Shuttle
  - Covered Wagon
  - Circus Train
  - Other (specify)



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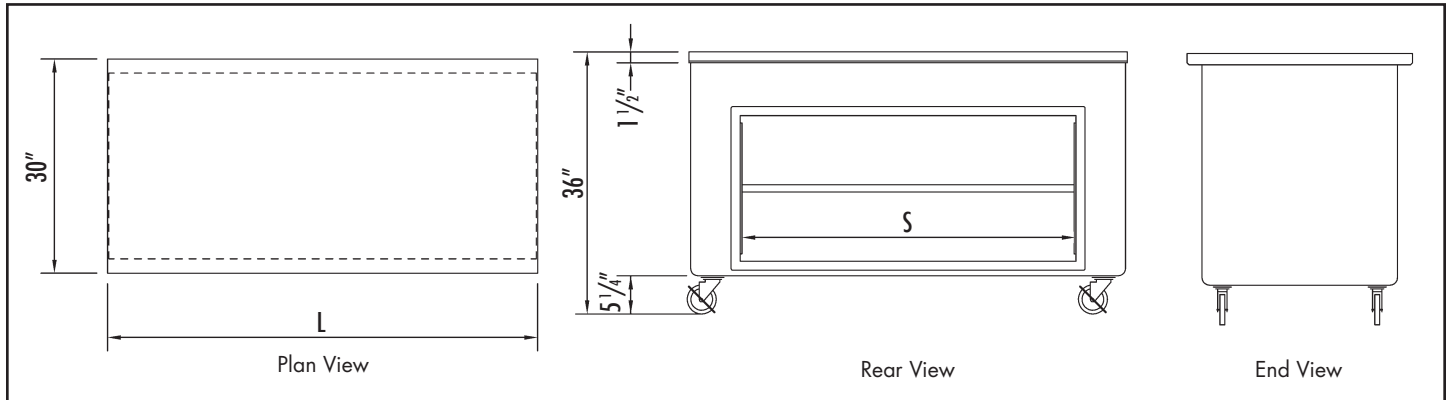
# Solid Top Food Table

Item: \_\_\_\_\_

Quantity: \_\_\_\_\_

Project: \_\_\_\_\_

Date: \_\_\_\_\_



MODEL	L	S	APPROX. SHIP WEIGHT
28-ST	28 3/8"	N/A	205 lbs.
36-ST	36 3/8"	15"	220 lbs.
50-ST	50 3/8"	36"	260 lbs.
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## Solid Top Food Table

**TOP:** Top to be 30" wide and fabricated from a minimum of 14 ga. stainless steel with square turndown on all sides and corners fully welded, ground and polished. Top to have #4 satin finish and with all edges having a #7 hi-lite finish.

**BODY:** Body to be seamless molded fiberglass (F.R.P.) with smooth exterior surfaces and rounded corners. To be constructed by a hand lay-up process with four layers of 1.5 oz continuous strand fiberglass mat, plus a 24 oz layer of woven roving on the bottom for added strength. Fiberglass to

be flame retardant per specification ASTM E-162 having a flame spread of 25 or less. Body interior to be reinforced at each end with 4" wide, 12 gauge galvanized channels welded to form integral "U" frame for maximum stress relief.

Rear of body to have an open storage base made from 18-gauge stainless steel. Liner to have removable top panels to allow for service access.

**CASTERS:** 4" diameter, ball bearing, swivel type casters to be non-marking and with brakes on all wheels. Casters to be mounted thru two 12 gauge channels for extra rigidity.

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All equipment to be built in accordance with the Underwriters Laboratories, Inc. and the National Sanitation Foundation, Inc. standards and shall bear the Underwriters Laboratories, Inc. listing label for safety and the Underwriters Laboratories classification label for sanitation.

08/2006

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APPLICATION:  
 JOB NAME:  
 QUANTITY:                      ITEM NO.

PRODUCT NAME:  
 SERVICE SINK FAUCET WITH LONG  
 SPOUT AND VACUUM BREAKER  
 \_\_\_\_\_ SPECIAL CONFIGURATION  
 (CHECK BASE MODEL AND OPTIONS)

MODEL:  
 8253

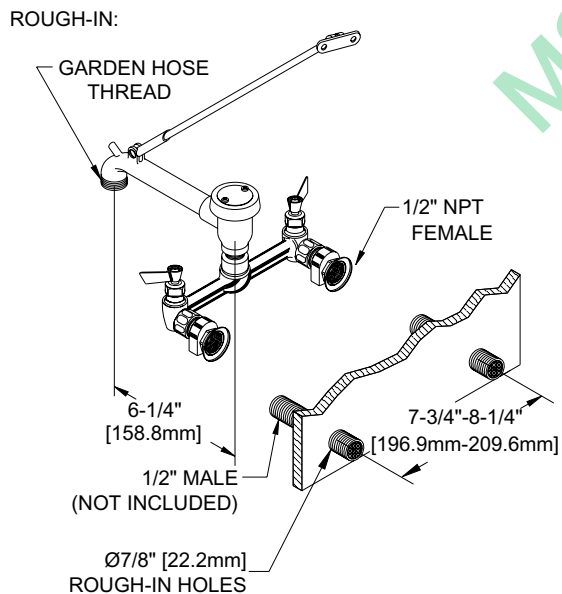
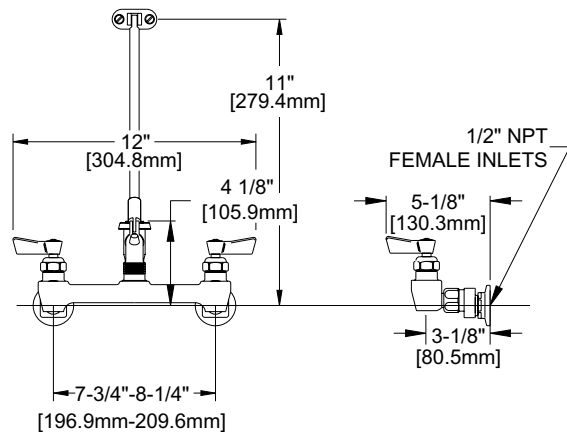
OPTIONS OR MODIFICATIONS  
 SUPPLY LINES (24" OR 36") CIRCLE LENGTH  
 NIPPLES  
 ELBOWS  
 VANDAL RESISTANT KIT  
 HANDLES (CROSS OR WRIST) CIRCLE STYLE  
 OTHER \_\_\_\_\_

FEATURES:

- CONTROL VALVE**
- \* ECCENTRICS ADJUST FROM 7-1/2" TO 8-1/2"
  - \* INTERNAL SPRING LOADED CHECK VALVES
  - \* SWIVELLING SEAT DISKS
  - \* HOT SIDE STEM - RIGHT HAND
  - \* COLD SIDE STEM - LEFT HAND
  - \* STAINLESS STEEL SEATS
  - \* STAINLESS STEEL SEAT SCREWS
  - \* STAINLESS STEEL HANDLE SCREWS
  - \* ATMOSPHERIC VACUUM BREAKER
  - \* 3/4" GARDEN HOSE THREAD OUTLET

- SYSTEM LIMITS**
- \* TEMP: 40°F MIN. TO 140°F MAX.
  - \* PRESSURE 200 PSI MAX. STATIC
  - \* 13.6 GPM AT 80 PSI

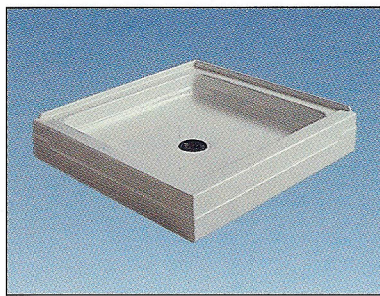
**SHIPPING WEIGHT**  
 \* 6.25 LBS



ANSI/A112.18.1M

**FISHER**  
 FISHER MANUFACTURING COMPANY  
 TOLL FREE: 800-421-6162 - FAX: 800-832-8238  
 information@fisher-mfg.com - www.fisher-mfg.com





### Durable, High-Gloss Shower Receptors

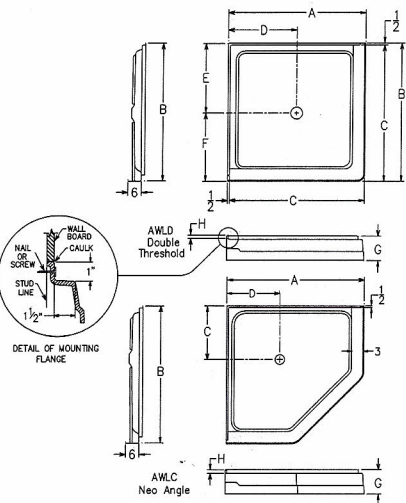
One-piece, cast acrylic shower receptors with slip-resistant surface.

#### Notes

- Illustrated installation instructions included
- Available in an array of Crane Plumbing®/Fiat Products®/ Universal-Rundle decorator colors
- Drain assembly included
- Five-year warranty

#### DIMENSIONS (IN INCHES)

MODEL	A	B	C	D	E	F	G	H	I
AWLD-3636	36	36	35.5	18	18	18	7.25	1	2
AWLC-3636	36	36	15	15	n/a	n/a	7.25	1	2
AWLC-3838	38	38	14.5	14.5	n/a	n/a	7.25	1	1.5
AWLC-4242	42	42	16.25	16.25	n/a	n/a	7.25	1	1.5



#### DIMENSIONS (IN INCHES)

MODEL	A	B	C	D	E	F	G	H	I
AWL-3232	32	32	31	16	16	16	7.25	1	2
AWL-3434	34	34	33	17	17	17	7.25	1	2
AWL-3636	36	36	35	18	18	18	7.25	1	1.5
AWL-3838	38	38	37	19	19	19	7.25	1	2
AWL-4234	42	34	41	21	17	17	7.25	1	2
AWL-4236	42	36	41	21	18	18	7.25	1	1.5
AWL-4242	42	42	41	21	21	21	7.25	1	1.5
AWL-4832	48	32	47	24	16	16	7.25	1	2
AWL-4834	48	34	47	24	17	17	7.25	1	1.5
AWL-6030RL*	60	30	59	8	15	15	7.25	1	2
AWL-6032C	60	32	59	30	16	16	7.25	1	2
AWL-6032RL*	60	32	59	8	16	16	7.25	1	2
AWL-6034	60	34	59	30	16.75	17.25	7.25	1	1.5

\* Left Hand Shown (Reverse D, E and F for Right Hand)



CR/PL, LLC • 1235 Hartrey Avenue, Evanston, Illinois 60202 • 847.864.7600 Fax 847.864.7652 • www.cranepumbing.com



# Acrylic Shower Floors

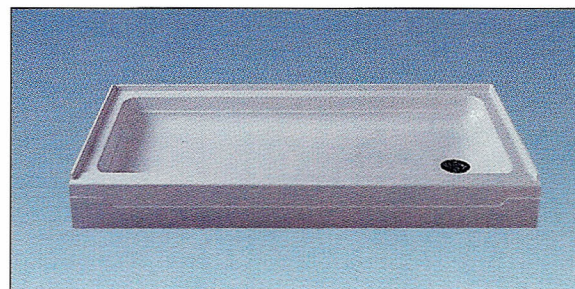


Crane Plumbing/Fiat Products acrylic shower floors are made from a single sheet of thermoformed acrylic and backed with a composite matrix. Acrylic shower floors are durable, easy-to-clean and have a high-gloss finish. The acrylic finish is mold, mildew and stain resistant. The floors have a raised dam to prevent water leakage. All floors have a slip-resistant surface. Drains are included with all floors.



## Single Threshold — Square

AWL 3232  
AWL 3434  
AWL 3636  
AWL 3838  
AWL 4242



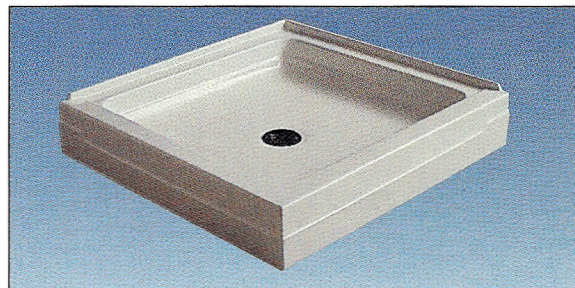
## Single Threshold — Rectangular

AWL 4234      AWL 6030R  
AWL 4236      AWL 6032C  
AWL 4832      AWL 6032L  
AWL 4834      AWL 6032R  
AWL 6030L      AWL 6034  
Right and left drain on 6030 L/R and 6036 L/R only  
All other models only have center drains



## Neo-Corner

AWLC 3636  
AWLC 3838  
AWLC 4242



## Double Threshold

AWLD 3636

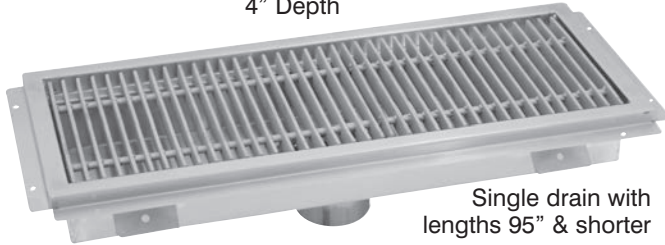


STAINLESS STEEL

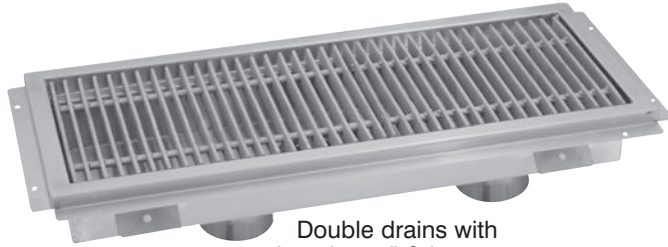
# FLOOR TROUGHS & FLOOR DRAINS

## Floor Troughs

4" Depth



Single drain with lengths 95" & shorter



Double drains with lengths 96" & longer



Item #: \_\_\_\_\_ Qty #: \_\_\_\_\_

Model #: \_\_\_\_\_

Project #: \_\_\_\_\_

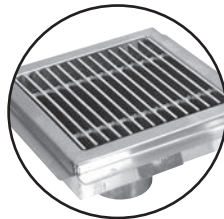


**FT-1**  
Optional Anti-Splash Guard  
(Per ft. Factory installed)

Cut-Out View of Anti-Splash

## Floor Drain

4" Depth



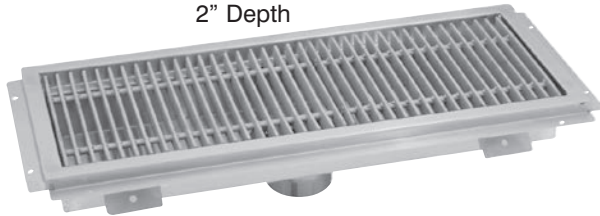
**FD-1**  
Optional Stainless Steel Grate for Floor Drains



**FT-2**  
Stainless Steel Strainer Basket with Handle (Included with all Floor Troughs, Water Receptacles & Floor Drains)

## Floor Water Receptacles

2" Depth



### OPTIONAL ACCESSORIES

Model #	Qty
FT-1 Anti-Splash Guard per ft.	
FT-2 Replacement Strainer Basket	
FD-1 Floor Drain Stainless Steel Grate	

### FEATURES:

- Waste receptacle will accommodate up to a 4" waste pipe.
- Includes 4" O.D. - 3" Long Plumbing Sleeve.
- Removable perforated stainless steel strainer basket with handle provided.
- Pitched towards waste.
- Includes "Subway Style" grating from 3/16" x 1" solid "304" stainless steel bar or fiberglass. (Not included with Floor Drains. Use Model FD-1)
- Grating is spaced 9/16" (Inside clearance) between bars to prevent casters from getting trapped.
- Troughs 96" or larger in length made with two (2) drains.
- Custom sizes available. Consult factory.

### CONSTRUCTION:

- All TIG welded.
- All external corners welded and polished to a satin finish.

### MECHANICAL:

- Creased design to ensure proper drainage.
- Perimeter flange mounts directly to sub floor.
- 3/4" vertical step designed to accommodate floor tile installation.

### MATERIAL:

- 14 gauge "304" type stainless steel polished stainless steel grating.
- Fiberglass grating: Gray fiberglass composite. Light weight, skid and corrosion resistant.



**Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.**

For Orders & Customer Service:

Email: customer@advancetabco.com or Fax: 631-242-6900

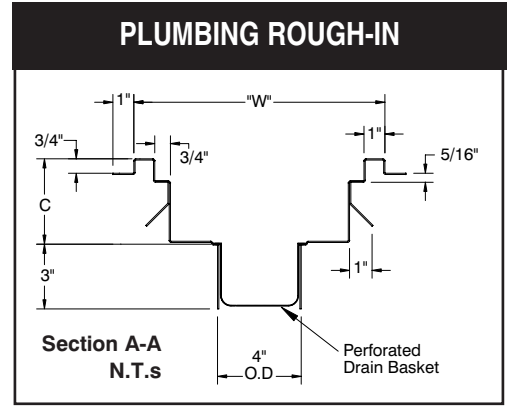
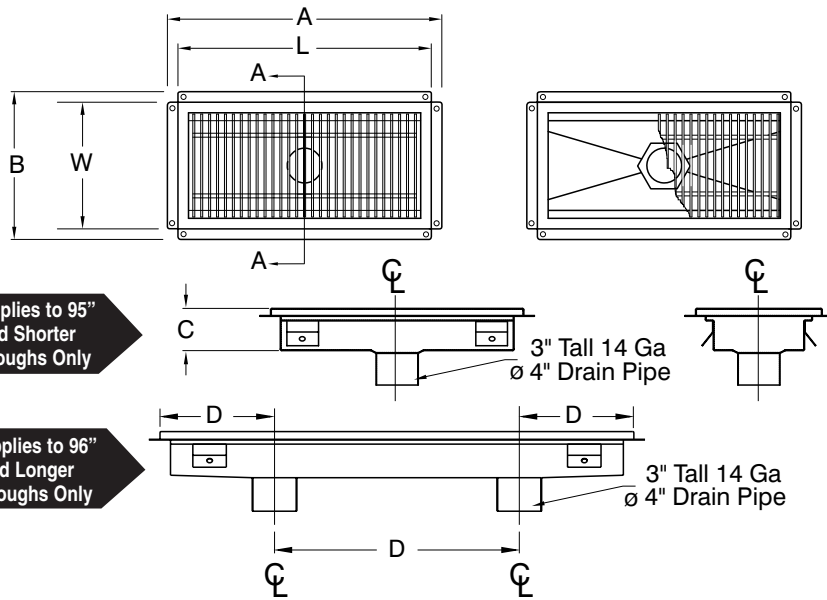
For Smart Fabrication™ Quotes:

Email: smartfab@advancetabco.com or Fax: 631-586-2933

# DIMENSIONS and SPECIFICATIONS

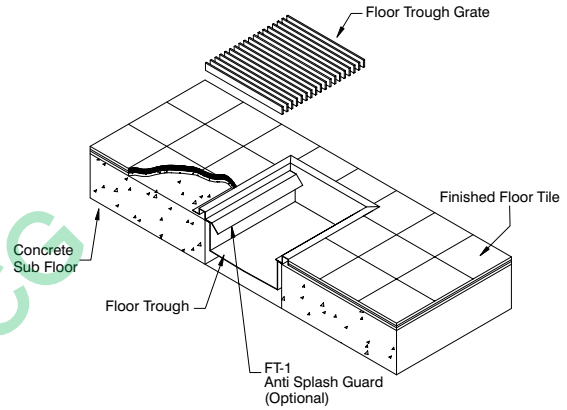
ALL DIMENSIONS ARE TYPICAL

TOL ± .500"



## FLOOR TROUGHS

Stainless Steel Grating	Wt.	Fiberglass Grating	Wt.	L	W	A	B	C	D
FTG-1224	46 lbs.	FFTG-1224	34 lbs.	24"	12"	26"	14"	4"	-
FTG-1230	56 lbs.	FFTG-1230	37 lbs.	30"	12"	32"	14"	4"	-
FTG-1236	66 lbs.	FFTG-1236	40 lbs.	36"	12"	38"	14"	4"	-
FTG-1242	76 lbs.	FFTG-1242	43 lbs.	42"	12"	44"	14"	4"	-
FTG-1248	86 lbs.	FFTG-1248	46 lbs.	48"	12"	50"	14"	4"	-
FTG-1254	96 lbs.	FFTG-1254	49 lbs.	54"	12"	56"	14"	4"	-
FTG-1260	106 lbs.	FFTG-1260	52 lbs.	60"	12"	62"	14"	4"	-
FTG-1272	116 lbs.	FFTG-1272	55 lbs.	72"	12"	74"	14"	4"	-
FTG-1284	126 lbs.	FFTG-1284	81 lbs.	84"	12"	86"	14"	4"	-
FTG-1296*	146 lbs.	FFTG-1296	90 lbs.	96"	12"	98"	14"	4"	32"
FTG-12108*	166 lbs.	FFTG-12108	99 lbs.	108"	12"	110"	14"	4"	36"
FTG-12120*	180 lbs.	FFTG-12120	108 lbs.	120"	12"	122"	14"	4"	40"
FTG-1824	62 lbs.	FFTG-1824	43 lbs.	24"	18"	26"	20"	4"	-
FTG-1830	74 lbs.	FFTG-1830	47 lbs.	30"	18"	32"	20"	4"	-
FTG-1836	86 lbs.	FFTG-1836	54 lbs.	36"	18"	38"	20"	4"	-
FTG-1842	98 lbs.	FFTG-1842	61 lbs.	42"	18"	44"	20"	4"	-
FTG-1848	110 lbs.	FFTG-1848	69 lbs.	48"	18"	50"	20"	4"	-
FTG-1854	122 lbs.	FFTG-1854	76 lbs.	54"	18"	56"	20"	4"	-
FTG-1860	134 lbs.	FFTG-1860	83 lbs.	60"	18"	62"	20"	4"	-
FTG-1872	146 lbs.	FFTG-1872	90 lbs.	72"	18"	74"	20"	4"	-
FTG-1884	165 lbs.	FFTG-1884	111 lbs.	84"	18"	86"	20"	4"	-
FTG-1896*	187 lbs.	FFTG-1896	125 lbs.	96"	18"	98"	20"	4"	32"
FTG-18108*	208 lbs.	FFTG-18108	138 lbs.	108"	18"	110"	20"	4"	36"
FTG-18120*	229 lbs.	FFTG-18120	150 lbs.	120"	18"	122"	20"	4"	40"
FTG-2424	69 lbs.	FFTG-2424	52 lbs.	24"	24"	26"	26"	4"	-
FTG-2430	81 lbs.	FFTG-2430	59 lbs.	30"	24"	32"	26"	4"	-
FTG-2436	104 lbs.	FFTG-2436	68 lbs.	36"	24"	38"	26"	4"	-
FTG-2442	118 lbs.	FFTG-2442	75 lbs.	42"	24"	44"	26"	4"	-
FTG-2448	131 lbs.	FFTG-2448	83 lbs.	48"	24"	50"	26"	4"	-
FTG-2454	145 lbs.	FFTG-2454	95 lbs.	54"	24"	56"	26"	4"	-
FTG-2460	162 lbs.	FFTG-2460	102 lbs.	60"	24"	62"	26"	4"	-
FTG-2472	195 lbs.	FFTG-2472	119 lbs.	72"	24"	74"	26"	4"	-
FTG-2484	218 lbs.	FFTG-2484	137 lbs.	84"	24"	86"	26"	4"	-
FTG-2496*	243 lbs.	FFTG-2496	153 lbs.	96"	24"	98"	26"	4"	32"
FTG-24108*	274 lbs.	FFTG-24108	168 lbs.	108"	24"	110"	26"	4"	36"
FTG-24120*	310 lbs.	FFTG-24120	188 lbs.	120"	24"	122"	26"	4"	40"



## FLOOR DRAINS

Model #	Length	Width	A	B	C	Wt.
FDR-1212	12"	12"	14"	14"	4"	26 lbs.

## FLOOR WATER RECEPTACLES

(2" Depth)

Model #	Length	Width	A	B	C	Wt.
FRG-24	24"	12"	26"	14"	2"	44 lbs.
FRG-36	36"	12"	38"	14"	2"	63 lbs.
FRG-48	48"	12"	50"	14"	2"	82 lbs.

**CUSTOM SIZES AVAILABLE!**

\*Troughs 96" or larger in length made with two (2) drains.

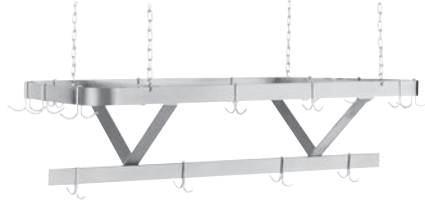




# STAINLESS STEEL POT RACKS

Item #: \_\_\_\_\_ Qty #: \_\_\_\_\_  
 Model #: \_\_\_\_\_  
 Project #: \_\_\_\_\_

## CEILING MOUNTED



## WALL MOUNTED



## SHELF w/ POT RACK



## Ceiling Mounted

L	S/S	POWDER COATED	# of Hooks	Wt
36"	SC-36	GC-36	12	42 lbs.
48"	SC-48	GC-48	12	48 lbs.
60"	SC-60	GC-60	18	54 lbs.
72"	SC-72	GC-72	18	60 lbs.
84"	SC-84	GC-84	18	66 lbs.
96"	SC-96	GC-96	18	80 lbs.
108"	SC-108	GC-108	18	86 lbs.
120"	SC-120	GC-120	18	92 lbs.
132"	SC-132	GC-132	18	98 lbs.
144"	SC-144	GC-144	18	104 lbs.

## Wall Mounted

L	S/S	POWDER COATED	# of Hooks	Wt
24"	SW-24	GW-24	12	18 lbs.
36"	SW-36	GW-36	12	22 lbs.
48"	SW-48	GW-48	12	26 lbs.
60"	SW-60	GW-60	18	30 lbs.
72"	SW-72	GW-72	18	34 lbs.
84"	SW-84	GW-84	18	44 lbs.
96"	SW-96	GW-96	18	48 lbs.
108"	SW-108	GW-108	18	52 lbs.
120"	SW-120	GW-120	18	56 lbs.
132"	SW-132	GW-132	18	60 lbs.
144"	SW-144	GW-144	18	64 lbs.

## Shelf with Pot Rack

L	12" Wide	Wt	15" Wide	Wt	18" Wide	Wt	# of Hooks
36"	PS-12-36	20 lbs.	PS-15-36	25 lbs.	PS-18-36	30 lbs.	6
48"	PS-12-48	30 lbs.	PS-15-48	35 lbs.	PS-18-48	40 lbs.	6
60"	PS-12-60	40 lbs.	PS-15-60	45 lbs.	PS-18-60	50 lbs.	9
72"	PS-12-72	50 lbs.	PS-15-72	55 lbs.	PS-18-72	60 lbs.	9
84"	PS-12-84	60 lbs.	PS-15-84	65 lbs.	PS-18-84	70 lbs.	9
96"	PS-12-96	70 lbs.	PS-15-96	75 lbs.	PS-18-96	80 lbs.	9
108"	PS-12-108	80 lbs.	PS-15-108	85 lbs.	PS-18-108	90 lbs.	9
120"	PS-12-120	90 lbs.	PS-15-120	95 lbs.	PS-18-120	100 lbs.	9
132"	PS-12-132	100 lbs.	PS-15-132	105 lbs.	PS-18-132	110 lbs.	9
144"	PS-12-144	110 lbs.	PS-15-144	115 lbs.	PS-18-144	120 lbs.	9

Units 8 ft. and larger are furnished with three (3) sets of supports brackets.

### FEATURES: (Ceiling Mounted)

Ceiling suspension with chain hangers. Optional stainless steel Flat Bar in lieu of Chain available. Use **TA-98**.

### MATERIAL:

Flat steel bar is 2" x 1/4", either stainless steel or powder coated (as specified).

Pot hooks are plated.

24" long chain hangers are plated.

### CONSTRUCTION:

All welded stainless steel units are blended to a satin finish.

All powder coated units are coated with FDA approved material.

### FEATURES: (Wall Mounted)

Secured to wall by means of bolts through welded brackets. (Hardware not provided)

### MATERIAL:

Flat steel bar is 2" x 1/4", either stainless steel or powder coated (as specified).

Pot hooks are plated.

### CONSTRUCTION:

All welded stainless steel units are blended to a satin finish.

All powder coated units are coated with FDA approved material.

### FEATURES: (Shelf/Pot Rack)

A dual purpose unit for shelf and utensil storage.

Secured to wall by means of bolts through welded brackets. (Hardware not provided)

### MATERIAL:

Flat stainless steel bar is 2" x 1/4". Pot hooks are plated.

Type "430" stainless steel shelf.

### CONSTRUCTION:

All welded stainless steel units are blended to a satin finish.



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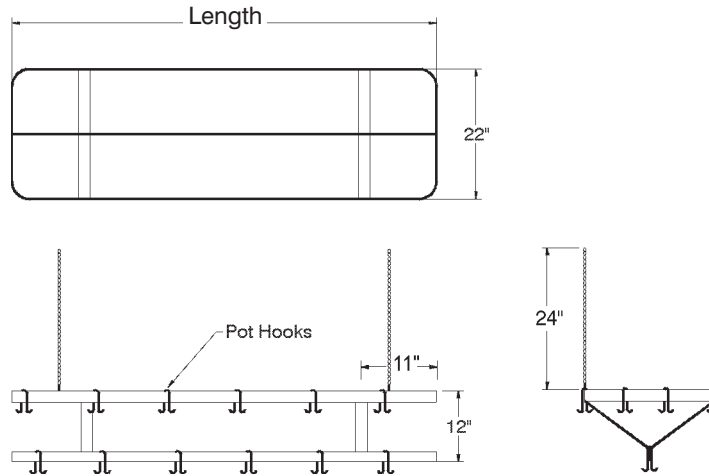
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# DETAILS and SPECIFICATIONS

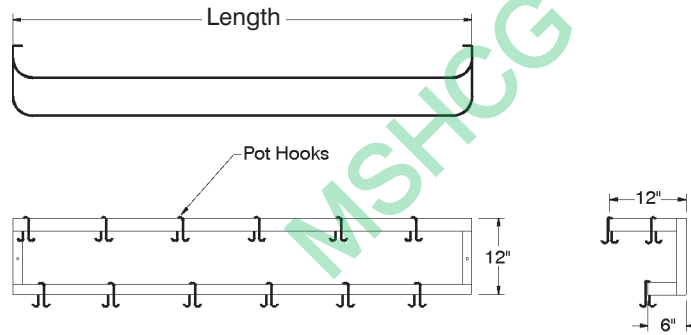
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ALL DIMENSIONS ARE TYPICAL

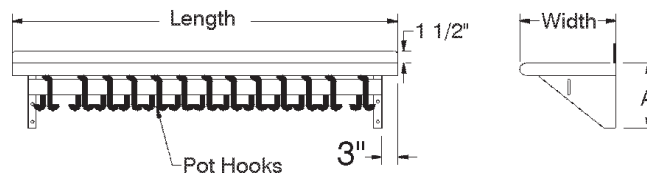
## Ceiling Mounted



## Wall Mounted



## Shelf with Pot Rack



Width	A
12"	10 1/2"
15"	13 1/2"
18"	16 1/2"





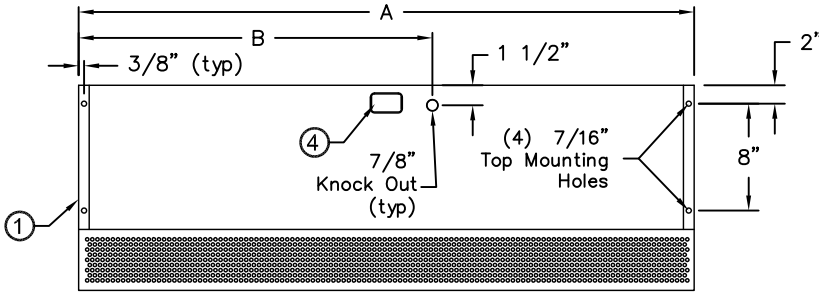
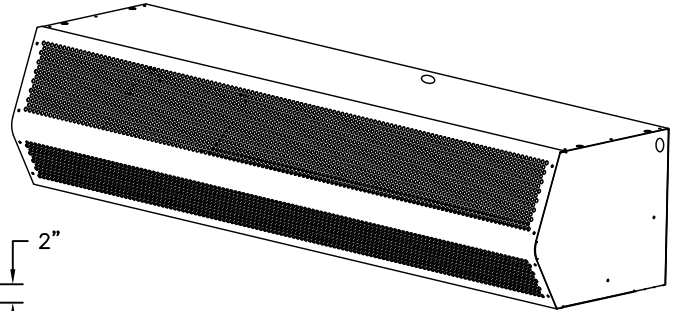
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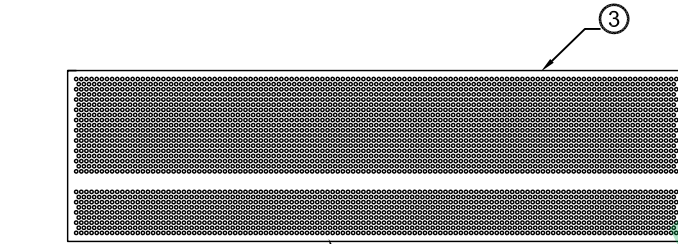
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TITLE			
COMMENTS		DATE 9/17/15	PAGE
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MODEL NO. EP2 Series	DRAWING NO EP2U-F	DRAWN BY TVN	CHECKED BY
		FILE NAME	

# Unheated Drawing

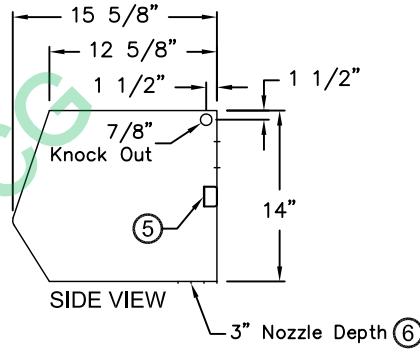
## EP2 (Extra Power 2) Series



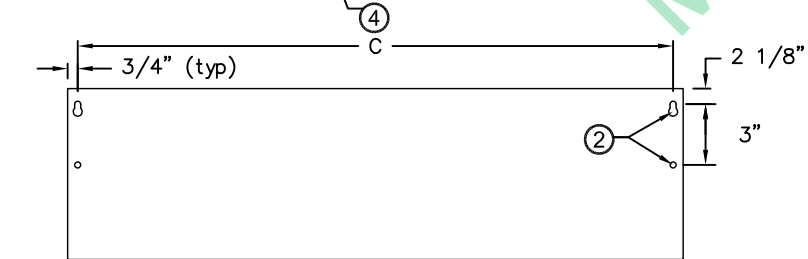
TOP VIEW



FRONT VIEW

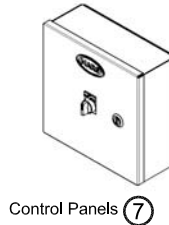


SIDE VIEW

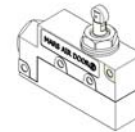


REAR VIEW

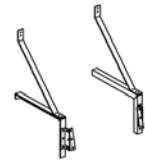
### ⑧ Recommended Accessories



Control Panels ⑦



Door Limit Switches



Brackets

\*- Use corresponding letters in "Electrical Data" columns to complete the model numbers.

### Notes:

- This product is designed to meet the National Electric Code (NEC), ETL Safety Listed for the US and Canada.
- (2) 1/2" key hole slots and (2) 7/16" mounting holes provided on for wall mounting and (4) 7/16" mounting holes for overhead mounting provided, (2) on each end.
- All units have a self contained one piece cabinet, fire retardant and corrosion proof paint lock metal double protected with baked on Titanium Silver color, rust preventative electrostatic polyurethane powder coating.
- Cabinet has sufficient strength for fastening to wall on both ends without intermediate support.
- Internal J-Box(es) for electrical wiring: one motor-(1) 2"x 4"; two motors-(1) 4"x 4"; three motors-(2) 4"x 4".
- Unit is to be installed such that air flow is unobstructed. Air discharge nozzle containing adjustable air directional vanes with 40° sweep front to back.
- Circuit protection as per NEC by others.
- Optional motor control panel, door limit switch and mounting brackets are field installed and/or wired by others. The door limit switch is to be mounted such that the air curtain turns on as door begins to open. To prevent unit damage, the mounting brackets must be installed such that the bottom of the air curtain is not below the door header.

MODEL NUMBER	OVERALL LENGTH A (in)	KNOCKOUT LOCATION B (in)	REAR MOUNTING CENTER C (in)
EP296-2U*-TS	96	52	94 1/2
EP2108-2U*-TS	108	58	106 1/2
EP2120-2U*-TS	120	64	118 1/2
EP2120-3U*-TS	120	64	118 1/2
EP2144-3U*-TS	144	76	142 1/2

# EP2 (Extra Power 2) Series

Unheated

Model Lengths 96" – 144"



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## Unheated Data Sheet

**Applications: Environmental Separation (up to 16') and Insect Control (up to 14')**

EP2 (Extra Power) Series 2	Mechanical Data						Lab Data		
	Model Number	Nozzle Length (in)	Length (in)	Depth (in)	Height (in)	Motor (hp)	Weight (lbs)	Max Velocity (fpm)	Max Volume (cfm)
	EP296-2U*-TS	96	96	16.0	14	Two 3	280	4800	9600
	EP2108-2U*-TS	108	108	16.0	14	Two 3	295	4200	9600
	EP2120-2U*-TS	120	120	16.0	14	Two 3	305	3840	9600
	EP2120-3U*-TS	120	120	16.0	14	Three 3	390	5760	14400
	EP2144-3U*-TS	144	144	16.0	14	Three 3	420	4800	14400

\* - Use corresponding letters in "Electrical Data" columns to complete the model numbers

Note: Data above for 3450 RPM at 60 Hz, 50 Hz is 2850 RPM with a 17% reduction in the performance data.

### Features:

- ❖ 3 HP Continuous Duty TEAO Motors
- ❖ Sleek self-contained one piece heavy gauge corrosion proof paint lock metal design
- ❖ ETL Certified to conform to UL 507 (US) and CSA 22.2 (Canada) Standards
- ❖ (4) 7/16" top and wall mounting holes provided, (2) on each end
- ❖ Cabinet has sufficient strength for fastening to wall on both ends without intermediate support
- ❖ Adjustable air directional vanes with 40° sweep front to back
- ❖ Standard color is Titanium Silver
- ❖ Rust preventative electrostatic polyurethane powder coating
- ❖ 5 year parts warranty
- ❖ Freight Included (FOB Continental USA)
- ❖ Proudly Made in the USA

### Options and Accessories: (see Accessories Brochure)

- ❖ Motor Control Panels
- ❖ Wall and Overhead Bracket
- ❖ Washdown units and accessories (NEMA 4 & 4x)
- ❖ Explosion Resistant units and accessories (Class I, Div. I, Group D)
- ❖ Custom colors and finishes (304SS, 316SS)

### Sound Levels: (measured at 10' in an open field)

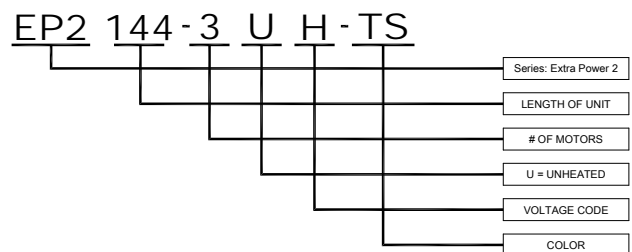
1 Motor Unit = 76 dBA, 2 Motor Unit = 79 dBA, 3 Motor Unit = 81 dBA

Electrical Data (FLA)	Unit Voltage (Voltage Code)		
	208/230v (G)	460v (H)	575v (I)
EP296-2U*-TS	16.6/15.2	7.6	6.0
EP2108-2U*-TS	16.6/15.2	7.6	6.0
EP2120-2U*-TS	16.6/15.2	7.6	6.0
EP2120-3U*-TS	24.9/22.8	11.4	9.0
EP2144-3U*-TS	24.9/22.8	11.4	9.0

\* - Use corresponding letters in "Electrical Data" columns to complete the model numbers.

Note: For Ampacity Multiply FLA X 1.25

EXAMPLE



NOTE: MARS AIR SYSTEMS, LLC reserves the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions or replacements for previously purchased equipment.





# STAINLESS STEEL DISHTABLES DISHLANDING SOIL

**NEW** Tile Edge Design



**SPEC-LINE**  
DTS-D60-72L Shown

**10-1/2" EXTRA LARGE**  
Bold Looking Backsplash  
with 2" return and tile edge



Item #: \_\_\_\_\_ Qty #: \_\_\_\_\_  
 Model #: \_\_\_\_\_  
 Project #: \_\_\_\_\_

**Spec-Line:** 14 ga. 304 Series Stainless Steel Top.  
 16 ga. 304 Stainless Steel Legs Stainless Steel Legs  
 with Welded Cross Bracing & Stainless Steel Bullet Feet.

**UPGRADED!**  
**Standard:** 16 ga. 304 Series Stainless Steel Top.  
 16 ga. 304 Stainless Steel Legs Stainless Steel Legs  
 with Welded Cross Bracing & Stainless Steel Bullet Feet.

**Super Saver:** 16 ga. 304 Series Stainless Steel Top.  
 Galvanized Legs with Plastic Bullet Feet.

**FEATURES:**

Tile edge for ease of installation.  
 STANDARD & SUPERSAVER SOIL section features 5" deep sink bowl.  
 SPEC-LINE SOIL section features 8" deep sink bowl.  
 Dishtable system consists of SOIL and CLEAN sections.  
 Table is furnished with 10-1/2" splash with a 2" return.

**CONSTRUCTION:**

All TIG welded.  
 Welded areas blended to match adjacent surfaces and to a satin finish.  
 Stainless Steel Gussets welded to a stainless steel support channel.

**MECHANICAL:**

Faucet holes in SPLASH punched on 8" centers, faucet not included.  
 Waste drain is 1 1/2" IPS basket type and is included.

ACCESSORIES	Model #	Qty
Faucet		
Wall Shelf		
Undershelf		

14 Gauge 304 16 Ga. Stainless Steel Legs	16 Gauge 304 Stainless Steel Legs	16 Gauge 304 Galvanized Legs
---	--------------------------------------	---------------------------------

Nominal Size	"L"	SPEC-LINE	STANDARD	SUPER SAVER	Approx. Wt.
4 Ft.	47"	DTS-D30-48L or R	DTS-D70-48L or R	DTS-D60-48L or R	180 lbs.
5 Ft.	59"	DTS-D30-60L or R	DTS-D70-60L or R	DTS-D60-60L or R	205 lbs.
6 Ft.	71"	DTS-D30-72L or R	DTS-D70-72L or R	DTS-D60-72L or R	230 lbs.
7 Ft.	83"	DTS-D30-84L or R	DTS-D70-84L or R	DTS-D60-84L or R	240 lbs.
8 Ft.	95"	DTS-D30-96L or R	DTS-D70-96L or R	DTS-D60-96L or R	255 lbs.
9 Ft.	107"	DTS-D30-108L or R	DTS-D70-108L or R	DTS-D60-108L or R	320 lbs.
10 Ft.	119"	DTS-D30-120L or R	DTS-D70-120L or R	DTS-D60-120L or R	380 lbs.
12 Ft.	143"	DTS-D30-144L or R	DTS-D70-144L or R	DTS-D60-144L or R	390 lbs.

Nominal sizing on all dishtables for ease of installation.



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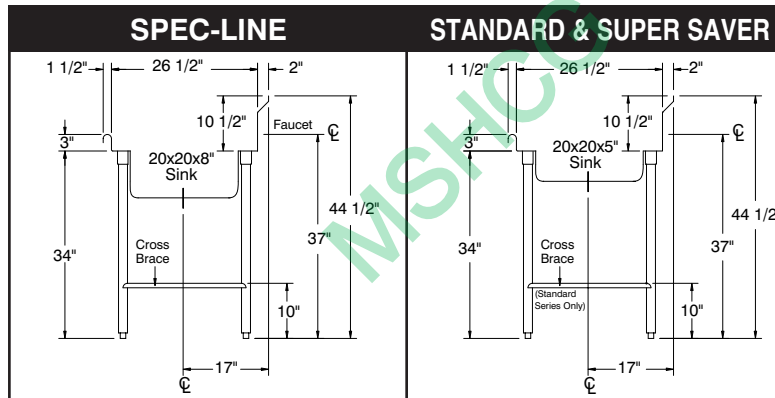
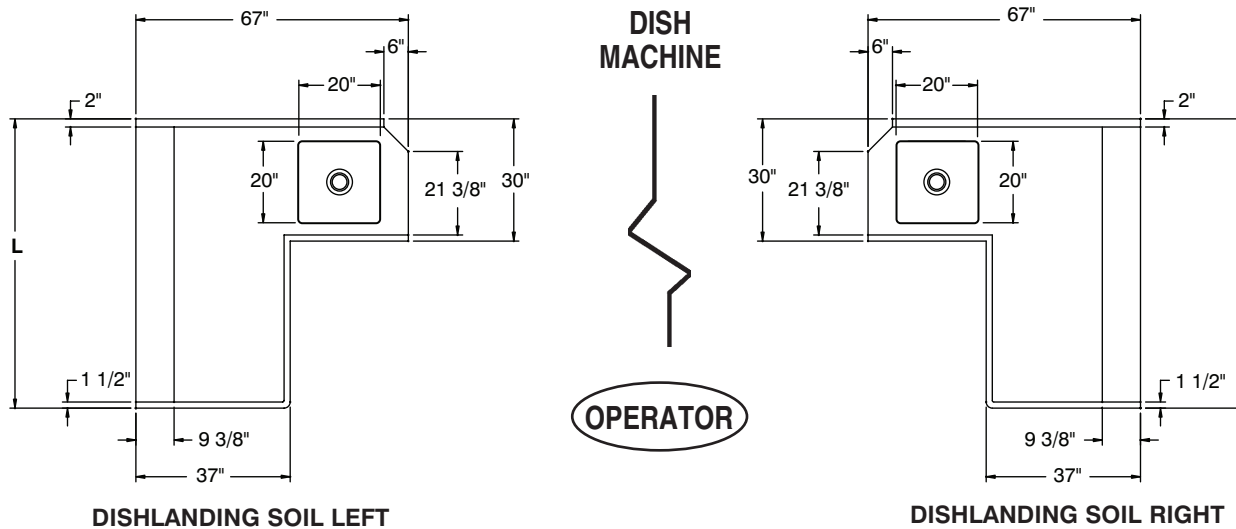
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# DIMENSIONS and SPECIFICATIONS

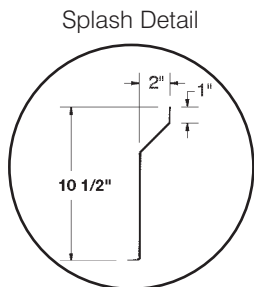
TOL ± .500"

ALL DIMENSIONS ARE TYPICAL

**SEE DISH MACHINE COMPATIBILITY CHART TO ENSURE PROPER FIT**  
 Dish Machine Compatibility Chart can be found on our website at [www.advancetabco.com](http://www.advancetabco.com) under "Product Support"



*CUSTOMIZE YOUR OWN SYSTEM  
 by Ordering Optional Accessories from our  
 PRODUCT & PRICE GUIDE*



Description	SPEC-LINE	STANDARD	SUPER SAVER
<b>Material</b>	14 Ga. 304 Series	16 Ga. 304 Series	16 Ga. 304 Series
<b>1 5/8" Dia. Legs</b>	Stainless Steel	Stainless Steel	galvanized
<b>Gussets</b>	Stainless Steel	Stainless Steel	Stainless steel
<b>Bullet Feet (1" adj.)</b>	Stainless Steel	Stainless Steel	Plastic
<b>Cross Bracing</b>	Welded	Welded	Optional
<b>Prerinse Bowl Depth</b>	8"	5"	5"
<b>Prerinse Basket</b>	Included	Optional	Optional





# DISHTABLE RACK SHELVES

Mounts to backsplash and end roll of dishtable



Item #: \_\_\_\_\_ Qty #: \_\_\_\_\_  
 Model #: \_\_\_\_\_  
 Project #: \_\_\_\_\_

## DTA-79

### TABLE MOUNTED TUBULAR, DOUBLE SIDED DESIGN



Recommended for D, G and U-Shaped Series Dishables Only.



**OPTION 1: Lower Angle**  
 (Racks cannot be back to back)



**OPTION 2: Higher Angle**  
 For back to back storage  
 (For maximum rack storage)

**FEATURES:**

A dual purpose double sided open tubular design table mounted rack shelf with solid end plates

**CONSTRUCTION:**

Stainless steel posts, cross-tubes & end plates  
 Mounts to dishtable with stainless steel bolts. Ships Knocked Down\*  
 Easily assembles with simple tool

**MATERIAL:**

End Plates are 14 gauge type 304 series stainless steel  
 Tubing is 1 5/8" diameter 18 gauge type 300 stainless steel tubing

**CENTER SUPPORT PROVIDED FOR 9' AND LONGER SHELVES**  
 Center support can be positioned to accommodate rack size

\*Shelf ships separately from table to reduce freight costs and chance of shipping damage. Entire unit may ship pre-assembled from factory where special applications exist. Consult factory.

Per Linear Foot. Minimum Length 48"

When using DTA-79 as a pass-thru for a glass rack, use **OPTION 2** (see above). This will allow the rack to pass through the middle (10" Clearance).



MODEL #	Qty.
DTA-79	

## DTA-79S

### TABLE MOUNTED, DOUBLE SIDED DESIGN WITH SOLID BASE

**FEATURES:**

Table mounted rack shelf with solid base & end plates.  
 Drip tubes for water drainage

**CONSTRUCTION:**

Stainless steel posts, cross-tube (at top along length) & end plates  
 Mounts to dishtable with stainless steel bolts. Ships Knocked Down\*  
 Easily assembles with simple tool

**MATERIAL:**

End Plates and shelf base are 14 gauge type 304 series stainless steel  
 Tubing is 1 5/8" diameter 18 gauge type 300 stainless steel tubing

**CENTER SUPPORT PROVIDED FOR 9' AND LONGER SHELVES**  
 Center support bolts to shelf surface at midpoint

\*Shelf ships separately from table to reduce freight costs and chance of shipping damage. Entire unit may ship pre-assembled from factory where special applications exist. Consult factory.

Per Linear Foot. Minimum Length 48"



MODEL #	Qty.
DTA-79S	



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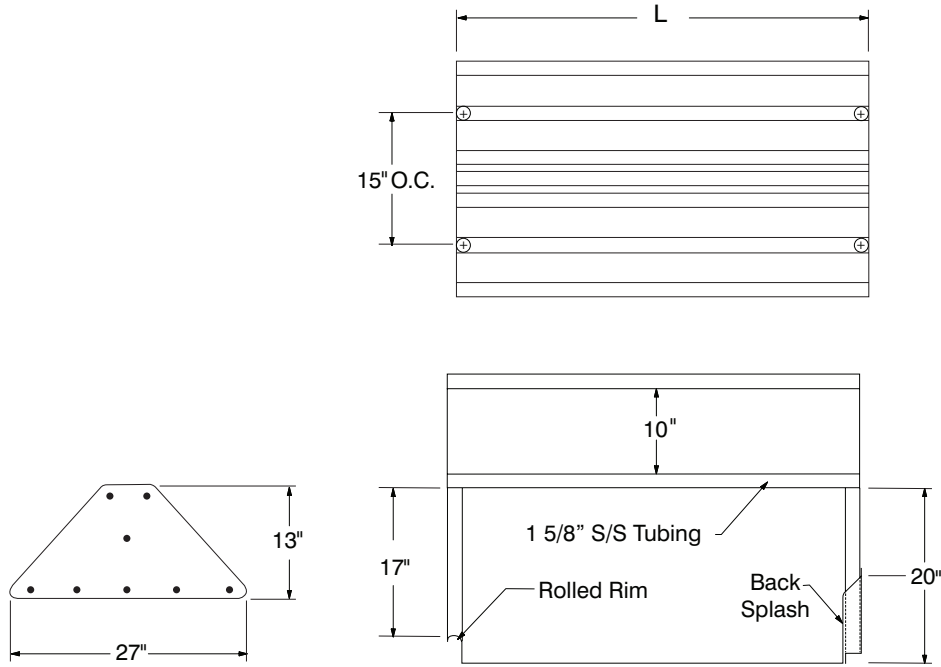
**NEVADA**  
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# DIMENSIONS and SPECIFICATIONS

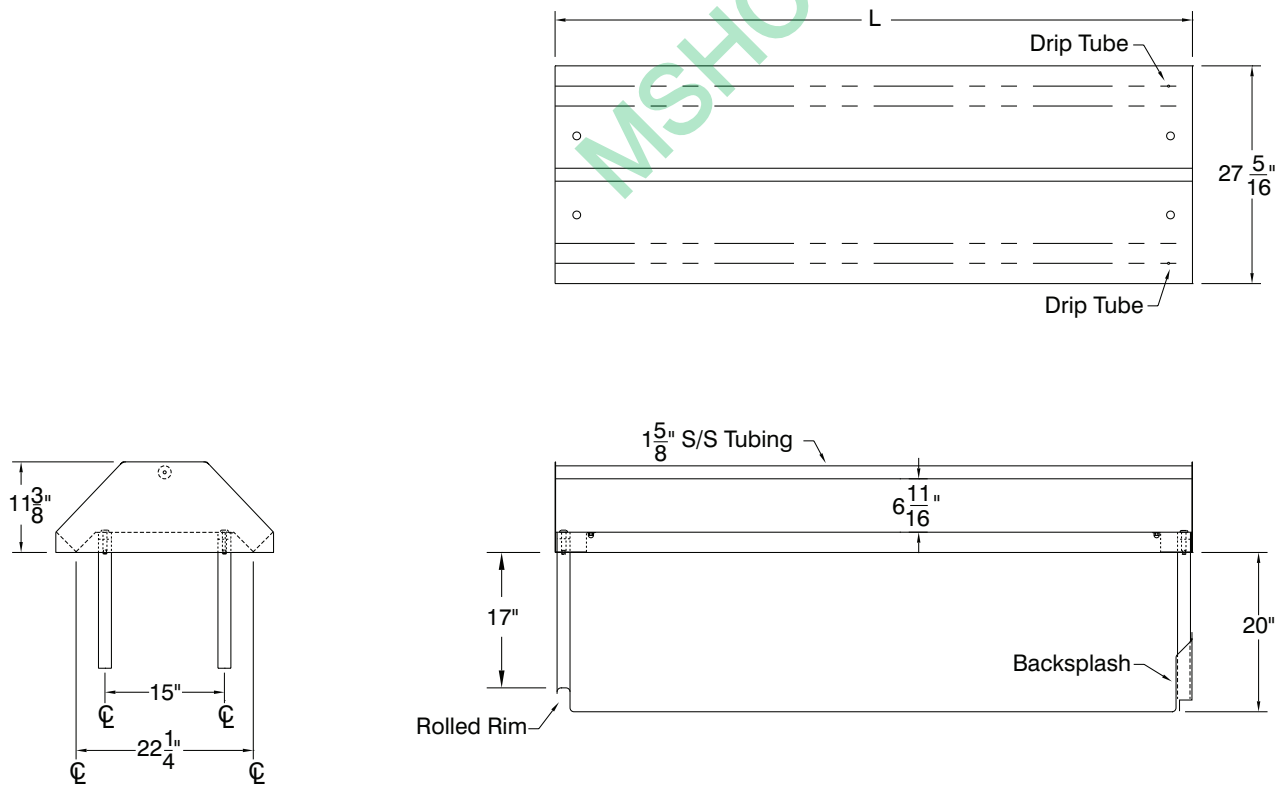
TOL ± .125"

ALL DIMENSIONS ARE TYPICAL

## DTA-79



## DTA-79S



ADVANCE TABCO is constantly engaged in a program of improving our products. Therefore, we reserve the right to change specifications without prior notice.

# Champion®

The Dishwashing Machine Specialists

Project \_\_\_\_\_

Item No. \_\_\_\_\_

Quantity \_\_\_\_\_

## STANDARD FEATURES

- **ENERGY STAR® Qualified**
- **NEW Exclusive** Built-in booster configured for both 40° and 70° Rise
- **NEW Exclusive** Field convertible to single or three phase, 208 or 240 volt, corner or straight through operation
- Rinse Sentry – ensures 180°F final rinse
- Auto start – starts unit when doors are closed
- High temperature
- Single point connection
- High efficiency 1 HP pump
- 55 racks per hour
- Self draining pump
- Automatic tank fill
- Detergent/chemical connections
- Interchangeable upper and lower arm
- Top mounted splash proof controls
- Automatic drain valve

## VERSA-CLEAN

DH2000 High Temperature  
Door-type  
Dishwashing Machine



VERSA-CLEAN DOOR-TYPE

VERSA-CLEAN  
MSHCC



## OPTIONS & ACCESSORIES

- Drain Tempering Kit
- Side Panels

## SPECIFIER STATEMENT

Specified unit will be Champion model Versa-Clean, DH2000 high temperature door-type dishwashing machine.

Features top mounted splash proof controls, Rinse Sentry, Auto start, interchangeable stainless steel wash and rinse arms, 55 racks/hr., .90 US gals/rack.

1 year parts and labor warranty.

Champion Industries, Inc.  
P. O. Box 4149, Winston-Salem, NC 27115  
Tel: 336/661-1556 Fax: 336/661-1979  
[www.championindustries.com](http://www.championindustries.com)

# VERSACLEAN



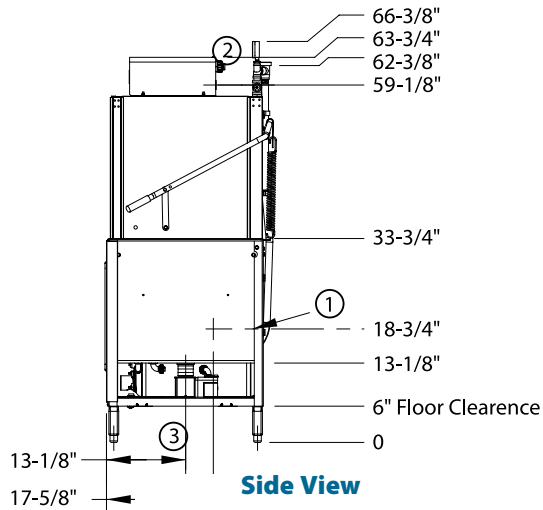
# Champion®

The Dishwashing Machine Specialists

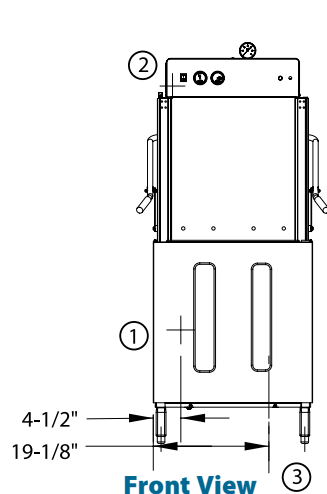
DH2000 High Temperature  
Door-type  
Dishwashing Machine

Shipping weight crated: 300 lbs.

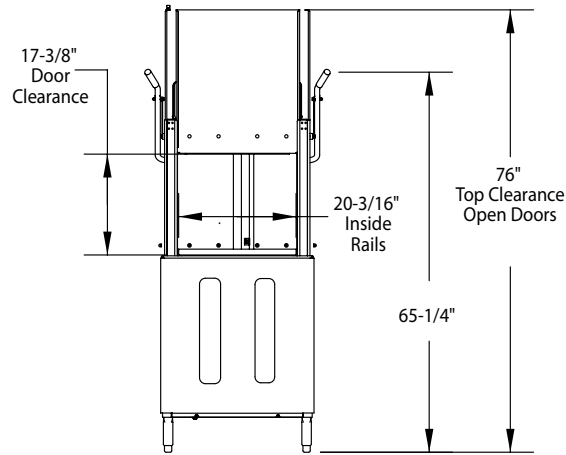
Dimensions shown in inches



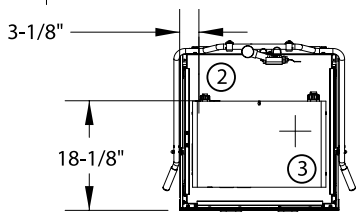
Side View



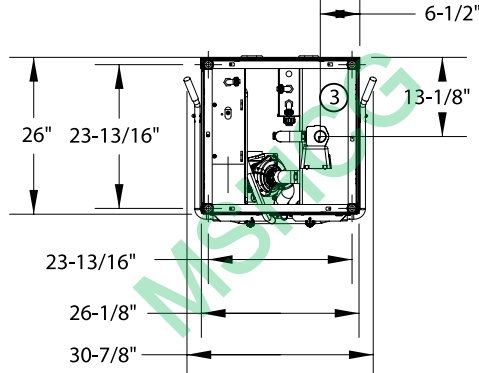
Front View



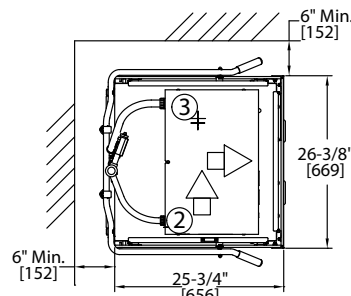
Door Clearance



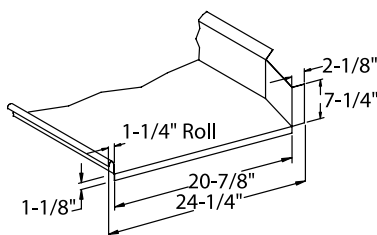
Straight Through Operation



Plan View



Corner Configuration



Typical Table Construction

**Plumbing Note:** Because of variation in house-supplied water pressure, pressure regulating valves (PRV's) for incoming water may be needed. The PRV's can be purchased from Champion or obtained locally.

Utilities	
1	<b>Water</b> 3/4" NPT
2	<b>Electrical</b> A. 208-240/60/1 B. 208-240/60/3
3	<b>Drain</b> A. 2" fit hose

Electric 40°/70° Rise Booster				
Voltage	Rated Amps	Minimum Supply Ckt. Conductor Ampacity	Maximum Overcurrent Protective Device	
208/60/1	65	80	80	
240/60/1	75	80	80	
208/60/3	40	50	50	
240/60/3	45	50	50	

**Warning:** Plumbing, electrical connections should be made by qualified personnel who will observe all the applicable plumbing, sanitary and safety codes and the National Electrical Code.

## SPECIFICATIONS

### Capacities

Racks per hr. (NSF rated)	55
Wash tank (gal.)	9.5

### Motor horsepower

1 HP

### Water consumption

Gal. per hr. (max. use)	49.5
Gal. per rack	.90

### Temperature °F

Wash	150
Rinse	180

### Heating

Tank heat, electric	5.2 kW
Electric Booster	7.5 kW

### Time cycle in seconds

Wash	40
Dwell	1
Rinse	12
Sanitary Dwell	7
Total cycle	60

'USGBC' and related logo is a trademark owned by the U.S. Green Building Council and is used by permission.

Due to an ongoing value analysis program at Champion, specifications contained in this catalog are subject to change without notice.

Champion Industries, Inc., P. O. Box 4149, Winston-Salem, NC 27115 • 336/661-1556 • Fax: 336/661-1979 • www.championindustries.com



# STAINLESS STEEL DISHTABLES ISLAND CLEAN

**NEW** Tile Edge Design



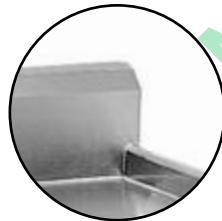
**SPEC-LINE**  
DTC-G70-60R Shown

**Optional Stainless Steel  
UNDERSHELF  
Die Cast LEG CLAMP**

secured to shelf eliminates  
unsightly nuts & bolts



**10-1/2" EXTRA LARGE  
Bold Looking Backsplash  
with 2" return and tile edge**



**Item #:** \_\_\_\_\_ **Qty #:** \_\_\_\_\_  
**Model #:** \_\_\_\_\_  
**Project #:** \_\_\_\_\_

**Spec-Line:** 14 ga. 304 Series Stainless Steel Top.  
16 ga. 304 Stainless Steel Legs Stainless Steel Legs  
with Welded Cross Bracing & Stainless Steel Bullet Feet.

**UPGRADED!**  
**Standard:** 16 ga. 304 Series Stainless Steel Top.  
16 ga. 304 Stainless Steel Legs Stainless Steel Legs  
with Welded Cross Bracing & Stainless Steel Bullet Feet.

**Super Saver:** 16 ga. 304 Series Stainless Steel Top.  
Galvanized Legs with Plastic Bullet Feet.

**FEATURES:**

Tile edge for ease of installation.  
Dishtable system consists of SOIL and CLEAN sections.  
Table is furnished with 10-1/2" splash with a 2" return.

**CONSTRUCTION:**

All TIG welded.  
Welded areas blended to match adjacent surfaces and to a  
satin finish.  
Stainless Steel Gussets welded to a stainless steel  
support channel.

ACCESSORIES	Model #	Qty
Undershelf		
Wall Shelf		

Nominal Size	"L"	14 Gauge 304	16 Gauge 304	16 Gauge 304	Approx. Wt.
		16 Ga. Stainless Steel Legs	Stainless Steel Legs	Galvanized Legs	
		SPEC-LINE	STANDARD	SUPER SAVER	
4 Ft.	47"	DTC-G30-48L or R	DTC-G70-48L or R	DTC-G60-48L or R	145 lbs.
5 Ft.	59"	DTC-G30-60L or R	DTC-G70-60L or R	DTC-G60-60L or R	165 lbs.
6 Ft.	71"	DTC-G30-72L or R	DTC-G70-72L or R	DTC-G60-72L or R	190 lbs.
7 Ft.	83"	DTC-G30-84L or R	DTC-G70-84L or R	DTC-G60-84L or R	205 lbs.
8 Ft.	95"	DTC-G30-96L or R	DTC-G70-96L or R	DTC-G60-96L or R	215 lbs.
9 Ft.	107"	DTC-G30-108L or R	DTC-G70-108L or R	DTC-G60-108L or R	310 lbs.
10 Ft.	119"	DTC-G30-120L or R	DTC-G70-120L or R	DTC-G60-120L or R	340 lbs.
12 Ft.	143"	DTC-G30-144L or R	DTC-G70-144L or R	DTC-G60-144L or R	360 lbs.

Nominal sizing on all  
dishtables for ease of  
installation.



**Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.**  
 Email Orders To: customer@advancetabco.com. For Smart Fabrication™ Quotes, Email To: smartfab@advancetabco.com or Fax To: 631-586-2933

**NEW YORK**  
Fax: (631) 242-6900

**GEORGIA**  
Fax: (770) 775-5625

**TEXAS**  
Fax: (972) 932-4795

**NEVADA**  
Fax: (775) 972-1578

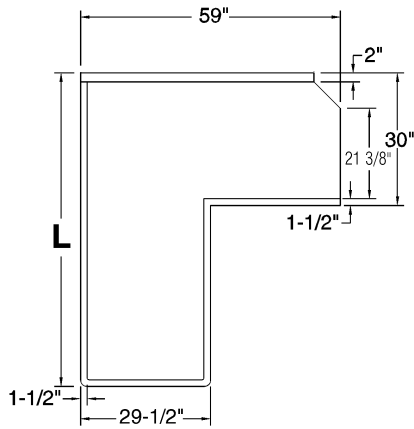
# DIMENSIONS and SPECIFICATIONS

TOL ± .500"

ALL DIMENSIONS ARE TYPICAL

## SEE DISH MACHINE COMPATIBILITY CHART TO ENSURE PROPER FIT

Dish Machine Compatibility Chart can be found on our website at [www.advancetabco.com](http://www.advancetabco.com) under "Product Support"

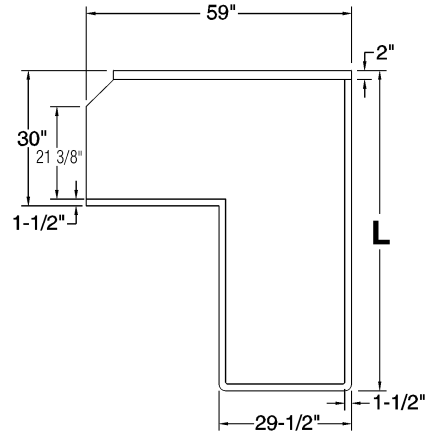


ISLAND CLEAN LEFT

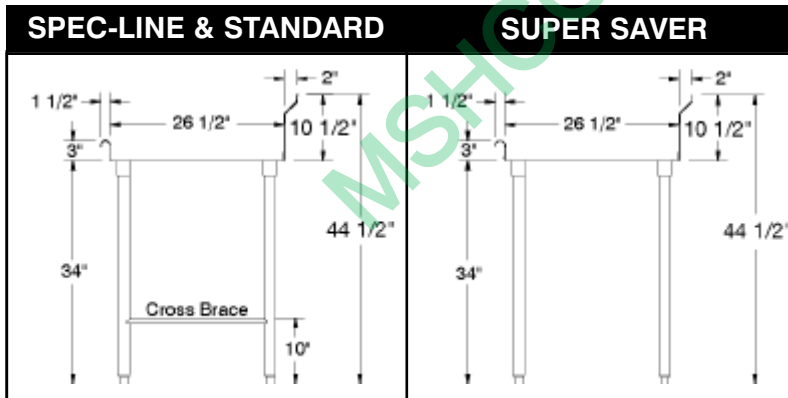
DISH MACHINE



OPERATOR

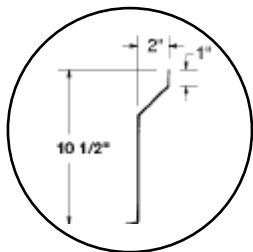


ISLAND CLEAN RIGHT



*CUSTOMIZE YOUR OWN SYSTEM  
by Ordering Optional Accessories from our  
PRODUCT & PRICE GUIDE*

Splash Detail



Description	SPEC-LINE	STANDARD	SUPER SAVER
<b>Material</b>	14 Ga. 304 Series	16 Ga. 304 Series	16 Ga. 304 Series
<b>1 5/8" Dia. Legs</b>	Stainless Steel	Stainless Steel	Galvanized
<b>Gussets</b>	Stainless Steel	Stainless Steel	Stainless Steel
<b>Bullet Feet (1" adj.)</b>	Stainless Steel	Stainless Steel	Plastic
<b>Cross Bracing</b>	Welded	Welded	Optional







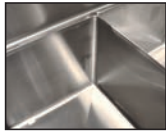
# STAINLESS STEEL FABRICATED ECONOMY SINKS

## Three & Four Compartments

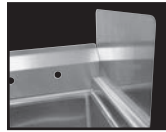


Rolled Rim Edge For Additional Strength

Item #: \_\_\_\_\_ Qty #: \_\_\_\_\_  
 Model #: \_\_\_\_\_  
 Project #: \_\_\_\_\_



Fabricated Bowls are Welded Together at the Seams



**K-700**  
 Removable Side Splashes  
 Fits Left OR Right Side

**FEATURES:**

Backsplash has tile edge for ease of installation.  
 Sink bowls are 3/4" coved corner and meet NSF requirements.

Rolled Rim Edge for additional strength.  
 Sink Bowls are 14" deep for greater capacity.

**CONSTRUCTION:**

All TIG welded.  
 Welded areas blended to match adjacent surfaces and to a satin finish.  
 Gussets welded to a die-formed reinforced plate.

**MATERIAL:**

1 5/8" diameter stainless steel legs with 1" adjustable stainless steel bullet feet.  
 Entire unit is 16 gauge 304 stainless steel.  
 Gussets - stainless steel.

**MECHANICAL:**

- Supply is 1/2" IPS hot & cold.
- Faucet holes on 8" centers.
- Faucets are not included (see accessories).
- Waste drains are 1 1/2" IPS S/S basket type, located in center of sink bowl, and are included.

MODEL #	Length L	Width W	Bowl Size A & B	Drbd. Length C	# of Drbds.	Drbd. Location	Wt.
FC-3-1515	50"	20 1/2"	15" x 15"	N/A	0	None	110 lbs.
FC-3-1515-15RorL	62 1/2"	20 1/2"		15"	1	Specify	120 lbs.
FC-3-1515-15RL	75"	20 1/2"		15"	2	R & L	120 lbs.
FC-3-1620	53"	26"	16" x 20"	N/A	0	None	120 lbs.
FC-3-1620-18RorL	68 1/2"	26"		18"	1	Specify	135 lbs.
FC-3-1620-18RL	84"	26"		18"	2	R & L	150 lbs.
FC-3-1620-24RL	96"	26"		24"	2	R & L	205 lbs.
FC-3-1620-36RL	120"	26"		36"	2	R & L	240 lbs.
FC-3-1818	59"	24"	18" x 18"	N/A	0	None	120 lbs.
FC-3-1818-18RorL	74 1/2"	24"		18"	1	Specify	128 lbs.
FC-3-1818-24RorL	80 1/2"	24"		24"	1	Specify	136 lbs.
FC-3-1818-18RL	90"	24"		18"	2	R & L	140 lbs.
FC-3-1818-24RL	102"	24"		24"	2	R & L	150 lbs.
FC-3-1824	59"	30"	18" x 24"	N/A	0	None	135 lbs.
FC-3-1824-18RorL	74 1/2"	30"		18"	1	Specify	142 lbs.
FC-3-1824-24RorL	80 1/2"	30"		24"	1	Specify	150 lbs.
FC-3-1824-18RL	90"	30"		18"	2	R & L	265 lbs.
FC-3-1824-24RL	102"	30"		24"	2	R & L	300 lbs.
FC-3-2028-24RL	108"	34"	20" x 28"	24"	2	R & L	315 lbs.
FC-3-2030-20RL	100"	36"	20" x 30"	20"	2	R & L	315 lbs.
FC-3-2030-30RL	120"	36"		30"	2	R & L	370 lbs.
† FC-3-2424	77"	30"	24" x 24"	N/A	0	None	175 lbs.
† FC-3-2424-18RorL	92.5"	30"		18"	1	Specify	310 lbs.
† FC-3-2424-18RL	108"	30"		18"	2	R&L	330 lbs.
† FC-3-2424-24RorL	98 1/2"	30"		24"	1	Specify	330 lbs.
† FC-3-2424-24RL	120"	30"		24"	2	R & L	350 lbs.
† FC-3-2430	77"	36"	24" x 30"	N/A	0	None	200 lbs.
† FC-3-2430-24RorL	99"	36"		24"	1	Specify	375 lbs.
† FC-3-2430-24RL	120"	36"		24"	2	R & L	400 lbs.
† FC-3-2430-30RorL	105"	36"		30"	1	Specify	425 lbs.
† FC-3-2430-30RL	132"	36"		30"	2	R & L	445 lbs.
† FC-3-2430-36RorL	111"	36"		36"	1	Specify	450 lbs.
† FC-3-2430-36RL	144"	36"		36"	2	R & L	490 lbs.
† FC-3-3024	95"	30"	30" x 24"	N/A	0	None	200 lbs.
† FC-3-3024-24RorL	117"	30"		24"	1	Specify	375 lbs.
† FC-3-3024-24RL	138"	30"		24"	2	R & L	400 lbs.
† FC-3-3024-30RorL	123"	30"		30"	1	Specify	425 lbs.
† FC-3-3024-30RL	150"	30"		30"	2	R & L	445 lbs.
† FC-3-3024-36RorL	129"	30"		36"	1	Specify	450 lbs.
† FC-3-3024-36RL	162"	30"		36"	2	R & L	490 lbs.
† FC-3-3030	95"	36"	30" x 30"	N/A	0	None	240 lbs.
† FC-3-3030-24RL	138"	36"		24"	2	R & L	470 lbs.
† FC-3-3030-30RL	150"	36"		30"	2	R & L	515 lbs.
† FC-3-3030-36RL	162"	36"		36"	2	R & L	560 lbs.
† FC-4-1818-18RL	108"	24"	18" x 18"	18"	2	R & L	270 lbs.
† FC-4-1824-18RL	108"	30"	18" x 24"	18"	2	R & L	325 lbs.
† FC-4-2424-24RL	144"	30"	24" x 24"	24"	2	R & L	355 lbs.

**3 COMPARTMENT**

**4 COMP.**

† Requires Two Sets of Faucets

**Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.**

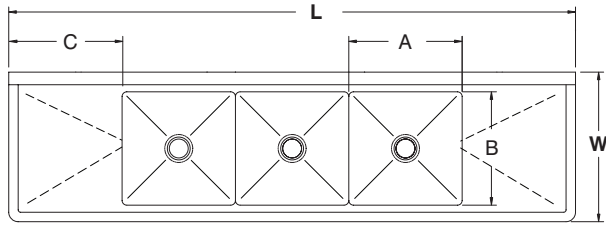
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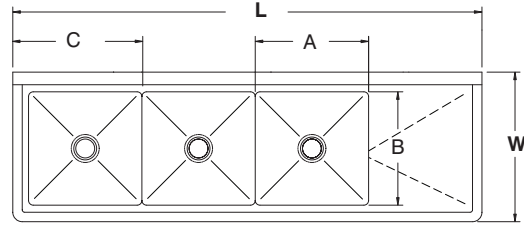
# DIMENSIONS and SPECIFICATIONS

TOL Overall: ± .500"  
 Interior: ± .250"

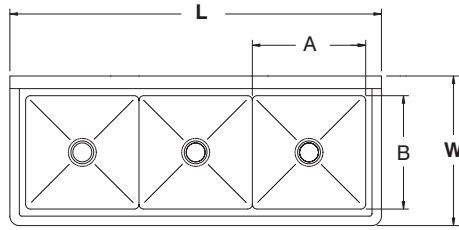
ALL DIMENSIONS ARE TYPICAL



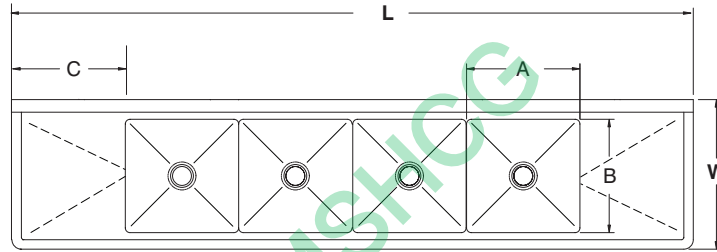
**3 COMP - 2 DRBD**



**3 COMP - 1 DRBD**



**3 COMP**

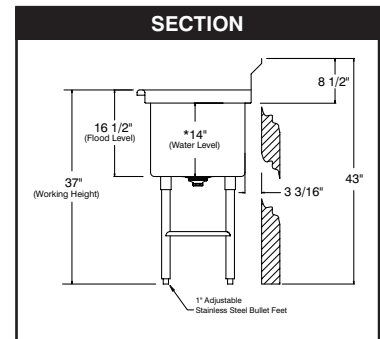
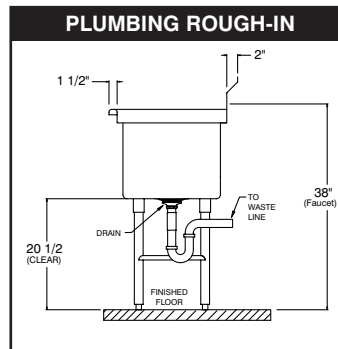


**4 COMP - 2 DRBD**

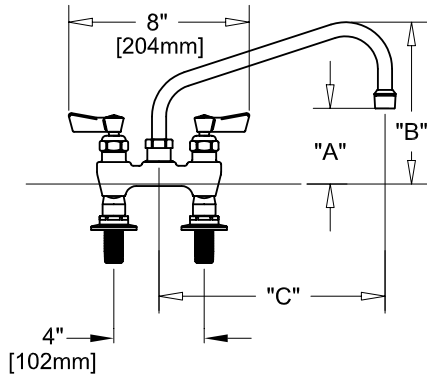
**ACCESSORIES**

**Model # Qty**

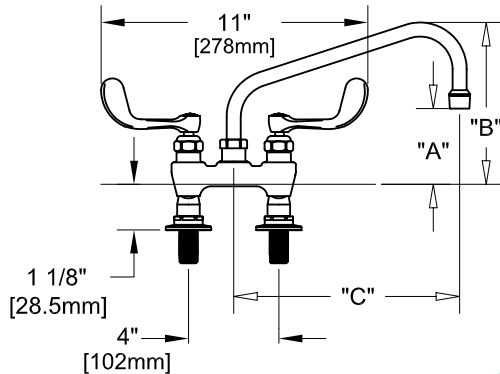
	Model #	Qty
DRAINS		
FAUCETS		



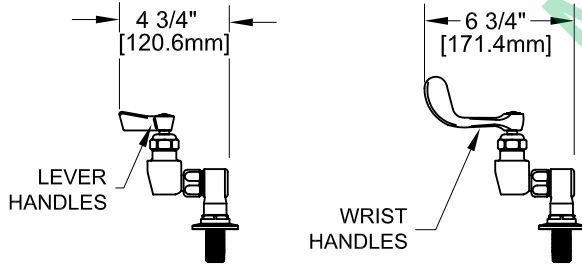
4" DECK MOUNT FAUCET W/ LEVER HANDLES



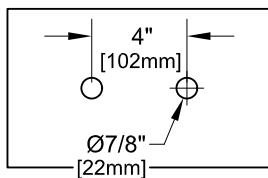
4" DECK MOUNT FAUCET W/ WRIST HANDLES



SIDE VIEW:



ROUGH-IN:



ANSI/A112.18.1-2005

PRODUCT NAME: STAINLESS STEEL  
4" DECK MOUNT FAUCETS

MODEL:

- 53740 W/ 6" SWING SPOUT W/ LEVER HANDLES
- 53759 W/ 8" SWING SPOUT W/ LEVER HANDLES
- 53767 W/ 10" SWING SPOUT W/ LEVER HANDLES
- 53775 W/ 12" SWING SPOUT W/ LEVER HANDLES
- 53783 W/ 14" SWING SPOUT W/ LEVER HANDLES
- 53791 W/ 16" SWING SPOUT W/ LEVER HANDLES
- 58564 W/ 6" SWING SPOUT W/ WRIST HANDLES
- 58572 W/ 8" SWING SPOUT W/ WRIST HANDLES
- 58580 W/ 10" SWING SPOUT W/ WRIST HANDLES
- 58599 W/ 12" SWING SPOUT W/ WRIST HANDLES
- 58602 W/ 14" SWING SPOUT W/ WRIST HANDLES
- 58610 W/ 16" SWING SPOUT W/ WRIST HANDLES

FEATURES

CONTROL VALVE

- \* 4" DECK MOUNT
- \* STAINLESS STEEL CONSTRUCTION
- \* SWIVELLING SEAT DISKS
- \* HOT SIDE STEM - RIGHT HAND
- \* COLD SIDE STEM - LEFT HAND
- \* LEVER HANDLES OR WRIST HANDLES
- \* SWING SPOUT

SYSTEM LIMITS

- \* TEMP: 40°F MIN. TO 140°F MAX.

SHIPPING WEIGHT

- \* 5.0 LBS

\* NSF 61-9 APPROVED & LISTED

www.truesdail.com

MODELS	DIM "A"	DIM "B"	DIM "C"
53740 58564	2-1/4" [57mm]	5-7/8" [149mm]	6" [152mm]
53759 58572	2-1/2" [64mm]	6-3/8" [162mm]	8" [204mm]
53767 58580	3-1/8" [79mm]	6-7/8" [175mm]	10" [254mm]
58599	3-3/4" [95mm]	7-3/8" [187mm]	12" [305mm]
53783 58602	4-3/8" [111mm]	8-1/4" [210mm]	14" [356mm]
53791 58610	5" [127mm]	8-7/8" [225mm]	16" [406mm]

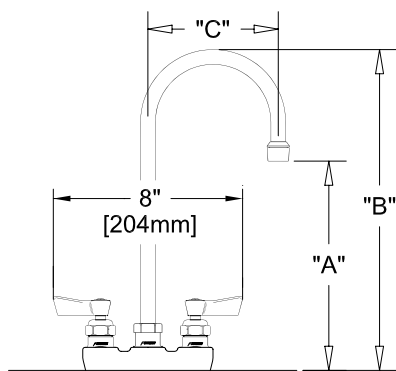
**FISHER**

FISHER MANUFACTURING COMPANY

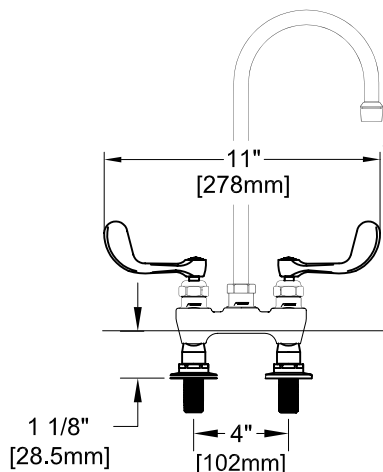
TOLL FREE: 800-421-6162 - FAX: 800-832-8238

information@fisher-mfg.com - www.fisher-mfg.com

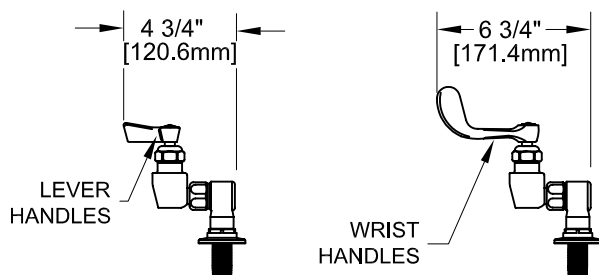
4" DECK MOUNT W/ LEVER HANDLES



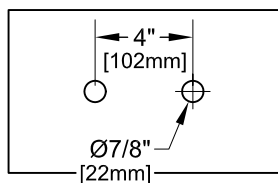
4" DECK MOUNT W/ WRIST HANDLES



SIDE VIEW:



ROUGH-IN:



ANSI/A112.18.1-2005

PRODUCT NAME: STAINLESS STEEL  
4" DECK MOUNT FAUCETS

MODEL:

- 53872 W/ 6" SWIVEL/RIGID GOOSENECK SPOUT  
W/ LEVER HANDLES
- 53880 W/ 12" SWIVEL/RIGID GOOSENECK SPOUT  
W/ LEVER HANDLES
- 58696 W/ 6" SWIVEL/RIGID GOOSENECK SPOUT  
W/ WRIST HANDLES
- 58718 W/ 12" SWIVEL/RIGID GOOSENECK SPOUT  
W/ WRIST HANDLES

FEATURES

CONTROL VALVE

- \* 4" DECK MOUNT
- \* STAINLESS STEEL CONSTRUCTION
- \* SWIVELLING SEAT DISKS
- \* HOT SIDE STEM - RIGHT HAND
- \* COLD SIDE STEM - LEFT HAND
- \* LEVER HANDLES OR WRIST HANDLES
- \* SWIVEL GOOSENECK SPOUT

SYSTEM LIMITS

- \* TEMP: 40°F MIN. TO 140°F MAX.

SHIPPING WEIGHT

- \* 6.0 LBS

\* NSF 61-9 APPROVED & LISTED  
[www.truesdail.com](http://www.truesdail.com)

MODELS	DIM "A"	DIM "B"	DIM "C"
53872	4-1/2"	8-1/16"	3-1/2"
58696	[114.3mm]	[204.8mm]	[88.90mm]
53880	8-1/4"	12-1/4"	5-1/2"
58718	[209.6mm]	[311.2mm]	[139.7mm]

**FISHER**

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TOLL FREE: 800-421-6162 - FAX: 800-832-8238

information@fisher-mfg.com - www.fisher-mfg.com

APPLICATION:  
 JOB NAME:  
 QUANTITY:      ITEM NO.:

PRODUCT NAME:  
**PRE-RINSE SPRING 8" C/C BACKSPLASH WITH WALL BRACKET & ADD-ON FAUCET**

- 99643 SPECIAL CONFIGURATION
- MODEL:
- 34436 WITH 6" SWING SPOUT
- 34444 WITH 8" SWING SPOUT
- 34452 WITH 10" SWING SPOUT
- 34460 WITH 12" SWING SPOUT
- 34479 WITH 14" SWING SPOUT
- 34487 WITH 16" SWING SPOUT

- OPTIONS OR MODIFICATIONS:
- SUPPLY LINES (24" OR 36") CIRCLE LENGTH
  - IN-LINE DUAL CHECK VALVE
  - BRUSH
  - VANDAL RESISTANT KIT
  - HANDLES (CROSS OR WRIST) CIRCLE STYLE
  - OTHER 1/2" NPT FEMALE ELBOWS

FEATURES:

- MAIN CONTROL VALVE
- \* 8" C/C BACKSPLASH
  - \* INTERNAL SPRING LOADED CHECK VALVES
  - \* SWIVELING SEAT DISKS
  - \* HOT SIDE STEM - RIGHT HAND CHECK
  - \* COLD SIDE STEM - LEFT HAND CHECK
  - \* STAINLESS STEEL SEATS, SEAT SCREWS AND HANDLE SCREWS

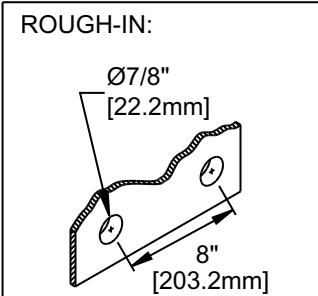
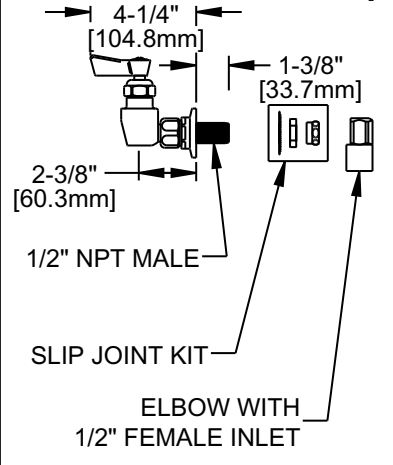
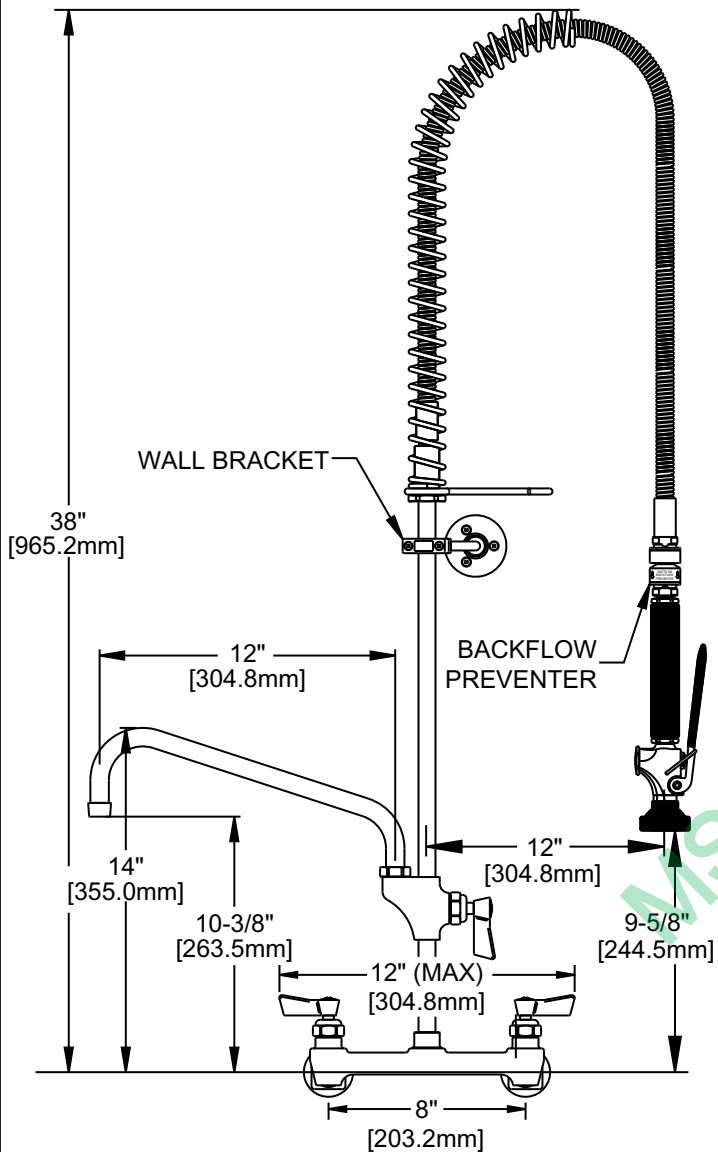
- ADD-ON CONTROL VALVE
- \* STEM - RIGHT HAND SWIVEL
  - \* HOT INDEX BUTTON
  - \* SWIVELLING SEAT DISKS
  - \* STAINLESS STEEL SEATS, SEAT SCREWS AND HANDLE SCREWS

- HOSE
- \* 36" LENGTH
  - \* STAINLESS STEEL END FITTINGS
  - \* STAINLESS STEEL EXTERNAL JACKET
  - \* 3-PLY FIBER REINFORCED INTERNAL RUBBER HOSE
  - \* REPAIRABLE IN FIELD WITH SIMPLE TOOLS

- SPRAY VALVE
- \* SOLID BRASS SHOWER HEAD - NO "O" RINGS TO LEAK
  - \* BRONZE HANDLE - NOT PLASTIC - MEANS FULL "ON"
  - \* FITS ALL BRANDS
  - \* 2.65 GPM AT 80 PSI
  - \* SHOWER SPRAY PATTERN

- WALL BRACKET
- \* ADJUSTS FROM 2" TO 12"

- SYSTEM LIMITS
- \* TEMP: 40°F MIN. TO 140°F MAX. STATIC
  - \* PRESSURE 200 PSI MAX. STATIC
  - \* SHIPPING WEIGHT: 15.0 LBS



ANSI/A112.18.1M, ANSI/NSF 61.9



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 information@fisher-mfg.com - www.fisher-mfg.com

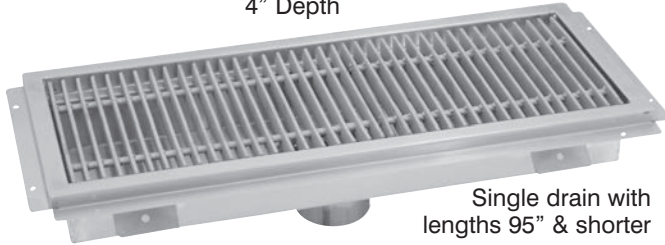


STAINLESS STEEL

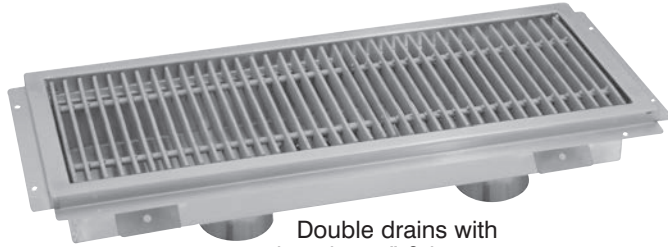
# FLOOR TROUGHS & FLOOR DRAINS

## Floor Troughs

4" Depth



Single drain with lengths 95" & shorter



Double drains with lengths 96" & longer



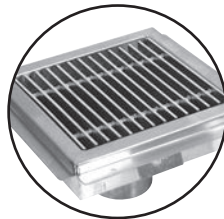
Item #: \_\_\_\_\_ Qty #: \_\_\_\_\_  
 Model #: \_\_\_\_\_  
 Project #: \_\_\_\_\_



**FT-1**  
Optional Anti-Splash Guard  
(Per ft. Factory installed)

## Floor Drain

4" Depth



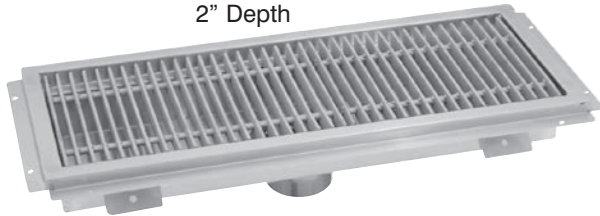
**FD-1**  
Optional Stainless Steel Grate for Floor Drains



**FT-2**  
Stainless Steel Strainer Basket with Handle (Included with all Floor Troughs, Water Receptacles & Floor Drains)

## Floor Water Receptacles

2" Depth



### OPTIONAL ACCESSORIES

Model #	Qty
FT-1 Anti-Splash Guard per ft.	
FT-2 Replacement Strainer Basket	
FD-1 Floor Drain Stainless Steel Grate	

### FEATURES:

- Waste receptacle will accommodate up to a 4" waste pipe. Includes 4" O.D. - 3" Long Plumbing Sleeve.
- Removable perforated stainless steel strainer basket with handle provided.
- Pitched towards waste.
- Includes "Subway Style" grating from 3/16" x 1" solid "304" stainless steel bar or fiberglass. (Not included with Floor Drains. Use Model FD-1) Grating is spaced 9/16" (Inside clearance) between bars to prevent casters from getting trapped.
- Troughs 96" or larger in length made with two (2) drains.
- Custom sizes available. Consult factory.

### CONSTRUCTION:

- All TIG welded.
- All external corners welded and polished to a satin finish.

### MECHANICAL:

- Creased design to ensure proper drainage.
- Perimeter flange mounts directly to sub floor.
- 3/4" vertical step designed to accommodate floor tile installation.

### MATERIAL:

- 14 gauge "304" type stainless steel polished stainless steel grating.
- Fiberglass grating: Gray fiberglass composite. Light weight, skid and corrosion resistant.



**Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.**

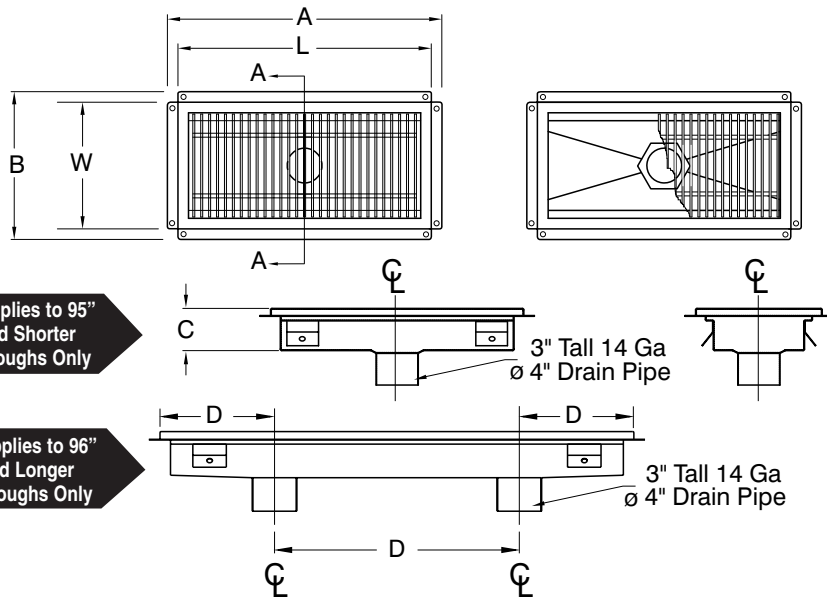
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 Email: customer@advancetabco.com or Fax: 631-242-6900

For Smart Fabrication™ Quotes:  
 Email: smartfab@advancetabco.com or Fax: 631-586-2933

# DIMENSIONS and SPECIFICATIONS

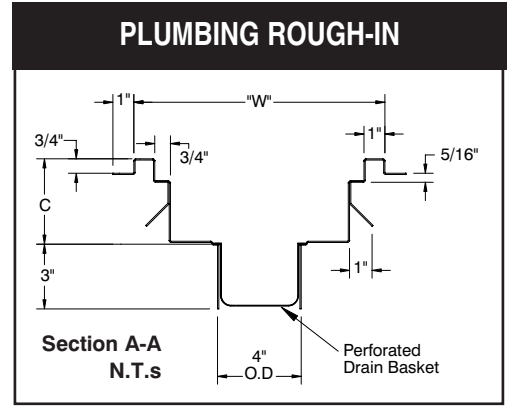
ALL DIMENSIONS ARE TYPICAL

TOL ± .500"



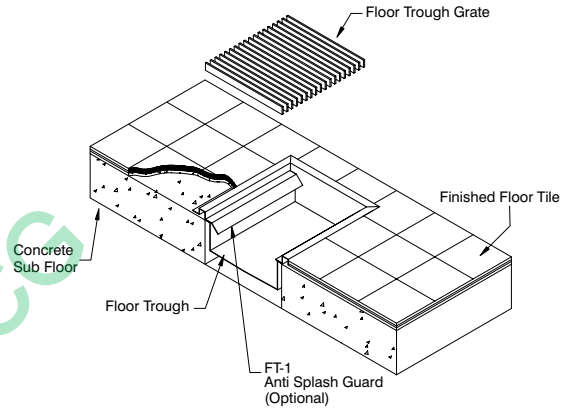
Applies to 95" and Shorter Troughs Only

Applies to 96" and Longer Troughs Only



## FLOOR TROUGHS

Stainless Steel Grating	Wt.	Fiberglass Grating	Wt.	L	W	A	B	C	D
FTG-1224	46 lbs.	FFTG-1224	34 lbs.	24"	12"	26"	14"	4"	-
FTG-1230	56 lbs.	FFTG-1230	37 lbs.	30"	12"	32"	14"	4"	-
FTG-1236	66 lbs.	FFTG-1236	40 lbs.	36"	12"	38"	14"	4"	-
FTG-1242	76 lbs.	FFTG-1242	43 lbs.	42"	12"	44"	14"	4"	-
FTG-1248	86 lbs.	FFTG-1248	46 lbs.	48"	12"	50"	14"	4"	-
FTG-1254	96 lbs.	FFTG-1254	49 lbs.	54"	12"	56"	14"	4"	-
FTG-1260	106 lbs.	FFTG-1260	52 lbs.	60"	12"	62"	14"	4"	-
FTG-1272	116 lbs.	FFTG-1272	55 lbs.	72"	12"	74"	14"	4"	-
FTG-1284	126 lbs.	FFTG-1284	81 lbs.	84"	12"	86"	14"	4"	-
FTG-1296*	146 lbs.	FFTG-1296	90 lbs.	96"	12"	98"	14"	4"	32"
FTG-12108*	166 lbs.	FFTG-12108	99 lbs.	108"	12"	110"	14"	4"	36"
FTG-12120*	180 lbs.	FFTG-12120	108 lbs.	120"	12"	122"	14"	4"	40"
FTG-1824	62 lbs.	FFTG-1824	43 lbs.	24"	18"	26"	20"	4"	-
FTG-1830	74 lbs.	FFTG-1830	47 lbs.	30"	18"	32"	20"	4"	-
FTG-1836	86 lbs.	FFTG-1836	54 lbs.	36"	18"	38"	20"	4"	-
FTG-1842	98 lbs.	FFTG-1842	61 lbs.	42"	18"	44"	20"	4"	-
FTG-1848	110 lbs.	FFTG-1848	69 lbs.	48"	18"	50"	20"	4"	-
FTG-1854	122 lbs.	FFTG-1854	76 lbs.	54"	18"	56"	20"	4"	-
FTG-1860	134 lbs.	FFTG-1860	83 lbs.	60"	18"	62"	20"	4"	-
FTG-1872	146 lbs.	FFTG-1872	90 lbs.	72"	18"	74"	20"	4"	-
FTG-1884	165 lbs.	FFTG-1884	111 lbs.	84"	18"	86"	20"	4"	-
FTG-1896*	187 lbs.	FFTG-1896	125 lbs.	96"	18"	98"	20"	4"	32"
FTG-18108*	208 lbs.	FFTG-18108	138 lbs.	108"	18"	110"	20"	4"	36"
FTG-18120*	229 lbs.	FFTG-18120	150 lbs.	120"	18"	122"	20"	4"	40"
FTG-2424	69 lbs.	FFTG-2424	52 lbs.	24"	24"	26"	26"	4"	-
FTG-2430	81 lbs.	FFTG-2430	59 lbs.	30"	24"	32"	26"	4"	-
FTG-2436	104 lbs.	FFTG-2436	68 lbs.	36"	24"	38"	26"	4"	-
FTG-2442	118 lbs.	FFTG-2442	75 lbs.	42"	24"	44"	26"	4"	-
FTG-2448	131 lbs.	FFTG-2448	83 lbs.	48"	24"	50"	26"	4"	-
FTG-2454	145 lbs.	FFTG-2454	95 lbs.	54"	24"	56"	26"	4"	-
FTG-2460	162 lbs.	FFTG-2460	102 lbs.	60"	24"	62"	26"	4"	-
FTG-2472	195 lbs.	FFTG-2472	119 lbs.	72"	24"	74"	26"	4"	-
FTG-2484	218 lbs.	FFTG-2484	137 lbs.	84"	24"	86"	26"	4"	-
FTG-2496*	243 lbs.	FFTG-2496	153 lbs.	96"	24"	98"	26"	4"	32"
FTG-24108*	274 lbs.	FFTG-24108	168 lbs.	108"	24"	110"	26"	4"	36"
FTG-24120*	310 lbs.	FFTG-24120	188 lbs.	120"	24"	122"	26"	4"	40"



## FLOOR DRAINS

Model #	Length	Width	A	B	C	Wt.
FDR-1212	12"	12"	14"	14"	4"	26 lbs.

## FLOOR WATER RECEPTACLES

(2" Depth)

Model #	Length	Width	A	B	C	Wt.
FRG-24	24"	12"	26"	14"	2"	44 lbs.
FRG-36	36"	12"	38"	14"	2"	63 lbs.
FRG-48	48"	12"	50"	14"	2"	82 lbs.

**CUSTOM SIZES AVAILABLE!**

\*Troughs 96" or larger in length made with two (2) drains.



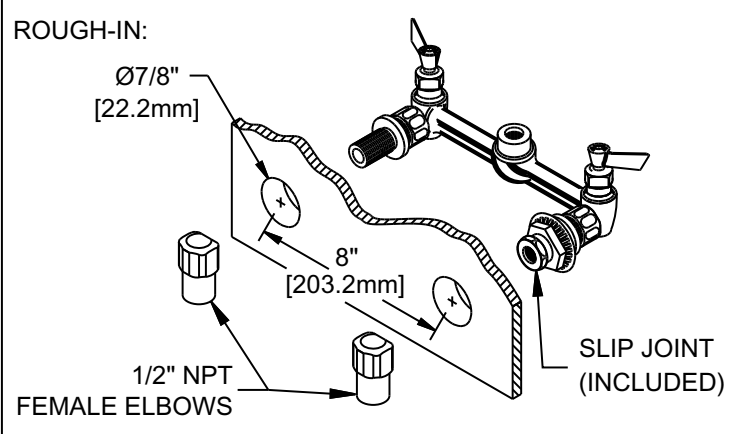
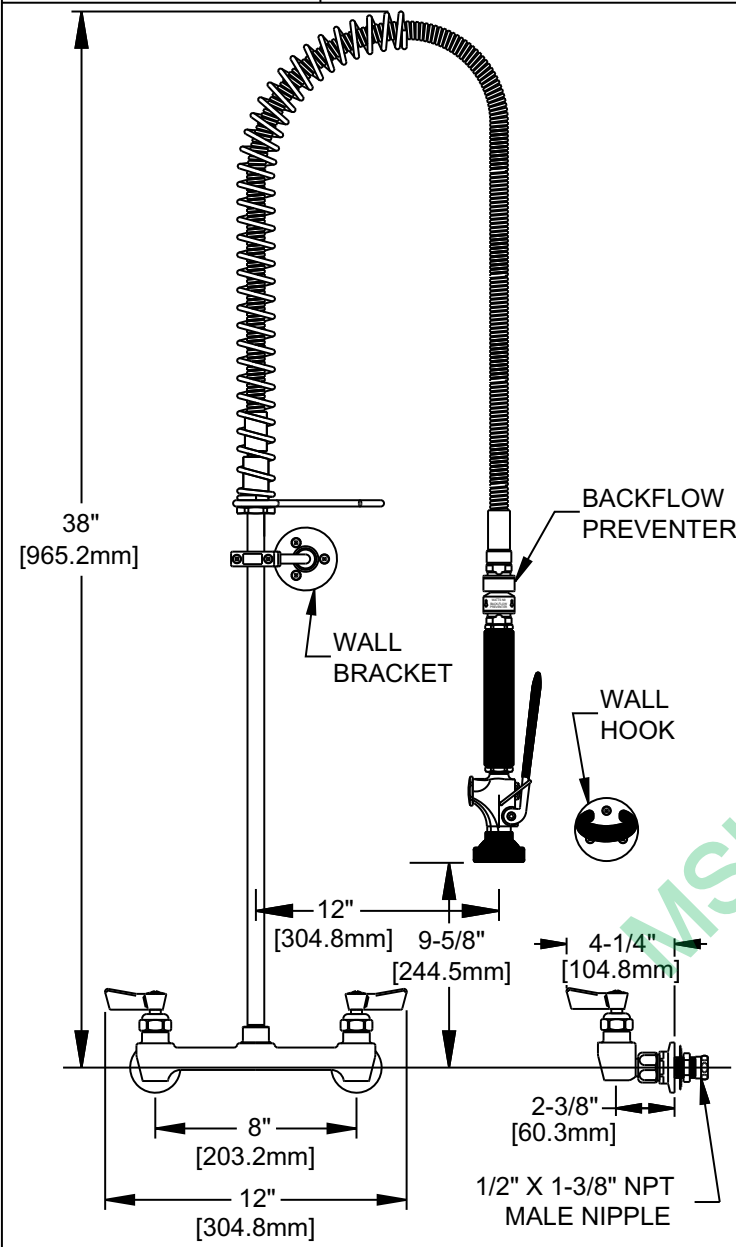
APPLICATION:  
 JOB NAME:  
 QUANTITY:      ITEM NO.:

PRODUCT NAME:  
**PRE-RINSE SPRING STYLE  
 8" C/C BACKSPASH MOUNT**

■ 99708 SPECIAL CONFIGURATION

MODEL: (CHECK BASE MODEL AND OPTIONS)

■ 13390 STD SPRAY VALVE w/WALL BRACKET  
 □ 13366 STD SPRAY VALVE, NO WALL BRACKET  
 □ 13382 ULT SPRAY VALVE w/WALL BRACKET  
 □ 13374 ULT SPRAY VALVE, NO WALL BRACKET



- OPTIONS OR MODIFICATIONS:
- SUPPLY LINES (24" OR 36") CIRCLE LENGTH
  - ADD-ON FAUCET (6",8",10",12",14",16") CIRCLE LGTH
  - IN-LINE DUAL CHECK VALVE
  - BRUSH
  - ELBOWS
  - VANDAL RESISTANT KIT
  - HANDLES (CROSS OR WRIST) CIRCLE STYLE
  - OTHER WALL HOOK

- FEATURES:
- CONTROL VALVE
- \* 8" C/C BACKSPASH MOUNT
  - \* INTERNAL SPRING LOADED CHECK VALVES
  - \* SWIVELING SEAT DISKS
  - \* HOT SIDE STEM - RIGHT HAND
  - \* COLD SIDE STEM - LEFT HAND
  - \* STAINLESS STEEL SEATS
  - \* STAINLESS STEEL SEAT SCREWS
  - \* STAINLESS STEEL HANDLE SCREWS
  - \* 1/2" SLIP JOINT KIT
- HOSE
- \* 36" LENGTH
  - \* STAINLESS STEEL END FITTINGS
  - \* STAINLESS STEEL EXTERNAL JACKET
  - \* 3-PLY FIBER REINFORCED INTERNAL RUBBER HOSE

- IN-LINE VACUUM BREAKER
- \* ATMOSPHERIC VENT
  - \* DOUBLE CHECK DESIGN
- STANDARD SPRAY VALVE
- \* SOLID BRASS SHOWER HEAD - NO O- RINGS TO LEAK
  - \* BRONZE HANDLE - NOT PLASTIC - MEANS FULL "ON"
  - \* SHOWER SPRAY PATTERN

- WALL BRACKET
- \* ADJUSTS FROM 2" TO 12"
- SYSTEM LIMITS
- \* 2.65 GPM AT 80 PSI
  - \* TEMP: 40°F MIN. TO 140°F MAX.
  - \* PRESSURE: 200 PSI MAX. STATIC
  - \* SHIPPING WEIGHT: 15 LBS

ANSI/A112.18.1M

**FISHER**

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STAINLESS STEEL  
**HAND SINKS**  
 with SOAP and PAPER TOWEL DISPENSER  
 Conforms To NSF 61/9 Lead Free Requirements



Item #: \_\_\_\_\_ Qty #: \_\_\_\_\_  
 Model #: \_\_\_\_\_  
 Project #: \_\_\_\_\_



7-PS-80



7-PS-79

**FEATURES:**

One piece **Deep Drawn** sink bowl design.  
 "Z" bracket wall mounting plate  
 Keyhole wall mount bracket.  
 Stainless steel 1-1/2" IPS basket drain.  
 C-fold style towel dispenser with hinged towel box.

**Specific Unit Features:**

**7-PS-41:**  
 14" x 16" x 5" sink bowl.  
 K-175 Hands Free AC/DC operated gooseneck faucet.  
 Deck mount liquid soap dispenser.  
 Front loading paper towel dispenser.  
 Stainless Steel Skirt with Removable Access Panel and enclosed bottom for storage.

**7-PS-46:**  
 14" x 16" x 5" sink bowl.  
 K-206 6" Extended splash mount gooseneck faucet with wrist handles  
 Front loading paper towel dispenser.  
 Deck mount liquid soap dispenser.  
 Stainless Steel Skirt with Removable Access Panel and enclosed bottom for storage.

**7-PS-69:**  
 10" x 14" x 5" sink bowl.  
 Splash mount liquid Soap Dispenser.  
 K-69 Heavy Duty Splash Mount Faucet (with Wrist Handles)  
 Side Support Brackets.  
 Lever operated drain, built-in overflow with plastic overflow tube and spring clamps.  
 1 1/2" P-Trap.

**7-PS-79:**  
 10" x 14" x 5" sink bowl.  
 K-59 gooseneck faucet.  
 Splash mount liquid Soap Dispenser.

**7-PS-80:**  
 10" x 14" x 5" sink bowl.  
 K-59 gooseneck faucet.  
 Splash mount liquid Soap Dispenser  
 Includes lever operated drain, built-in overflow with plastic overflow tube and spring clamps.  
 1 1/2" P-Trap.

**7-PS-85**  
 10" x 14" x 5" sink bowl.  
 K-59 gooseneck faucet.  
 Splash mount liquid Soap Dispenser.  
 Chrome plated 1 1/2" P-Trap & apron.

**CONSTRUCTION:**  
 All TIG welded.  
 All sink bowls have a large liberal radii with a minimum dimension of 2" and are rectangular in design for increased capacity.  
 Welded areas blended to match adjacent surfaces and to a satin finish.  
 Die formed Countertop Edge with a No-Drip offset.

**MATERIAL:**  
 Heavy gauge type 304 series stainless steel.  
 Wall mounting bracket is Galvanized and of offset design.  
 All fittings are brass / chrome plated unless otherwise indicated.

**MECHANICAL:**  
 Faucet supply is 1/2" IPS male thread hot and cold.



Includes Skirt

7-PS-85



Includes Side Supports

7-PS-69

**TAPERED BOWL DESIGN**

Electronic Faucet



7-PS-41

Front Loading



7-PS-46

**WARNING:** Equipment that includes a faucet may expose you to chemicals, including lead, that are known to the State of California to cause cancer or birth defects or other reproductive harm. For more info, visit [www.p65warnings.ca.gov](http://www.p65warnings.ca.gov).



Customer Service Available To Assist You **1-800-645-3166** 8:30 am - 8:00 pm E.S.T.

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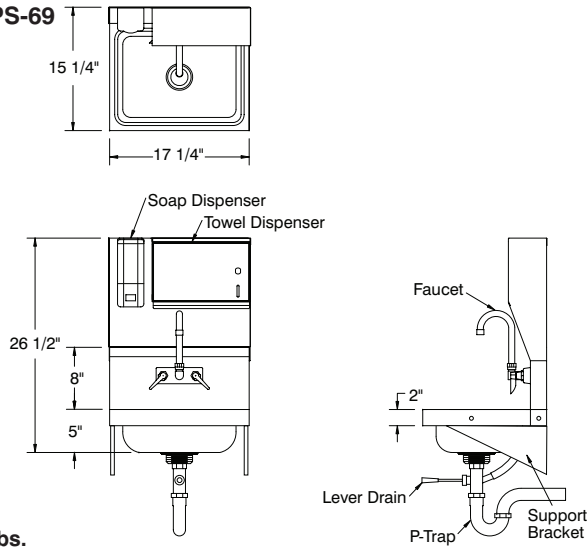
# DIMENSIONS and SPECIFICATIONS

TOL Overall: ± .500" Interior: ± .250"

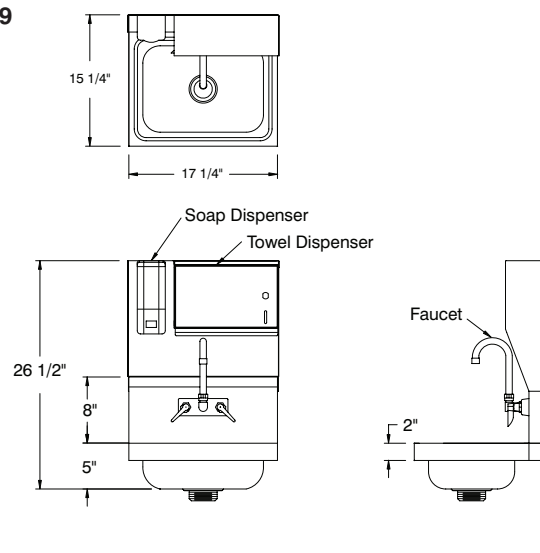
FITTINGS SUPPLIED AS SHOWN

ALL DIMENSIONS ARE TYPICAL

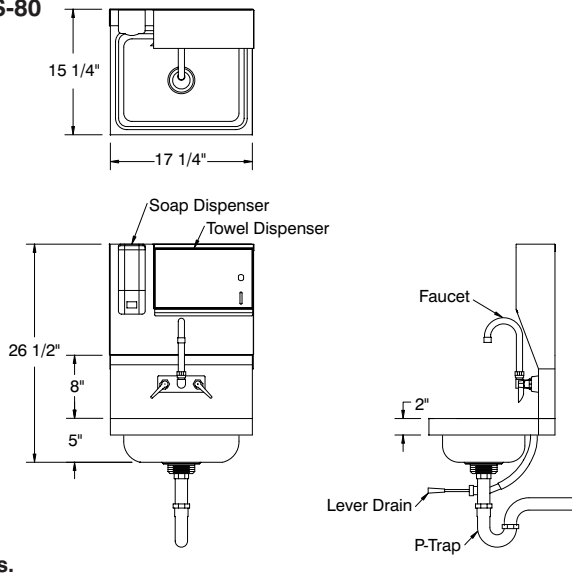
7-PS-69



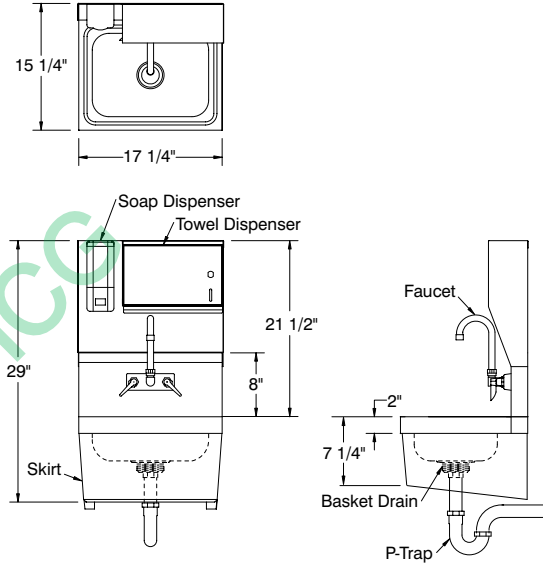
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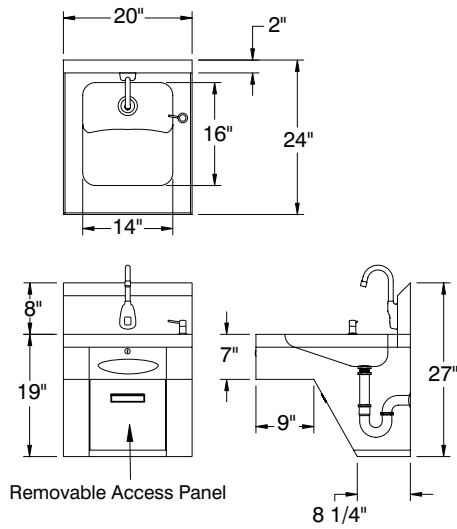
7-PS-80



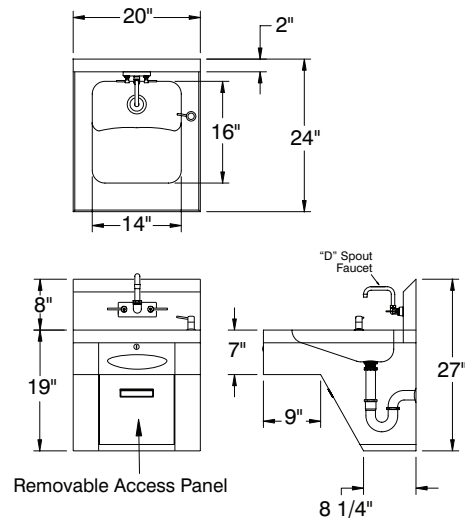
7-PS-85



7-PS-41



7-PS-46





We put space to work.

Item # \_\_\_\_\_

Job \_\_\_\_\_

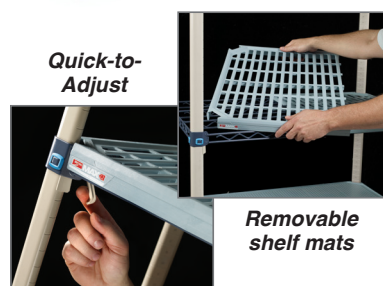
## MetroMax Q® Polymer / Wire Shelving

Quick-to-adjust, corrosion resistant shelving constructed of removable polymer open grid shelf mats, wire shelf frames, and corner releases. Shelf frames and steel posts have an epoxy coating over an electroplated substrate. Shelves and epoxy coated posts offer a 15 year warranty against rust and corrosion. Optional corrosion proof polymer posts are available. Microban® antimicrobial product protection is built into the shelf mats and posts. Shelf has a rigid four-sided frame with center truss(es). Robust corner provides complete 360° capture of the wedge and post for added stability. Stationary units have maximum capacity of 2,000 lbs. (907kg) evenly distributed. Mobile units (with stem casters) offer a maximum total unit load of 900 lbs. (408kg). Units assemble easily — shelves mount on four one-piece wedges along grooved, numbered posts and adjust on 1" (25mm) increments.

- **Forever Strong:** Proven corner connection and four-sided shelf frame with center truss(es) assures stability and strength in stationary, mobile, and high-density track shelving configurations.  
800 lbs. (363kg) per shelf for lengths of 24" to 48" (610 to 1219mm)  
600 lbs. (272kg) per shelf for lengths of 54" (1372mm) or longer  
Stationary unit: 2000lbs (907kg) evenly distributed.  
Mobile unit (with stem casters): Up to 900lbs. (408kg).  
Multiply the caster load rating by 3 to determine actual rating.
- **Rust & Corrosion Resistant:** Corrosion resistant shelves and posts offer a 15 year warranty against rust and corrosion.
- **Easy to Clean and Maintain:** Polymer mats can be easily removed and cleaned in a sink or commercial washer / dish machine.
- **Microban® Antimicrobial Product Protection** is built into the shelf mats and posts to inhibit the growth of bacteria, mold, mildew, and fungus that cause odors and product degradation. Microban product protection keeps the product "cleaner between cleanings".
- **Quick-to-Adjust:** Patented corner release allows shelves to be adjusted without tools. Simply flip each corner release, relocate the wedge connectors on the posts, and reposition the shelf. Quickly adjust shelves to reclaim wasted vertical space.
- **Efficient Use of Space:** Shelves adjust on 1" (25mm) increments along the post to maximize the use of available vertical space.
- **Fast, Easy Assembly:** Shelves are ready to use right out of the box. One-piece wedges securely attach to the posts — Raised beads on the back of each wedge snap into the grooves on the post. Window on wedge aligns with numbers on the post to locate the desired shelf position. Shelf mounts on four wedges, A unit can be assembled without tools in minutes.
- **Interchangeable:** Part of the MetroMax platform, MetroMax Q shelves are compatible on the same shelving units with MetroMax i and MetroMax 4 shelves.
- **Open Grid and Solid Mat Options:** MetroMax Q is available with open grid mats. Open grid shelves promote air circulation and light penetration. For 21" (530mm) deep MetroMax Q, solid mat overlays are available. For 18" and 24" (457 and 610mm) depths, MetroMax i or MetroMax 4 solid shelves may be added when solid shelves are required.
- **NSF Listed** for all environments.
- **Optional Accessories** are on spec sheet 9.25.

\*MICROBAN® and the MICROBAN® symbol are registered trademarks of the Microban® Products Company, Huntersville, NC. Microban® product protection does not by itself protect a user from food borne illness. Product must be routinely cleaned.

All Metro Catalog Sheets are available on our website: [www.metro.com](http://www.metro.com)



Supports good  
**HACCP**  
processes

L02-178  
Printed in U.S.A. 3/18



**InterMetro Industries Corporation**  
North Washington Street, Wilkes-Barre, PA 18705  
Product Information. U.S. and Canada: 1.800.992.1776  
Outside U.S. and Canada: [www.metro.com/contactus](http://www.metro.com/contactus)

Information and specifications are subject to change without notice. Please confirm at time of order.

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**MetroMax Q®** Polymer / Wire Shelving

**9.21**

Job \_\_\_\_\_

# MetroMax Q<sup>®</sup> POLYMER / WIRE SHELVING

We put space to work.<sup>®</sup>

## Material Specifications:

- **Shelf Mats:** Injection-molded polypropylene with exclusive built-in Microban<sup>®</sup> antimicrobial product protection.
- **Shelf frames:** Steel with electroplated substrate and highly durable, abrasion-resistant epoxy finish.
- **Epoxy-coated posts:** Steel with electroplated substrate and highly durable, abrasion-resistant epoxy finish. Epoxy finish has built-in Microban antimicrobial product protection. The adjustable foot is reinforced nylon.
- **Shelf Wedge Connector:** Reinforced nylon.
- **Temperature range:** -20°F (-29°C) to 125°F (52°C) continuous use, with intermittent exposure to 200°F (93°C) for cleaning. Visit metro.com/service-support for cleaning guidelines.



**Replacement  
MetroMax Q Wedges**  
Cat. No. MQ9985  
Bag of 4  
(included with each shelf)

## Standard Interchangeable Shelves

- Part number includes shelf with removable mats and one bag of wedges

Shelf with Grid Mat Model No.	Nominal Size		Actual Size				Approx. Pkd. Wt.		
	Width (in.)	Length (mm)	Width (in.)	Length (mm)	Width (in.)	Length (mm)	(lbs.)	(kg)	
MQ1824G	18	457	24	610	18 <sup>3</sup> / <sub>8</sub>	467	23 <sup>13</sup> / <sub>16</sub>	605	6.2 2.8
MQ1830G	18	457	30	762	18 <sup>3</sup> / <sub>8</sub>	467	29 <sup>13</sup> / <sub>16</sub>	757	8.0 3.6
MQ1836G	18	457	36	914	18 <sup>3</sup> / <sub>8</sub>	467	35 <sup>13</sup> / <sub>16</sub>	910	9.7 4.4
MQ1842G	18	457	42	1067	18 <sup>3</sup> / <sub>8</sub>	467	41 <sup>13</sup> / <sub>16</sub>	1062	11.4 5.2
MQ1848G	18	457	48	1219	18 <sup>3</sup> / <sub>8</sub>	467	47 <sup>13</sup> / <sub>16</sub>	1215	13.2 6.0
MQ1854G	18	457	54	1372	18 <sup>3</sup> / <sub>8</sub>	467	53 <sup>13</sup> / <sub>16</sub>	1367	15.0 6.8
MQ1860G	18	457	60	1524	18 <sup>3</sup> / <sub>8</sub>	467	59 <sup>13</sup> / <sub>16</sub>	1519	16.7 7.6
MQ1872G	18	457	72	1829	18 <sup>3</sup> / <sub>8</sub>	467	71 <sup>13</sup> / <sub>16</sub>	1824	20.0 9.1
MQ2124G	21	530	24	610	21 <sup>3</sup> / <sub>8</sub>	543	23 <sup>13</sup> / <sub>16</sub>	605	8.0 3.6
MQ2130G	21	530	30	762	21 <sup>3</sup> / <sub>8</sub>	543	29 <sup>13</sup> / <sub>16</sub>	757	9.7 4.4
MQ2136G	21	530	36	914	21 <sup>3</sup> / <sub>8</sub>	543	35 <sup>13</sup> / <sub>16</sub>	910	11.4 5.2
MQ2142G	21	530	42	1067	21 <sup>3</sup> / <sub>8</sub>	543	41 <sup>13</sup> / <sub>16</sub>	1062	12.8 5.8
MQ2148G	21	530	48	1219	21 <sup>3</sup> / <sub>8</sub>	543	47 <sup>13</sup> / <sub>16</sub>	1215	14.5 6.6
MQ2154G	21	530	54	1372	21 <sup>3</sup> / <sub>8</sub>	543	53 <sup>13</sup> / <sub>16</sub>	1367	16.7 7.6
MQ2160G	21	530	60	1524	21 <sup>3</sup> / <sub>8</sub>	543	59 <sup>13</sup> / <sub>16</sub>	1519	18.5 8.4
MQ2172G	21	530	72	1829	21 <sup>3</sup> / <sub>8</sub>	543	71 <sup>13</sup> / <sub>16</sub>	1824	21.7 9.9
MQ2424G	24	610	24	610	24 <sup>3</sup> / <sub>8</sub>	619	23 <sup>13</sup> / <sub>16</sub>	605	9.7 4.4
MQ2430G	24	610	30	762	24 <sup>3</sup> / <sub>8</sub>	619	29 <sup>13</sup> / <sub>16</sub>	757	11.4 5.2
MQ2436G	24	610	36	914	24 <sup>3</sup> / <sub>8</sub>	619	35 <sup>13</sup> / <sub>16</sub>	910	13.1 6.0
MQ2442G	24	610	42	1067	24 <sup>3</sup> / <sub>8</sub>	619	41 <sup>13</sup> / <sub>16</sub>	1062	14.1 6.4
MQ2448G	24	610	48	1219	24 <sup>3</sup> / <sub>8</sub>	619	47 <sup>13</sup> / <sub>16</sub>	1215	15.8 7.1
MQ2454G	24	610	54	1372	24 <sup>3</sup> / <sub>8</sub>	619	53 <sup>13</sup> / <sub>16</sub>	1367	18.5 8.4
MQ2460G	24	610	60	1524	24 <sup>3</sup> / <sub>8</sub>	619	59 <sup>13</sup> / <sub>16</sub>	1519	20.3 9.2
MQ2472G	24	610	72	1829	24 <sup>3</sup> / <sub>8</sub>	619	71 <sup>13</sup> / <sub>16</sub>	1824	23.5 10.7

## Solid Shelf Options:

MetroMax i and MetroMax 4 solid shelves may be used with MetroMax Q shelves on the same unit. See spec sheets 9.20 & 9.22 for model numbers.

## Posts

- Corrosion resistant epoxy-coated steel option.
- Corrosion proof polymer option.

### STATIONARY POST WITH LEVELING FOOT

Epoxy-Coated Steel Model No.	Approx. Pkd. Wt. (lbs.)	(kg)	Polymer Model No.	Approx. Pkd. Wt. (lbs.)	(kg)	Nominal Height (in.)	(mm)	Actual Height (in.)	(mm)
MQ13PE	1.0	0.5	MX13P	0.5	0.2	13	370	14 <sup>3</sup> / <sub>16</sub>	360
MQ27PE	2.0	0.9	MX27P	0.9	0.4	27	685	28 <sup>3</sup> / <sub>16</sub>	716
MQ33PE	2.5	1.1	MX33P	1.0	0.5	33	875	34 <sup>3</sup> / <sub>16</sub>	868
MQ54PE	4.0	1.8	MX54P	1.6	0.7	54	1370	54 <sup>3</sup> / <sub>16</sub>	1376
MQ63PE	4.5	2.0	MX63P	1.8	0.8	63	1585	62 <sup>3</sup> / <sub>16</sub>	1580
MQ74PE	5.5	2.5	MX74P	2.3	1.0	74	1690	74 <sup>3</sup> / <sub>16</sub>	1884
MQ86PE	6.5	2.9	MX86P	2.5	1.4	86	2195	86 <sup>3</sup> / <sub>16</sub>	2189

### MOBILE POST FOR STEM CASTER

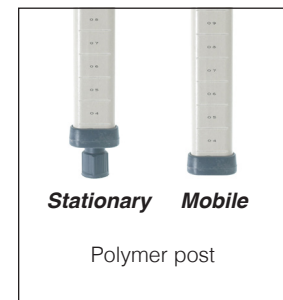
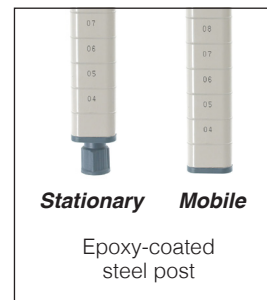
Epoxy-Coated Steel Model No.	Approx. Pkd. Wt. (lbs.)	(kg)	Polymer Model No.	Approx. Pkd. Wt. (lbs.)	(kg)	Nominal Height (in.)	(mm)	Actual Height (in.)	(mm)
MQ13UPE	1.0	0.5	MX13UP	0.5	0.2	13	370	13 <sup>3</sup> / <sub>16</sub>	335
MQ27UPE	2.0	0.9	MX27UP	0.9	0.4	27	685	27 <sup>3</sup> / <sub>16</sub>	691
MQ33UPE	2.5	1.1	MX33UP	1.0	0.5	33	875	33 <sup>3</sup> / <sub>16</sub>	843
MQ54UPE	4.0	1.8	MX54UP	1.6	0.7	54	1370	53 <sup>3</sup> / <sub>16</sub>	1351
MQ63UPE	4.5	2.0	MX63UP	1.8	0.8	63	1585	61 <sup>3</sup> / <sub>16</sub>	1554
MQ74UPE	5.5	2.5	MX74UP	2.3	1.0	74	1690	73 <sup>3</sup> / <sub>16</sub>	1859
MQ86UPE	6.5	2.9	MX86UP	3.0	1.4	86	2195	85 <sup>3</sup> / <sub>16</sub>	2164

\*Stationary posts include an adjustable leveling foot to compensate for uneven floors. Leveling foot can be adjusted 1" (25mm). Special height cut posts are available. Consult your Metro representative.

## Heavy-Duty Dunnage Shelves

- Weight capacity per shelf evenly distributed: 1,200 lbs. (544kg) on shelves up to and including 48" (1219mm) long; 900 lbs. (408kg) for shelves 60" (1524mm) long.
- Dunnage shelves are recommended for use on units with four posts, not on an add-on unit with two posts.

Grid Mat Model No.	Nominal		Approx. Pkd. Wt.		
	Width (in.)	Length (mm)	(lbs.)	(kg)	
MHP2436G	24	610	36	914	21 9.5
MHP2448G	24	610	48	1220	27 12.2
MHP2460G	24	610	60	1524	33 15.0



an Ali Group Company



The Spirit of Excellence



**BRUTE®**



**THE TOUGHEST JUST GOT MORE PRODUCTIVE**

MSI/CG

**SINCE 1968, BRUTE CONTAINERS** have been trusted by professionals for their iconic durability and reliability. With every lift, drag and drop, they've outlasted – and outperformed every competitor in their industry thanks to their proprietary design and the highest quality materials. That's why our containers are chosen first to get the job done.

But we're raising the bar even higher with the new BRUTE. Innovative venting channels make removing liners up to 50% easier. Integrated cinches secure can liners, meaning knot-free liner changes. Contoured base handles improve grip, reduce strain and improve efficiency when emptying containers.

With these brand new innovations, we're proud to stamp BRUTE on every container guaranteeing its legendary performance. When you see our stamp, it means that your toughest job just got a whole lot easier.





## 50% EASIER TO LIFT LINERS

**THE BRUTE IS DESIGNED WITH FOUR BUILT-IN VENTING CHANNELS** that create airflow throughout the container. This air circulation eliminates the vacuum effect that occurs when lifting out liners in traditional containers. By reducing the pull force required to lift out liners by up to 50%, the BRUTE improves productivity and reduces the risk of injury.

# IMPROVED PRODUCTIVITY



## VENTING CHANNELS

Make removing liners up to 50% easier, improving productivity and reducing the risk of injury.



## BAG CINCHES

Secure liners allowing for knot-free liner changes. Tested to 20,000 cycles.



## CONTOURED BASE HANDLES

Improve grip and ergonomics, reducing strain and improving efficiency when emptying containers.



## SEAMLESS CONSTRUCTION

Helps make cleaning easier.



2 & 21 Compliant





**BRUTE.**

Rubbermaid  
Commercial Products

**REDUCE TIME AND EFFORT NEEDED  
TO MANAGE REFUSE STREAMS**

Overexertion is among the leading causes of workplace injuries according to the U.S. Department of Labor. The BRUTE delivers on improved productivity by managing and collecting refuse more efficiently and safely. BRUTE Containers reduce exertion through greater ergonomics when lifting, transporting and emptying refuse.

# ICONIC DURABILITY



## COMMERCIAL-GRADE CONSTRUCTION

Proprietary design constructed with the highest quality material plus a UV inhibitor ensures long life in even the most extreme commercial environments. Guaranteed to never fade, warp, crack, or crush.



## RIM WITH RIB STRENGTHENED DESIGN

Increases strength and resists crushing.



## ROUNDED HANDLES

Make lifting and moving easier, and are reinforced to resist tearing or damage from even the heaviest loads.



## REINFORCED BASE

Specifically engineered to be dragged over rough surfaces, extending life and durability in even the toughest environments.



**GUARANTEED TO NEVER FADE, WARP, CRACK OR CRUSH**  
For almost 50 years, professionals have trusted BRUTE to get the job done. Manufactured in Winchester, VA, BRUTE Containers feature a proprietary design constructed with the highest quality material plus a UV inhibitor to ensure long life in even the most extreme commercial environments. Every BRUTE must pass extreme durability performance standards ensuring our commitment to manufacture the toughest.



### SELF-DRAINING LIDS

**SELF-DRAINING CHANNELS** prevent water from pooling, reducing still water buildup.

**SNAP-LOCK** ensures a secure fit.

**RIDGES ENABLE STACKING** of BRUTE containers to provide a space-efficient storage solution.



### DOME TOP LIDS

**SPRING ACTION DOOR** allows easy trash disposal while keeping odors in and insects out.

**SNAP-LOCK** ensures a secure fit.



### FUNNEL TOP LIDS

**CUT-OUT TOP** enables hands-free refuse disposal.

**FUNNEL DESIGN** conceals waste from public view.

### MULTIPLE COLOR OFFERING

Recycling, sorting and organizational needs.



2 & 21 Compliant



## DOLLY

**FIVE RUGGED CASTERS** - Help keep fully loaded BRUTEs stable, even on rough and uneven floors, and swivel smoothly for easy maneuvering.

**STRUCTURAL FOAM CONSTRUCTION** - Provides superior strength and durability, with a 250-pound load capacity.

**NON-MARKING CASTERS** - Help protect floors, keeping public areas looking their best.

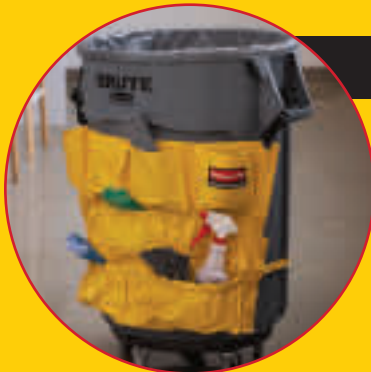


## TANDEM DOLLY

**TWO TWIST LOCKS** - Hold containers securely and unlock easily for unloading, allowing easy transport of two loaded 44-gallon BRUTEs for increased productivity.

**HEAVY-DUTY 8" WHEELS AND 3" SWIVEL CASTERS** - Maneuver easily across rough floors and around corners.

**STRUCTURAL FOAM CONSTRUCTION** - Provides superior strength and durability, with a 400-pound load capacity.



## CADDY BAG

**ELASTIC POCKETS** - Knock out quick cleanups on-the-go with onboard storage for spray bottles, cleaning cloths, brushes, extra can liners, latex gloves, and other cleaning supplies.

**HEAVY-DUTY VINYL** - For long life and easy cleaning.

**ADJUSTABLE STRAPS** - Allow easy installation and removal on both 32 and 44-gallon BRUTEs.



## RIM CADDY

**MULTIPLE STORAGE COMPARTMENTS AND HOOKS** - Provide storage for everything from wet floor signs to spray bottles to extra can liners and all the other cleaning supplies needed for on-the-go cleaning.

**LINER RETENTION BANDS** - Keep can liners securely in place and allow for quick liner changes for improved productivity.

**SNAP-ON TABS** - Hold caddy securely on a 44-gallon BRUTE, even when changing out full can liners.

## BRUTE Containers

	DESCRIPTION	ITEM #	COLOR	HEIGHT	DIAMETER
10 GALLON	BRUTE 10 GALLON CONTAINER GRAY	FG261000GRAY	GRAY	17.13"	15.63"
	BRUTE 10 GALLON CONTAINER WHITE	FG261000WHT	WHITE	17.13"	15.63"
	BRUTE 10 GALLON CONTAINER RED	FG261000RED	RED	17.13"	15.63"
	BRUTE 10 GALLON CONTAINER YELLOW	FG261000YEL	YELLOW	17.13"	15.63"
	BRUTE 10 GALLON CONTAINER BLUE	1779699	BLUE	17.13"	15.63"
	BRUTE 10 GALLON CONTAINER DARK GREEN	FG261000DGRN	DARK GREEN	17.13"	15.63"
	BRUTE 10 GALLON CONTAINER BLACK	1926827	BLACK	17.13"	15.63"
20 GALLON	BRUTE 20 GALLON CONTAINER GRAY	FG262000GRAY	GRAY	22.91"	19.38"
	BRUTE 20 GALLON CONTAINER WHITE	FG262000WHT	WHITE	22.91"	19.38"
	BRUTE 20 GALLON CONTAINER RED	FG262000RED	RED	22.91"	19.38"
	BRUTE 20 GALLON CONTAINER YELLOW	FG262000YEL	YELLOW	22.91"	19.38"
	BRUTE 20 GALLON CONTAINER BLUE	FG262000BLUE	BLUE	22.91"	19.38"
	BRUTE 20 GALLON CONTAINER DARK GREEN	FG262000DGRN	DARK GREEN	22.91"	19.38"
	BRUTE 20 GALLON CONTAINER BLACK	1779734	BLACK	22.91"	19.38"
	BRUTE 20 GALLON RECYCLING CONTAINER BLUE	FG262073BLUE	BLUE	22.91"	19.38"
	BRUTE 20 GALLON RECYCLING CONTAINER DARK GREEN	1926828	DARK GREEN	22.91"	19.38"
32 GALLON	BRUTE 32 GALLON CONTAINER GRAY	FG263200GRAY	GRAY	27.77"	21.92"
	BRUTE 32 GALLON CONTAINER WHITE	FG263200WHT	WHITE	27.77"	21.92"
	BRUTE 32 GALLON CONTAINER RED	FG263200RED	RED	27.77"	21.92"
	BRUTE 32 GALLON CONTAINER YELLOW	FG263200YEL	YELLOW	27.77"	21.92"
	BRUTE 32 GALLON CONTAINER BLUE	FG263200BLUE	BLUE	27.77"	21.92"
	BRUTE 32 GALLON CONTAINER DARK GREEN	FG263200DGRN	DARK GREEN	27.77"	21.92"
	BRUTE 32 GALLON CONTAINER BLACK	1867531	BLACK	27.77"	21.92"
	BRUTE 32 GALLON RECYCLING CONTAINER BLUE	FG263273BLUE	BLUE	27.77"	21.92"
	BRUTE 32 GALLON RECYCLING CONTAINER DARK GREEN	1788472	DARK GREEN	27.77"	21.92"
44 GALLON	BRUTE 44 GALLON CONTAINER GRAY	FG264360GRAY	GRAY	31.50"	24.00"
	BRUTE 44 GALLON CONTAINER WHITE	1779740	WHITE	31.50"	24.00"
	BRUTE 44 GALLON CONTAINER RED	FG264360RED	RED	31.50"	24.00"
	BRUTE 44 GALLON CONTAINER YELLOW	FG264360YEL	YELLOW	31.50"	24.00"
	BRUTE 44 GALLON CONTAINER BLUE	FG264360BLUE	BLUE	31.50"	24.00"
	BRUTE 44 GALLON CONTAINER DARK GREEN	1779741	DARK GREEN	31.50"	24.00"
	BRUTE 44 GALLON CONTAINER BLACK	FG264360BLA	BLACK	31.50"	24.00"
	BRUTE 44 GALLON RECYCLING CONTAINER BLUE	FG264307BLUE	BLUE	31.50"	24.00"
	BRUTE 44 GALLON RECYCLING CONTAINER DARK GREEN	1926829	DARK GREEN	31.50"	24.00"
55 GALLON	BRUTE 55 GALLON CONTAINER GRAY	FG265500GRAY	GRAY	33.19"	26.38"
	BRUTE 55 GALLON CONTAINER WHITE	FG265500WHT	WHITE	33.19"	26.38"
	BRUTE 55 GALLON CONTAINER RED	FG265500RED	RED	33.19"	26.38"
	BRUTE 55 GALLON CONTAINER YELLOW	FG265500YEL	YELLOW	33.19"	26.38"
	BRUTE 55 GALLON CONTAINER BLUE	1779732	BLUE	33.19"	26.38"
	BRUTE 55 GALLON CONTAINER DARK GREEN	FG265500DGRN	DARK GREEN	33.19"	26.38"
	BRUTE 55 GALLON CONTAINER BLACK	1779739	BLACK	33.19"	26.38"

10 & 55 GALLON CONTAINERS FEATURE STRAIGHT WALL DESIGN



## BRUTE Lids and Accessories

	DESCRIPTION	ITEM #	COLOR	LENGTH	WIDTH	HEIGHT	DIAMETER
10 GALLON	BRUTE 10 GALLON LID GRAY	FG260900GRAY	GRAY	—	—	1.25"	17.13"
	BRUTE 10 GALLON LID WHITE	FG260900WHT	WHITE	—	—	1.25"	17.13"
	BRUTE 10 GALLON LID RED	FG260900RED	RED	—	—	1.25"	17.13"
	BRUTE 10 GALLON LID YELLOW	FG260900YEL	YELLOW	—	—	1.25"	17.13"
	BRUTE 10 GALLON LID BLUE	1779700	BLUE	—	—	1.25"	17.13"
	BRUTE 10 GALLON LID DARK GREEN	FG260900DGRN	DARK GREEN	—	—	1.25"	17.13"
	BRUTE 10 GALLON LID BLACK	1926826	BLACK	—	—	1.25"	17.13"
20 GALLON	BRUTE 20 GALLON LID GRAY	FG261960GRAY	GRAY	—	—	1.80"	19.88"
	BRUTE 20 GALLON LID WHITE	FG261960WHT	WHITE	—	—	1.80"	19.88"
	BRUTE 20 GALLON LID RED	FG261960RED	RED	—	—	1.80"	19.88"
	BRUTE 20 GALLON LID YELLOW	FG261960YEL	YELLOW	—	—	1.80"	19.88"
	BRUTE 20 GALLON LID BLUE	1779731	BLUE	—	—	1.80"	19.88"
	BRUTE 20 GALLON LID DARK GREEN	FG261960DGRN	DARK GREEN	—	—	1.80"	19.88"
	BRUTE 20 GALLON LID BLACK	FG261960BLA	BLACK	—	—	1.80"	19.88"
32 GALLON	BRUTE 32 GALLON LID GRAY	FG263100GRAY	GRAY	—	—	1.85"	22.41"
	BRUTE 32 GALLON LID WHITE	FG263100WHT	WHITE	—	—	1.85"	22.41"
	BRUTE 32 GALLON LID RED	FG263100RED	RED	—	—	1.85"	22.41"
	BRUTE 32 GALLON LID YELLOW	FG263100YEL	YELLOW	—	—	1.85"	22.41"
	BRUTE 32 GALLON LID BLUE	FG263100BLUE	BLUE	—	—	1.85"	22.41"
	BRUTE 32 GALLON LID DARK GREEN	FG263100DGRN	DARK GREEN	—	—	1.85"	22.41"
	BRUTE 32 GALLON LID BLACK	1867532	BLACK	—	—	1.85"	22.41"
	BRUTE 32 GALLON FUNNEL TOP GRAY	FG354300GRAY	GRAY	—	—	5.00"	22.38"
	BRUTE 32 GALLON DOME TOP GRAY	FG263788GRAY	GRAY	—	—	12.25"	22.69"
	BRUTE 32 GALLON DOME TOP RED	FG263788RED	RED	—	—	12.25"	22.69"
	BRUTE 32 GALLON DOME TOP DARK GREEN	1829397	DARK GREEN	—	—	12.25"	22.69"
	BRUTE 32 GALLON DOME TOP BLUE	1829398	BLUE	—	—	12.25"	22.69"
	BRUTE 32 GALLON DOME TOP YELLOW	1829399	YELLOW	—	—	12.25"	22.69"
44 GALLON	BRUTE 44 GALLON LID GRAY	FG264560GRAY	GRAY	—	—	2.00"	24.50"
	BRUTE 44 GALLON LID WHITE	FG264560WHT	WHITE	—	—	2.00"	24.50"
	BRUTE 44 GALLON LID RED	FG264560RED	RED	—	—	2.00"	24.50"
	BRUTE 44 GALLON LID YELLOW	FG264560YEL	YELLOW	—	—	2.00"	24.50"
	BRUTE 44 GALLON LID BLUE	1779636	BLUE	—	—	2.00"	24.50"
	BRUTE 44 GALLON LID DARK GREEN	FG264560DGRN	DARK GREEN	—	—	2.00"	24.50"
	BRUTE 44 GALLON LID BLACK	FG264560BLA	BLACK	—	—	2.00"	24.50"
	BRUTE 44 GALLON DOME TOP GRAY	FG264788GRAY	GRAY	—	—	12.63"	24.81"
	BRUTE 44 GALLON DOME TOP RED	FG264788RED	RED	—	—	12.63"	24.81"
	BRUTE 44 GALLON DOME TOP DARK GREEN	1834838	DARK GREEN	—	—	12.63"	24.81"
	BRUTE 44 GALLON DOME TOP YELLOW	1834839	YELLOW	—	—	12.63"	24.81"
	BRUTE 44 GALLON DOME TOP BLUE	1834840	BLUE	—	—	12.63"	24.81"
	55 GALLON	BRUTE 55 GALLON LID GRAY	FG265400GRAY	GRAY	—	—	2.09"
BRUTE 55 GALLON LID WHITE		FG265400WHT	WHITE	—	—	2.09"	29.06"
BRUTE 55 GALLON LID RED		FG265400RED	RED	—	—	2.09"	29.06"
BRUTE 55 GALLON LID YELLOW		FG265400YEL	YELLOW	—	—	2.09"	29.06"
BRUTE 55 GALLON LID BLUE		1779733	BLUE	—	—	2.09"	29.06"
BRUTE 55 GALLON LID DARK GREEN		FG265400DGRN	DARK GREEN	—	—	2.09"	29.06"
BRUTE 55 GALLON LID BLACK		1779738	BLACK	—	—	2.09"	29.06"
BRUTE 55 GALLON DOME TOP GRAY		FG265788GRAY	GRAY	—	—	14.50"	27.25"
BRUTE 55 GALLON DOME TOP RED		FG265788RED	RED	—	—	14.50"	27.25"
ACCESSORIES	BRUTE DOLLY	FG264000BLA	BLACK	—	—	6.63"	18.25"
	BRUTE QUIET DOLLY	FG264043BLA	BLACK	—	—	6.63"	18.25"
	BRUTE TANDEM DOLLY	FG264600BLA	BLACK	45.00	20.25	8.00"	—
	BRUTE CADDY BAG	FG264200YEL	YELLOW	—	—	20.50"	20.00"
	BRUTE RIM CADDY	FG9W8700YEL	YELLOW	32.5	26.5	6.75"	—

10 & 55 GALLON LIDS FEATURE TRADITIONAL DESIGN



To see our complete range of refuse solutions visit our online catalog at [rubbermaidcommercial.com](http://rubbermaidcommercial.com)

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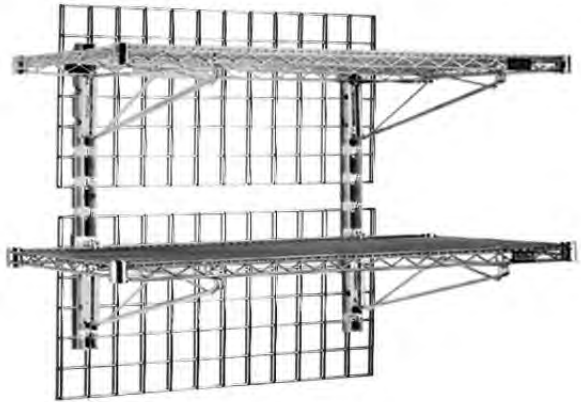
Profit from the Eagle Advantage®

# Specification Sheet

## Short Form Specifications

Eagle Walstor® Single Shelf Kit, model \_\_\_\_\_.  
 Consists of one EAGLEbrite® zinc-coated patented Quad-Truss® design open-grid wire shelf, one pair of 30" vertical uprights one wire mat, and one pair of 18" wire shelf brackets.

Eagle Walstor® Double Shelf Kit, model \_\_\_\_\_.  
 Consists of two EAGLEbrite® zinc-coated patented Quad-Truss® design open-grid wire shelves, one pair of 45" vertical uprights, two wall mats, and two pairs of wire shelf brackets.



double shelf kit

### Options / Accessories\*

- Pan holders
- Hooks
- Bins
- Racks
- Baskets

**EAGLE GROUP**  
 100 Industrial Boulevard, Clayton, DE 19938-8903 USA  
 Phone: 302-653-3000 • Fax: 302-653-2065  
 www.eaglegrp.com

**Foodservice Division: Phone 800-441-8440**  
**MHC/Retail Display Divisions: Phone 800-637-5100**

For custom configuration or fabrication needs, contact our **SpecFAB® Division**.  
 Phone: 302-653-3000 • Fax: 302-653-3091 • e-mail: specfab@eaglegrp.com

**Spec sheets available for viewing, printing or downloading from our online literature library at [www.eaglegrp.com](http://www.eaglegrp.com)**

*Eagle Foodservice Equipment, Eagle MHC, SpecFAB®, and Retail Display are divisions of Eagle Group. ©2011 by the Eagle Group*

Item No.: \_\_\_\_\_  
 Project No.: \_\_\_\_\_  
 S.I.S. No.: \_\_\_\_\_

## Walstor® Modular Wall System

### MODELS:

- |                                     |                                 |                                 |                                 |
|-------------------------------------|---------------------------------|---------------------------------|---------------------------------|
| <input type="checkbox"/> WAL-1-1836 | <input type="checkbox"/> WM1848 | <input type="checkbox"/> WM2496 | <input type="checkbox"/> PR45VU |
| <input type="checkbox"/> WAL-1-1848 | <input type="checkbox"/> WM1860 | <input type="checkbox"/> WM3354 | <input type="checkbox"/> PR14B  |
| <input type="checkbox"/> WAL-2-1836 | <input type="checkbox"/> WM2448 | <input type="checkbox"/> WM4848 | <input type="checkbox"/> PR18B  |
| <input type="checkbox"/> WAL-2-1848 | <input type="checkbox"/> WM2472 | <input type="checkbox"/> PR12VU | <input type="checkbox"/> PR21B  |
| <input type="checkbox"/> WM1836     | <input type="checkbox"/> WM2484 | <input type="checkbox"/> PR30VU | <input type="checkbox"/> PR24B  |

### Design and Construction Features

- Walstor® design provides for placement of wire shelves where you want them.
- Unique design positions vertical uprights at stud locations, while shelf brackets lock shelves once shelf is in place.
- Provides the ability to add, remove, or adjust shelves quickly and easily.
- Features EAGLEbrite® zinc finish, sealed with MasterSeal®.
- WalStor® accessories\* can be mounted anywhere on wall mat without fasteners.
- Eagle wire shelves feature patented QuadTruss® design (patent #5,390,803), making shelves up to 25% stronger and providing a retaining ledge for increased stability and product retention.

### Shelf Kits

- Single Shelf Kits:
  - One wire shelf with patented Quad-Truss® design (patent # 5,390,803) and EAGLEbrite® zinc finish
  - One wall mat
  - One pair of 30" (762mm) vertical wall uprights
  - One pair of 18" (457mm) wire shelf brackets
- Double Shelf Kits:
  - Two wire shelves with patented Quad-Truss® design (patent # 5,390,803) and EAGLEbrite® zinc finish
  - Two wall mats
  - One pair of 45" (1143mm) vertical wall uprights
  - Two pairs of 18" (457mm) wire shelf brackets

### Components (all of which are zinc-plated)

- Wall Mats:
  - Required only for hanging accessories\*
  - 3" x 3" (76 x 76mm) grids
- Vertical Wall Uprights (pair)
- Wire Shelf Brackets (pair)

\* See spec sheet #EG02.00B for Walstor® accessories.  
 See spec sheet #EG02.00C for Wall Grid Shelving.

### Certifications / Approvals



### AUTOQUOTES



EG02.00A Rev. 07/11

Catalog Specification Sheet No. **EG02.00A**

Walstor® Modular Wall System

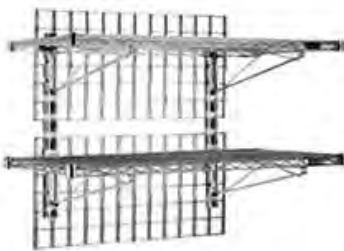


Item No.: \_\_\_\_\_  
 Project No.: \_\_\_\_\_  
 S.I.S. No.: \_\_\_\_\_

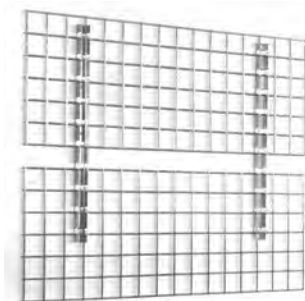
## Walstor® Modular Wall System



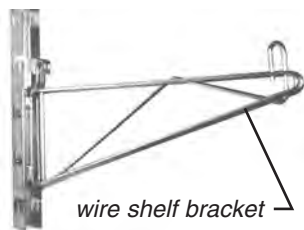
single shelf kit



double shelf kit



wall mats and  
vertical wall uprights



wire shelf bracket

### SINGLE SHELF KITS

model #	weight		shelf & wall matt size			
	lbs.	kg	width		length	
	in.	mm	in.	mm	in.	mm
WAL-1-1836	35	15.9	18"	457	36"	915
WAL-1-1848	36	16.3	18"	457	48"	1219

### DOUBLE SHELF KITS

model #	weight		shelf dimensions			
	lbs.	kg	width		length	
	in.	mm	in.	mm	in.	mm
WAL-2-1836	41	18.6	18"	457	36"	915
WAL-2-1848	49	22.2	18"	457	48"	1219

### WALL MATS

model #	weight		height		length	
	lbs.	kg	in.	mm	in.	mm
WM1836	9	4.1	18"	457	36"	915
WM1848	11	5.0	18"	457	48"	1219
WM1860	14	6.4	18"	457	60"	1524
WM2448	13	5.8	24"	610	48"	1219
WM2472	19	8.6	24"	610	72"	1828
WM2484	22	9.9	24"	610	84"	2133
WM2496	25	11.3	24"	610	96"	2438
WM3354	22	9.9	33"	838	54"	1372
WM4848	19	8.6	48"	1219	48"	1219

### VERTICAL WALL UPRIGHTS

model #	weight		height	
	lbs.	kg	in.	mm
PR12VU	2	0.9	12"	305
PR30VU	4	1.8	30"	762
PR45VU	5	2.3	45"	1143

### WIRE SHELF BRACKETS

model #	weight		depth	
	lbs.	kg	in.	mm
PR14B	3	1.5	14"	356
PR18B	4	1.8	18"	457
PR21B	4	1.8	21"	533
PR24B	5	2.3	24"	610

**Please note:** Walstor® must be mounted to a solid surface or studs in a wall. User needs to determine installation materials and methods suitable to hold and support the Walstor® system.

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Rev. 07/11

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Although every attempt has been made to ensure the accuracy of the information provided, we cannot be held responsible for typographical or printing errors. Information and specifications are subject to change without notice. Please confirm at time of order.



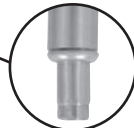
STAINLESS STEEL  
**TABLE WITH SINK**  
 Conforms To NSF 61/9 Lead Free Requirements



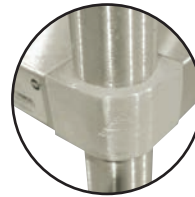
Item #: \_\_\_\_\_ Qty #: \_\_\_\_\_  
 Model #: \_\_\_\_\_  
 Project #: \_\_\_\_\_



Rolled Rim Edge on  
 Front & Square  
 Edges on Side & Back



Bullet Feet



Featuring as Standard:  
**"THE PROVEN"**  
 ORIGINAL ADVANCE TABCO  
**Adjustable Undershelf  
 with Die Cast Leg Clamp**

KMS-11B-305R Shown

### FEATURES:

Top is furnished with 1 5/8" sanitary rolled rim edge on front and square sides, and a 5" splash with a 1" return on the rear side.

THREE hat channels stud welded to reinforce and maintain a level working surface.

Pre-engineered welded angle adapters insure ease of future drawer installation.

Aluminum die cast "leg-to-shelf" clamp secures shelf to leg eliminating unsightly nuts and bolts. Undershelf is adjustable.

Stainless steel 16" x 20" x 12" sink bowl integrally welded to top.

K-50 deck mounted lead free compliant faucet included.

### CONSTRUCTION:

All TIG welded. Exposed weld areas polished to match adjacent surfaces.

Entire top mechanically polished to a satin finish.

Top is sound deadened.

Roll formed embossed galvanized hat channels are secured to top by means of structural adhesive and weld studs.

Gussets welded to support hat channels.

### MATERIAL:

TOP is 16 gauge stainless steel type "304" series.

SHELF is 18 gauge stainless steel type "430" series.

LEGS are 1 5/8" diameter, tubular stainless steel with stainless steel gussets and 1" adjustable stainless steel bullet feet.

30" WIDE Model #	Length (L)	Sink Location	Approx. Weight	Approx. Cu. Ft.
KMS-11B-305L	60"	Left	150 lbs.	18
KMS-11B-305R	60"	Right	150 lbs.	18
KMS-11B-306L	72"	Left	180 lbs.	22
KMS-11B-306R	72"	Right	180 lbs.	22

Choose Left or Right Sink Position

**WARNING:** Equipment that include faucets on this page may contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.



Customer Service Available To Assist You **1-800-645-3166** 8:30 am - 8:00 pm E.S.T.

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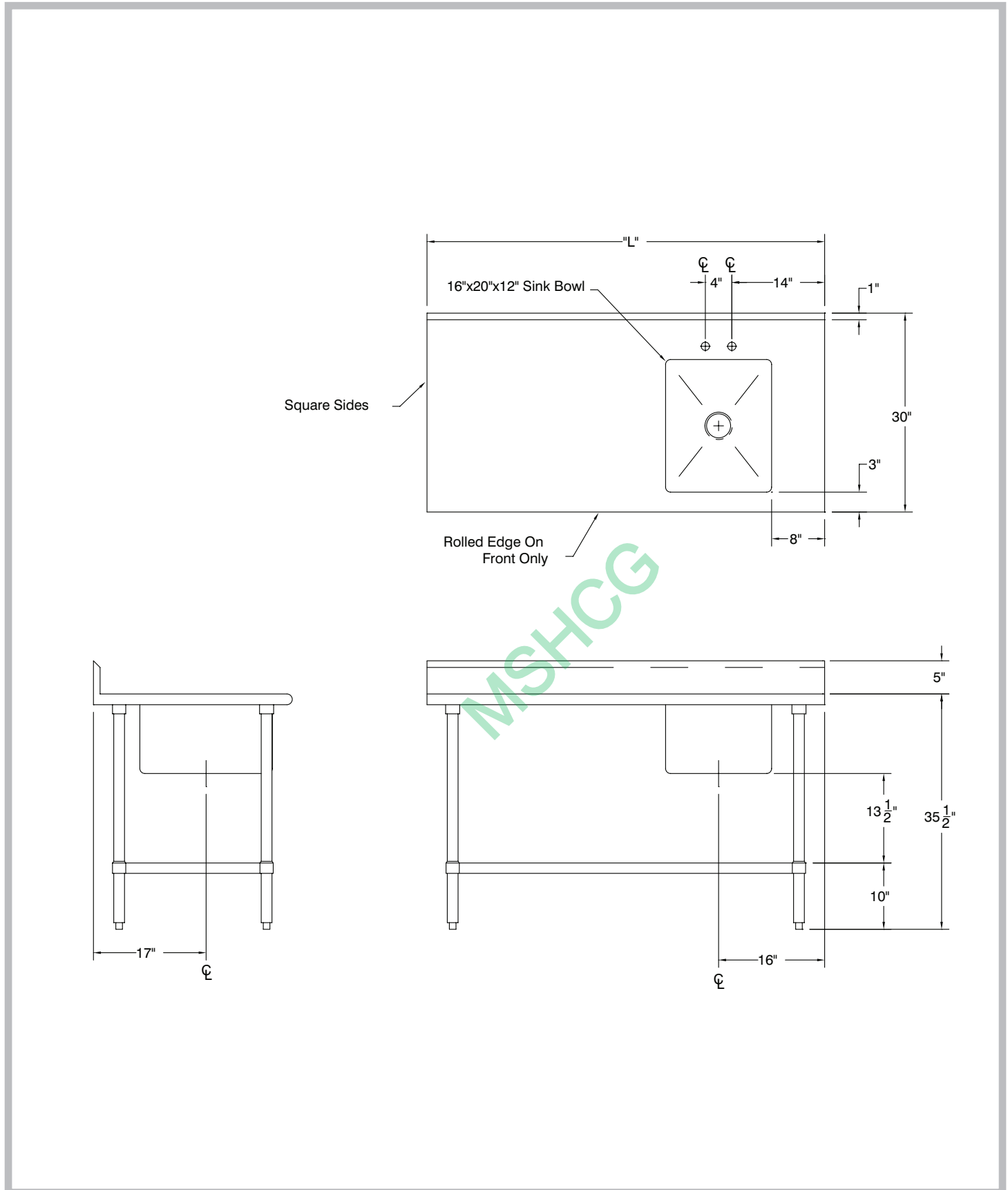
For Smart Fabrication™ Quotes:

Email: smartfab@advancetabco.com or Fax: 631-586-2933

# DETAILS and SPECIFICATIONS

TOL ± .500"

ALL DIMENSIONS ARE TYPICAL



**CAMBRO****Ingredient Bins****Standard**

- Models IBSF27 – 27 gallon (102 L)  
 IB32 – 32 gallon (121 L)  
 IB36 – 34 gallon (129 L)  
 IB44 – 43 gallon (161 L)

Item No. \_\_\_\_\_

Specifier Identification No. \_\_\_\_\_

Model No. \_\_\_\_\_

Quantity \_\_\_\_\_

**Features & Benefits**

- Stores and transports a wide variety of dry ingredients such as flour, sugar, rice or grains. Perfect for restaurants, food manufacturers or commissaries.
- Available in 27, 32, 34, and 43 gallon (102, 121, 129, 161 L) capacity to meet standard industry requirements for storage and transportation of bulk foods.
- One-piece, seamless single-wall polyethylene bin construction is extremely durable. Won't rust or corrode. Liquids and dry foods will not stick or seep between seams.
- FDA accepted material. Meets all food contact requirements and eliminates need for liners.
- Smooth interior and exterior are easy to clean.
- Injection molded Camwear® polycarbonate lids are transparent, break resistant and offer quick and easy identification of contents. Slide-back feature for easy access.
- Working height permits storage under standard work tables.
- Heavy-duty 3" (7,6 cm) casters, 2 front swivel, 2 fixed, are bolted into molded-in steel plates and will not pull out or fall off.
- No assembly required.
- Available in White (148) only with Clear (135) cover.

**Approvals****CAMBRO**

© Cambro Manufacturing Company 5801 Skylab Road, Huntington Beach, CA 92647-2056, U.S.A.  
 Telephone 714 848 1555 Toll Free 800 854 7631 Customer Service Department 800 833 3003

# Ingredient Bins

## Standard

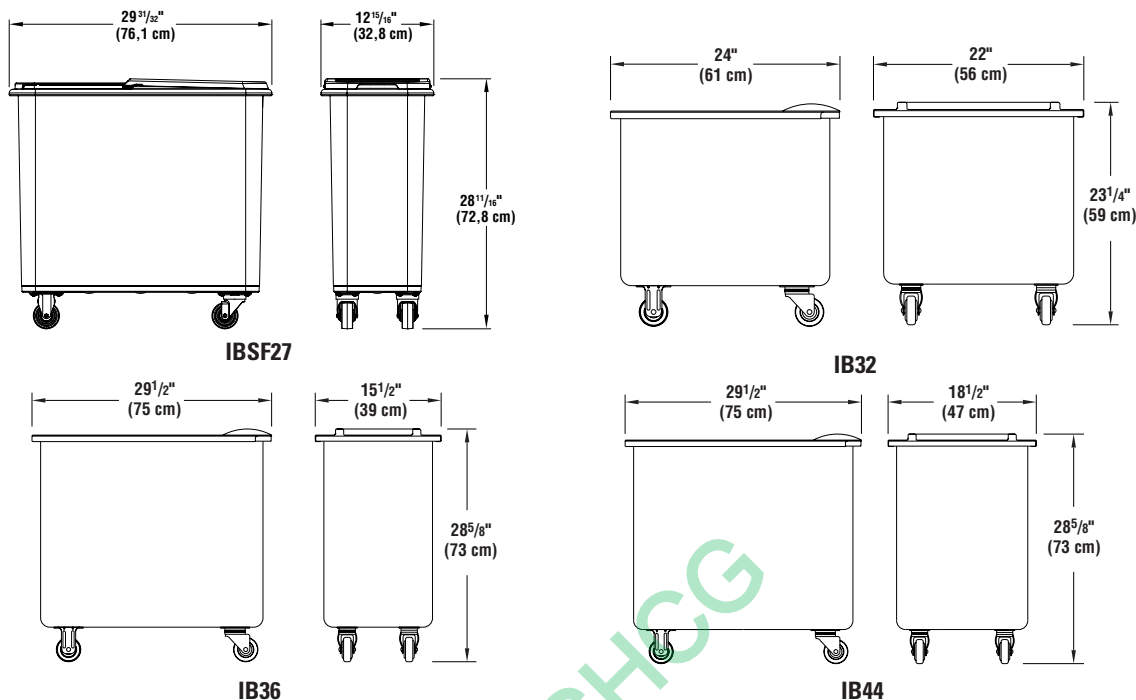
Models IBSF27 – 27 gallon (102 L)  
 IB32 – 32 gallon (121 L)  
 IB36 – 34 gallon (129 L)  
 IB44 – 43 gallon (161 L)

Item No. \_\_\_\_\_

Specifier Identification No. \_\_\_\_\_

Model No. \_\_\_\_\_

Quantity \_\_\_\_\_



## Specifications

Dimension Tolerance: +/- 1/4" (0,64 cm)

Code	Description	Volume Capacity	Load Capacity		Exterior Dimensions W x D x H	Case lbs./cube Kg/m <sup>3</sup>
			Sugar	Flour		
<b>Standard Ingredient Bin</b>						
IBSF27	27 gal. Ingredient Bin (102 L)	3.56 Cubic feet (0,100) Cubic meters	216 lbs. (98 kg.)	150 lbs. (68 kg.)	12 <sup>15</sup> / <sub>16</sub> " x 29 <sup>31</sup> / <sub>32</sub> " x 28 <sup>11</sup> / <sub>16</sub> " (32,8 x 76,1 x 72,8 cm)	28.5 (6,91) 11,2 (0,196)
IB32	32 gal. Ingredient Bin (121 L)	4.28 Cubic feet (0,121) Cubic meters	215 lbs. (97,5 kg.)	160 lbs. (73 kg.)	22" x 24" x 23 <sup>1</sup> / <sub>4</sub> " (56 x 61 x 59 cm)	27.75 (7,50) 13 (0,21)
IB36	34 gal. Ingredient Bin (129 L)	4.54 Cubic feet (0,128) Cubic meters	252 lbs. (114 kg.)	180 lbs. (82 kg.)	15 <sup>1</sup> / <sub>2</sub> " x 29 <sup>1</sup> / <sub>2</sub> " x 28 <sup>5</sup> / <sub>8</sub> " (39 x 75 x 73 cm)	30 (8,51) 14 (0,24)
IB44	43 gal. Ingredient Bin (161 L)	5.69 Cubic feet (0,161) Cubic meters	320 lbs. (145 kg.)	230 lbs. (104 kg.)	18 <sup>1</sup> / <sub>2</sub> " x 29 <sup>1</sup> / <sub>2</sub> " x 28 <sup>5</sup> / <sub>8</sub> " (47 x 75 x 73 cm)	30.75 (9,14) 14 (0,26)

## Architect Specs

The Ingredient Bins shall be Cambro Model..., manufactured by Cambro Mfg. Co., Huntington Beach, CA 92648 U.S.A. Each unit shall be one piece, seamless, single-wall molded construction made of FDA Approved white polyethylene. Unit capacity shall range from 27 - 43 gallons (102 - 161 L) and/or 3.56 - 5.69 cu. ft. (0,100 - 0,161 cubic meters).

It shall have four each 3" (7,6 cm) casters with 1<sup>1</sup>/<sub>4</sub>" (3,2 cm) wide tread, 2 front swivel and 2 fixed, mounted on molded-in steel plates. It shall have an injection molded, transparent, slide-back polycarbonate lid. It shall not exceed 29" (73,6 cm) in height so that it can store under standard work tables. It shall be available in white only with a clear cover.

## Approvals



# CAMBRO

© Cambro Manufacturing Company 5801 Skylab Road, Huntington Beach, CA 92647-2056, U.S.A.  
 Telephone 714 848 1555 Toll Free 800 854 7631 Customer Service Department 800 833 3003



STAINLESS STEEL  
**WORK TABLES**

**PREMIUM Series - 5" Backsplash - Open Base Style**



Item #: \_\_\_\_\_ Qty #: \_\_\_\_\_  
 Model #: \_\_\_\_\_  
 Project #: \_\_\_\_\_



**Rolled Rim Edges on Front & Splash on Back and Square Side Edges**



**1-5/8" LEG STRETCHERS Ensure Stability**

**FEATURES:**

Top is furnished with 1 5/8" sanitary rolled rim edge on front and square sides, and a 5" splash with a 1" return on the rear side.

24" wide tables supplied with TWO hat channels stud welded to reinforce and maintain a level working surface. 30" and 36" wide tables supplied with THREE hat channels.

Pre-engineered welded angle adapters insure ease of future drawer installation.

Front to back Stretchers are welded to legs. Left to right Stretcher bolted to legs and requires assembly.

**CONSTRUCTION:**

All TIG welded. Exposed weld areas polished to match adjacent surfaces.

Entire top mechanically polished to a satin finish.

Top is sound deadened.

Roll formed embossed galvanized hat channels are secured to top by means of structural adhesive and weld studs.

Gussets welded to support hat sections.

**MATERIAL:**

**TKSS-SERIES: Stainless Steel Legs - Open Base**

**TOP:** 14 gauge stainless steel type "304" series.

**STRETCHERS:** 1 5/8" dia. tubular stainless steel.

**LEGS:** 1 5/8" diameter tubular stainless steel.  
 1" adjustable stainless steel bullet feet.  
 Stainless steel gussets.

**TKLG-SERIES: Galvanized Legs - Open Base**

**TOP:** 14 gauge stainless steel type "304" series.

**STRETCHERS:** 1 5/8" dia. tubular galvanized steel.

**LEGS:** 1 5/8" diameter tubular galvanized steel.  
 1" adjustable plastic bullet feet.  
 Galvanized steel gussets.

**TKSS-Series:  
Stainless Steel Legs & Stretchers**

L	24" Wide	30" Wide	36" Wide
30"	TKSS-240	TKSS-300	
24"	TKSS-242	TKSS-302	
36"	TKSS-243	TKSS-303	TKSS-363
48"	TKSS-244	TKSS-304	TKSS-364
60"	TKSS-245	TKSS-305	TKSS-365
72"	TKSS-246	TKSS-306	TKSS-366
84"	TKSS-247	TKSS-307	TKSS-367
*96"	TKSS-248	TKSS-308	TKSS-368
*108"	TKSS-249	TKSS-309	TKSS-369
*120"	TKSS-2410	TKSS-3010	TKSS-3610
*132"	TKSS-2411	TKSS-3011	TKSS-3611
*144"	TKSS-2412	TKSS-3012	TKSS-3612

**TKLG-Series:  
Galvanized Steel Legs & Stretchers**

L	24" Wide	30" Wide	36" Wide
30"	TKLG-240	TKLG-300	
24"	TKLG-242	TKLG-302	
36"	TKLG-243	TKLG-303	TKLG-363
48"	TKLG-244	TKLG-304	TKLG-364
60"	TKLG-245	TKLG-305	TKLG-365
72"	TKLG-246	TKLG-306	TKLG-366
84"	TKLG-247	TKLG-307	TKLG-367
*96"	TKLG-248	TKLG-308	TKLG-368
*108"	TKLG-249	TKLG-309	TKLG-369
*120"	TKLG-2410	TKLG-3010	TKLG-3610
*132"	TKLG-2411	TKLG-3011	TKLG-3611
*144"	TKLG-2412	TKLG-3012	TKLG-3612



\*Units 8 ft. and larger are furnished with six (6) legs

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For Smart Fabrication™ Quotes:

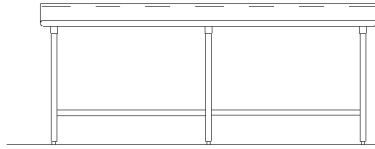
Email: smartfab@advancetabco.com or Fax: 631-586-2933

# DETAILS and SPECIFICATIONS

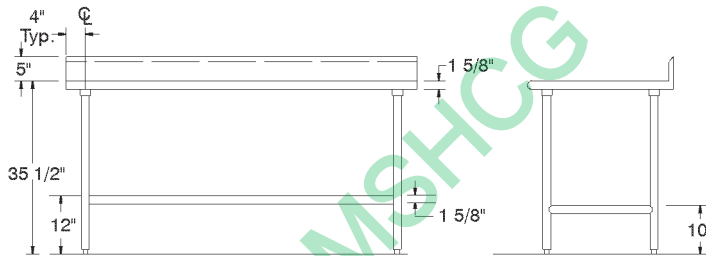
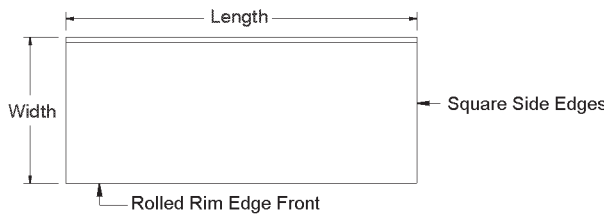
ALL DIMENSIONS ARE TYPICAL TOL ± .500"

All Units Shipped Unassembled (KD) for Reduced Shipping Costs.

## TKSS & TKLG Series Open Base Style 5" Backsplash



Units 8ft. and larger are furnished with six (6) legs



### TKSS-Series: Stainless Steel Legs & Stretchers

L	24" Wide	Wt.	30" Wide	Wt.	36" Wide	Wt.
30"	TKSS-240	49 lbs.	TKSS-300	55 lbs.		
24"	TKSS-242	43 lbs.	TKSS-302	48 lbs.		
36"	TKSS-243	55 lbs.	TKSS-303	62 lbs.	TKSS-363	80 lbs.
48"	TKSS-244	67 lbs.	TKSS-304	75 lbs.	TKSS-364	85 lbs.
60"	TKSS-245	77 lbs.	TKSS-305	89 lbs.	TKSS-365	99 lbs.
72"	TKSS-246	89 lbs.	TKSS-306	97 lbs.	TKSS-366	112 lbs.
84"	TKSS-247	107 lbs.	TKSS-307	118 lbs.	TKSS-367	131 lbs.
96"	TKSS-248	119 lbs.	TKSS-308	131 lbs.	TKSS-368	145 lbs.
108"	TKSS-249	135 lbs.	TKSS-309	150 lbs.	TKSS-369	165 lbs.
120"	TKSS-2410	234 lbs.	TKSS-3010	249 lbs.	TKSS-3610	268 lbs.
132"	TKSS-2411	258 lbs.	TKSS-3011	276 lbs.	TKSS-3611	298 lbs.
144"	TKSS-2412	273 lbs.	TKSS-3012	291 lbs.	TKSS-3612	313 lbs.

### TKLG-Series: Galvanized Steel Legs & Stretchers

L	24" Wide	Wt.	30" Wide	Wt.	36" Wide	Wt.
30"	TKLG-240	49 lbs.	TKLG-300	55 lbs.		
24"	TKLG-242	43 lbs.	TKLG-302	48 lbs.		
36"	TKLG-243	55 lbs.	TKLG-303	62 lbs.	TKLG-363	80 lbs.
48"	TKLG-244	67 lbs.	TKLG-304	75 lbs.	TKLG-364	85 lbs.
60"	TKLG-245	77 lbs.	TKLG-305	89 lbs.	TKLG-365	99 lbs.
72"	TKLG-246	89 lbs.	TKLG-306	97 lbs.	TKLG-366	112 lbs.
84"	TKLG-247	107 lbs.	TKLG-307	118 lbs.	TKLG-367	131 lbs.
96"	TKLG-248	119 lbs.	TKLG-308	131 lbs.	TKLG-368	145 lbs.
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144"	TKLG-2412	273 lbs.	TKLG-3012	291 lbs.	TKLG-3612	313 lbs.



ADVANCE TABCO is constantly engaged in a program of improving our products. Therefore, we reserve the right to change specifications without prior notice.



**HOBART**701 S Ridge Avenue, Troy, OH 45374  
1-888-4HOBART • www.hobartcorp.com**HS9/HS9N  
SLICER****HOBART****STANDARD FEATURES****KNIFE**

- 13" CleanCut™ Knife
- Removable Ring Guard Cover
- Zero Knife Exposure
- Heavy-Gauge Stainless Steel Knife Cover
- Top-Mounted Borazon Stone Sharpener

**OPERATION**

- ½ H.P. Knife Drive Motor
- Timing Belt for Automatic Drive System
- Variable Four-Speed Automatic Carriage with Front Mounted Controls
- Three Stroke Lengths

**INTERLOCKS**

- Home-Start Position
- Close-to-Stop
- Gauge-Plate Interlock
- Carriage-System Interlock
- No-Volt Release
- 30-Second Shut Off

**HOUSING AND BASE**

- Sanitary Anodized Aluminum Base
- Machined Grooves on Gauge Plate and Knife Cover
- Exclusive Tilting, Removable Carriage System
- Electroless Nickel Plated Single Slide Rod with Reservoir Wick in Transport
- Double-Action Indexing Cam
- Lift Assist Cleaning Leg
- Ergonomic-Style Handle
- Rear-Mounted, Removable Meat/Vegetable Grip Arm

**MODELS**

- HS9 – Automatic Slicer/Anodized Finish with Removable Knife Feature
- HS9N – Automatic Slicer/Anodized Finish with Non-Removable Knife Feature

**ACCESSORIES**

- Full Fence
- Food Chute
- Debris Deflector

Specifications, Details and Dimensions on Inside and Back.

**HS9/HS9N SLICER**

# HS9/HS9N SLICER

# HOBART

701 S Ridge Avenue, Troy, OH 45374  
1-888-4HOBART • www.hobartcorp.com

## SOLUTIONS / BENEFITS

### PRECISION SLICING

#### 13" CleanCut™ Knife

- Super alloy edge stays sharp longer
- Lasts two to three times longer than carbon coated or stainless steel knives

#### Top Mounted Borazon Stone Sharpener

- Single-action sharpens and hones in just 15 seconds
- Removable and warewasher safe for easy cleaning and sanitation – can be used wet or dry
- Lifetime guaranteed Borazon sharpening stones provide maximum performance with reduced maintenance costs

#### Machined Grooves on Gauge Plate and Knife Cover

- Reduces drag for smoother slicing motion

#### Double-Action Indexing Cam

- The first full revolution of the indexing knob provides precise control of shaving, chipping and thin slicing
- The second revolution opens the gauge plate quickly for thicker slicing
- Gauge plate holds position for consistent, precision slicing

### EASY TO USE

#### ½ H.P. Knife Drive Motor

- Reserve power runs at 430 rpm for optimum results

#### Timing Belt Automatic Drive System

- Extends belt life while producing optimum slicing results
- Quieter operating slicer
- Four carriage speeds including 28, 38, 48 and 58 strokes per minute

#### Three Stroke Lengths

- Three stroke lengths ideal for a variety of products

#### Electroless Nickel Plated Single Slide Rod with Reservoir Wick in Transport

- Smooth operation with continuous lubrication of carriage rod

#### Zero Knife Exposure\*

- Knife edge is covered when sharpener is both mounted and removed, making cleaning easier
- Gauge plate remains closed during operation of sharpener

#### Home Start Position

- Carriage must be in 'home position' before the slicer will start

#### Close to Stop

- Closing of the gauge plate turns off the slicer

#### Gauge Plate Interlock

- Gauge plate must be closed to remove carriage for cleaning and cannot be opened when removed

#### Carriage System Interlock

- Will not tilt away or remove if gauge plate is not closed

#### No Volt Release

- Slicer must be restarted if power fails or slicer is unplugged

#### Automatic Shutoff

- Knife shuts off after 30 seconds of inactivity

### EASY TO CLEAN

#### Removable Knife Option\* – HS9

- Knife easily removes with patented removal tool
- Area within ring guard is open for faster cleaning
- Knife and tool are warewasher safe for easy cleaning and sanitation

#### Removable Ring Guard Cover\*

- Catches product debris around the knife for easy removal during cleaning
- Reduces time to 'floss' during cleaning

#### Exclusive Tilting, Removable Carriage System\*

- Tilt design allows for ease of mid-day cleaning
- Removable for complete cleaning and sanitation

#### Rear-Mounted, Removable Meat Grip

- Opens up front of product tray for unobstructed loading
- Removable meat grip allows for easy cleaning

#### Lift Assist Cleaning Leg

- Gas assisted leg helps operator easily lift machine for cleaning underneath

#### Sanitary Anodized Aluminum Base

- Limited cracks/crevices or bolt holes where product can lodge and bacteria may grow
- Easy clean up and durable finish

\*Feature unique to Hobart



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## HS9/HS9N SLICER

### SPECIFICATIONS

#### KNIFE

**13" CleanCut Knife:** The knife is approximately 13 inches, constructed of 304L stainless steel and high performance Stellite alloy. Knife cover is retained magnetically, and is quickly removed by pulling straight back on the top cover knob.

**Removable Knife Option HS9:** The patented knife removal tool covers the knife edge and safely removes knife from gauge plate to allow for thorough cleaning.

**Removable Ring Guard Cover:** Fits on top of ring guard to catch food debris. When removed, reveals a 0.12" space between knife and guard for easier flossing. Ring guard is made with Zytel™ plastic and can be washed in warewasher or three compartment sink.

**Zero Knife Exposure:** Knife edge is not exposed during cleaning or sharpening procedures.

**Top Mounted Borazon Stone Sharpener:** Single action operation utilizing two Borazon stones to sharpen and hone in five seconds. Removable, top mounted and warewasher safe. When sharpener is removed for cleaning, knife edge is completely shielded. Borazon stones have a lifetime guarantee.

#### MOTOR

**Poly V-Belt Knife Drive System:** Knife is driven by a Hobart Poly V belt and runs at 430 rpm for optimal performance.

**Four Stroke Speeds:** Stroke speed can be set to 28, 38, 48 and 58 strokes per minute.

**½ H.P. Knife Drive Motor:** ½ H.P. permanently lubricated ball bearings. Single phase capacitor-start, induction run.

#### INTERLOCKS

**Home Start Position:** Home-start ensures carriage is in a convenient position before starting the slicer.

**Close to Stop:** After slicing, a quick turn of the index knob to the closed position turns off the slicer.

**Gauge Plate Interlock:** Gauge plate interlock protects knife edge when indicator is at zero.

**Carriage System Interlock:** Carriage will not tilt away or remove if gauge plate indicator is not closed.

**No Volt Release:** In the event of a power loss, slicer must be restarted before operation can continue.

**Automatic Shut Off:** Knife shuts off after 30 seconds of inactivity to extend motor life and save energy.

#### HOUSING AND BASE

**Sanitary Anodized Aluminum Base:** One-piece base has fewer places to harbor soil and is easier to clean. Limits holes or crevices in which food can lodge.

**Finish:** Stainless steel top cover, anodized aluminum product tray and gauge plate.

**Exclusive Tilting, Removable Carriage System:** Aluminum product tray tilts easily for mid-day cleaning and is removable for thorough cleaning and sanitation procedures. The carriage has 12.5" manual travel.

**Electroless Nickel Plated Single Slide Rod with Reservoir Wick in Transport:** Transport slide rod is E-Nickel electroless plated. Slide rod bearings feature an oil reservoir/oil wick.

**Double-Action Indexing Cam:** A solid construction index knob moves the gauge plate via a barrel cam ensuring consistent slice thickness across machine and over time. First revolution of index cam for precision slicing; second revolution for thicker slicing selection.

**Lift Assist Cleaning Leg:** Gas assisted leg helps operator easily lift machine for cleaning underneath.

**Ergonomic Style Handle:** Specially shaped and positioned for ease of use during manual operation.

**Rear Mounted, Removable Meat Grip Arm:** Rear mounted grip is high strength thermoplastic. Swings out of way when not in use.

**Electrical Specification:** 120/60/1; 5.6 Amps.

**Switch:** Moisture protected push button switch.

**Cord & Plug:** 6-foot, three-wire power supply cord and plug. Plug not furnished on export models.

**Capacity:** The carriage will take food up to 5¾" x 10¾" rectangle or 7.5" in diameter.

**Gauge Plate:** Gauge plate is a heavy aluminum extrusion with machined grooves for smooth feeding. Adjustable to cut any thickness of slice up to 1".

**Warranty:** All parts and service coverage for one year including knife. Lifetime guarantee on Borazon stones in the sharpening system.

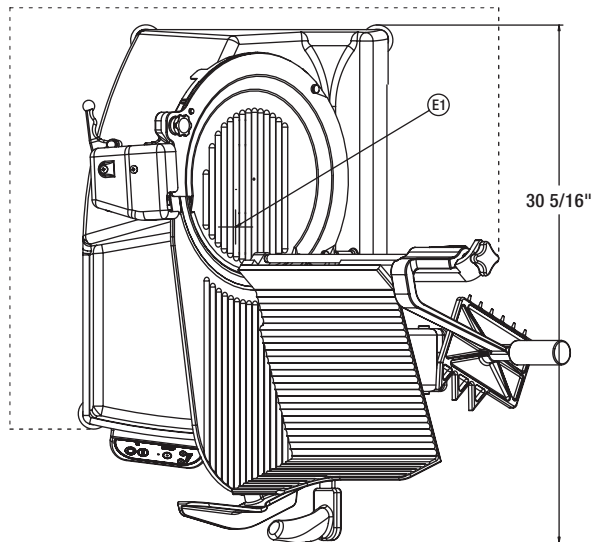
**Shipping Weight:** 142 lbs.

# HS9/HS9N SLICER

## HOBART

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### DETAILS AND DIMENSIONS

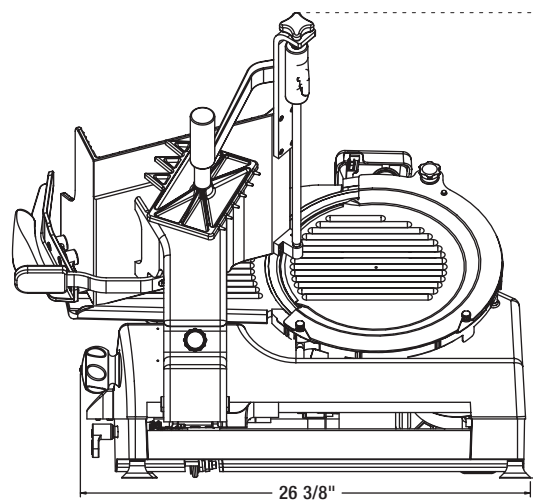
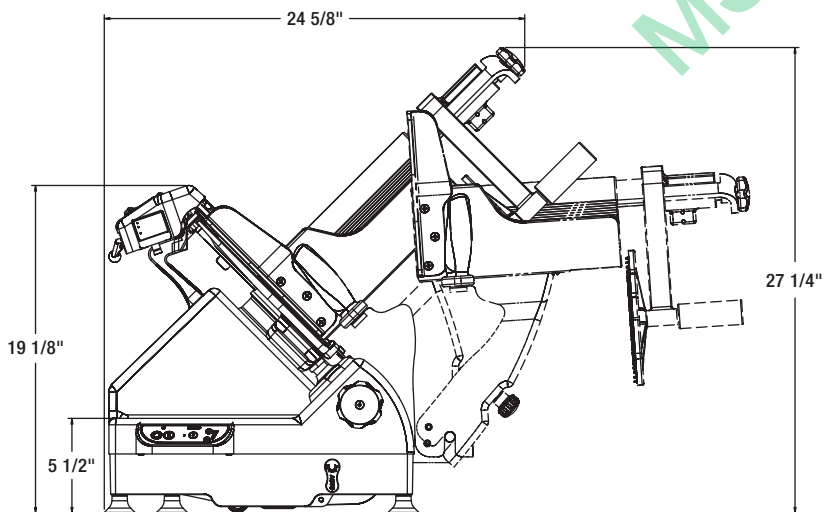


#### **WARNING**

ELECTRICAL AND GROUNDING CONNECTIONS MUST COMPLY WITH THE APPLICABLE PORTIONS OF THE NATIONAL ELECTRICAL CODE AND/OR OTHER LOCAL ELECTRICAL CODES.

E1 - ELECTRICAL CONNECTIONS

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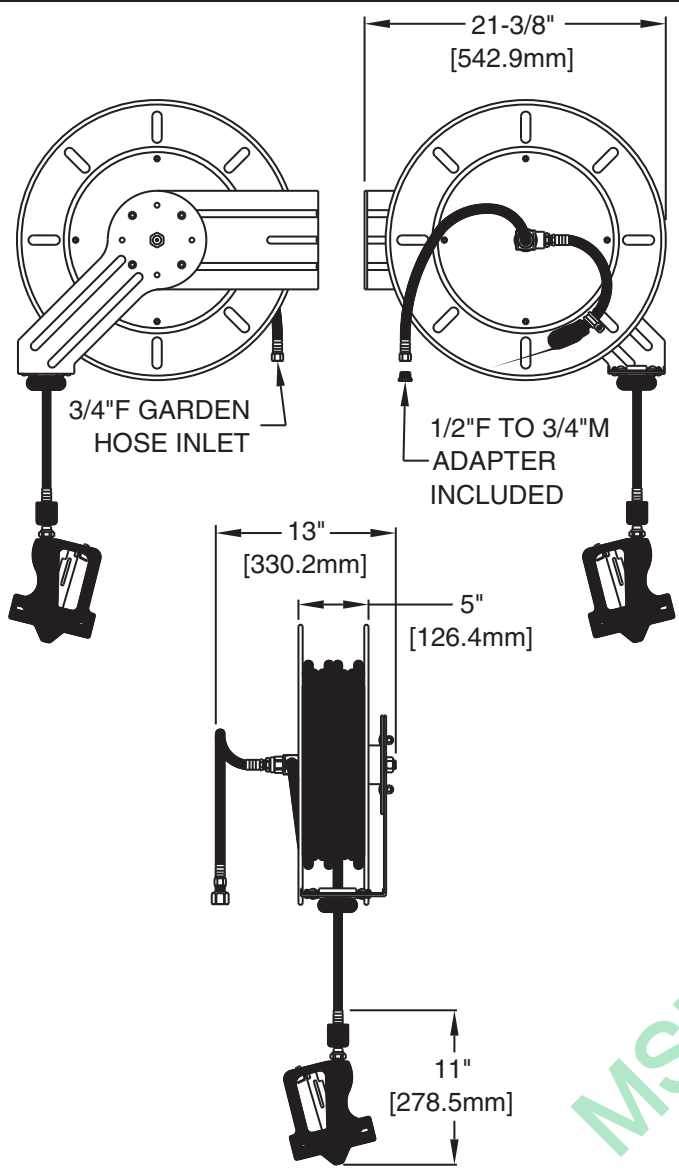


As continued product improvement is a policy of Hobart, specifications are subject to change without notice.

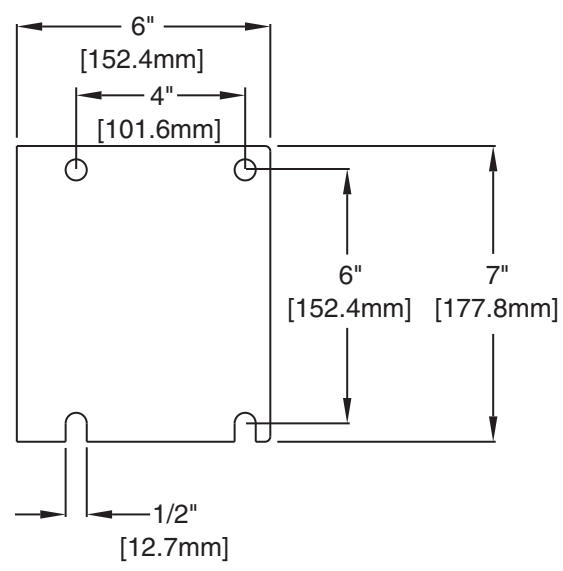
JOB NAME:

QUANTITY:

ITEM NO.:



ROUGH-IN: SEE MOUNTING PLATE BELOW



PRODUCT NAME:  
**STAINLESS STEEL REEL RINSE  
 EXPOSED WITH SPRAY GUN**

\_\_\_\_\_ SPECIAL CONFIGURATION  
 (CHECK BASE MODEL AND OPTIONS)

MODEL:  
 29599 W/ 35' LENGTH HOSE  
 29262 W/ 50' LENGTH HOSE

OPTIONS OR MODIFICATIONS:  
 OTHER \_\_\_\_\_

FEATURES:  
 REEL RINSE  
 \* EXPOSED DESIGN  
 \* STAINLESS STEEL CONSTRUCTION  
 \* GUIDE ARM ADJUSTABLE TO 9 POSITIONS  
 \* RATCHET LOCK AND EASY TENSION ADJUST  
 \* STAINLESS STEEL OR BRASS FLUID PATH

HOSE  
 \* 35' OR 50' LENGTH REEL HOSE  
 \* 5/8" ID HIGH TEMPERATURE HOSE  
 \* 3-PLY FIBER REINFORCED  
 \* 1/2" NPT OR 3/4" GARDEN HOSE INLET  
 \* 18" LENGTH INLET HOSE  
 \* ADJUSTABLE BALL STOP

SPRAY GUN  
 \* STAINLESS STEEL CONSTRUCTION  
 \* WATERPROOF NYLON COVER  
 \* ERGONOMIC DESIGN  
 \* LOCKING TRIGGER MECHANISM  
 \* 7.0 GPM AT 80 PSI

SYSTEM LIMITS  
 \* TEMP: 40°F MIN. TO 140°F MAX.  
 \* PRESSURE 150 PSI MAX. STATIC

SHIPPING WEIGHT  
 \* 29599 - 55.0 LBS  
 \* 29262 - 60.0 LBS

ANSI/A112.18.1M

FISHER MANUFACTURING COMPANY  
 1900 SOUTH "O" STREET, TULARE, CALIFORNIA 93274  
 MAILING ADDRESS: P.O. BOX 60, TULARE, CALIFORNIA 93275  
 PHONE: (800) 421-6162 FAX: (800) 832-8238  
 MADE IN U.S.A.

# SND-2 With AC-PSP & PSP Accessory

## Low Ceiling Exhaust Hood With Make-Up Air



*The SND-2 Series is a Type I, Sloped Wall Canopy Hood for use over 400°F and 600°F cooking surface temperatures. The Sloped Canopy is the ideal hood choice for low ceiling heights.*

### Features & Benefits

- Superior exhaust flow rates.
- Insulated, double-wall rigid front has aerodynamic design that reduces radiant heat into kitchen, prevents condensation and provides exceptional capture and containment of cooking vapors. The signature “mechanical baffle” on the front of the hood’s capture area is available on 18” Front Model only.
- The mechanical baffle provides a built-in wiring chase for optimal positioning of electrical controls and outlets on the front face of the hood without penetrating capture area or requiring external chase way.
- U.L. incandescent light fixtures and globes shall be installed and pre-wired to a junction box. The light fixtures shall be installed with a maximum of 4’0” spacing on center and allow up to a 100 watt standard light bulb.
- Pre-punched hanging angles on each end of hood and additional set provided for hoods 12’ and longer.
- Polished stainless steel on the interior and exterior of the front enhance aesthetics. Fully welded and polished front corners. Fabricated from stainless steel. Sloped front for low ceiling applications.
- All hoods come standard with stainless steel baffle filters and a deep grease trough which allows for easy cleaning. Grease drain system with removable 1/2 pint cup for easy cleaning. Standard filter stops eliminate gaps between filters.
- Hoods can be equipped with modular utility cabinets and end standoffs. Optional listed light and fan control switches flush mounted and pre-wired through electrical chase way.
- Rigid single wall end panels reduce weight.
- Front Make-Up Air (PSP Accessory) Featuring
  - Provides up to 80% Make-up Air
  - Low Discharge Velocities
  - Directs Make-up Air Into Hood’s Capture Area
  - Evenly distributes make-up air along the length of the hood
  - Stainless steel construction to match the ventilation hood
- Front Make-Up Air (AC-PSP Accessory) Featuring
  - Provides up to 80% Make-up Air
  - Delivers AC where it is needed most
  - AC air does not interfere with hood’s capture and containment
  - Make-up plenum is located nearest the hood; the air conditioned plenum is away from the hood

- Make-up air stream and the air conditioned air stream are not permitted to mix until leaving the dual plenum
- Perforated, stainless steel diffuser plates provide even air distribution
- Stainless steel construction to match the ventilation hood
- Optional LED Lights

### Options

- Utility Cabinet
- Electrical Controls
- Front Perforated Supply Plenum
- Fully Integrated Self Cleaning System
- CORE Fire Suppression
- Integral Clearance to Combustibles System
- ETL Listed Exhaust Fire Damper
- Enclosure Panels to Ceiling
- Type 304 Stainless Steel Construction
  - Exposed Surfaces Only
  - 100% Construction
- High Velocity Cartridge Filters
  - Stainless Steel Baffle Type
  - Captrate Combo & Solo Filters
  - High Efficiency Stainless Steel Baffle
- Lighting
  - Recessed Incandescent
  - Recessed Fluorescent
  - Compact Fluorescent
  - Recessed LED
  - Halogen
- Roof Top Package

### Performance Data

Max Avg Cooking Surface Temp (°F) - Cooking Surface	Configuration	Min. Exhaust CFM/Ft.	Recommended Duct Sizing
400°F - Ovens, Steamers, Kettles, Open-Burner Ranges, Griddles, Fryers	Single Wall Hood	228	Exhaust - Based on 1500 FPM
	2 Wall Hoods Back-to-Back in an Island Configuration	456	
600°F - Gas Charbroilers, Electric Charbroilers	Single Wall Hood	294	
	2 Wall Hoods Back-to-Back in an Island Configuration	588	

- Separate Exhaust and/or Make-Up Air Fans
- Heated Make-Up Air Units
  - Direct Gas Fired Heated Make-Up Air Fans
  - Indirect Gas Fired Heated Make-Up Air Units
  - Electric Heated Make-Up Air Units
- Face Mounted Controls

### Specifications

**Description** The model SND-2 is a Type I wall mounted or double island, exhaust canopy used for collection and removal of grease-laden vapors and smoke over all types of restaurant equipment. The hood shall provide flexibility in designing kitchen ventilation equipment and shall be tested and listed for use over 400°F light/medium duty cooking surfaces and 600°F heavy duty cooking surfaces.

**Construction** The hood shall be constructed of type 430 stainless steel with #3 or #4 polish where exposed. All seams shall be welded or in conformance with UL 710 Standards. Unexposed surfaces shall be constructed of aluminized steel. Individual component construction shall be determined by manufacturer and ETL. Construction shall be dependent on the structural application to minimize distortion and other defects. All seams, joints and penetrations of the hood where grease-laden vapors and exhaust gases are present must be liquid-tight, continuous weld in accordance with NFPA 96.

### The hood shall be constructed to include:

- A double wall insulated front to eliminate condensation and increase rigidity.
- An integral front baffle to direct grease-laden vapors toward the exhaust filter bank.
- Removable grease cup to facilitate cleaning
- A built-in wiring chase for electrical controls on the front face of the hood designed to avoid penetration of the capture area and eliminate the need for an external chaseway.
- ETL incandescent light fixtures and globes, allowing up to a 100 watt standard light bulb, installed and pre-wired to a junction box and installed with a maximum of 3'-6" spacing on center.
- Exhaust duct collar 4" high with 1" flange.
- A minimum of 4 connections for hanger rods. Corner hanging angles have a 5/8" x 1-1/2" slot pre-punched at the factory, allowing hanging rods to be used for quick and safe installation.
- UL Classified stainless steel baffle filters, with size and quantity determined by the hood's dimensional parameters, but extending the full length of the hood with filler panels not to exceed 6".

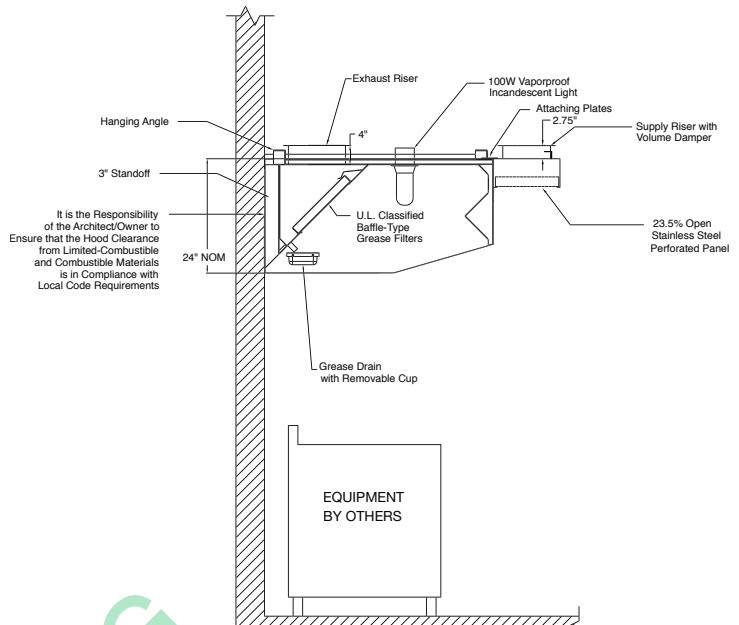
### Certifications

The SND-2 Model has been certified by ITS. This certification mark indicates that the product has been tested to and has met the minimum requirements of a widely recognized (consensus) U.S. and Canadian products safety standard, that the manufacturing site has been audited, and that the applicant has agreed to a program of periodic factory follow-up inspections to verify continued performance.



Models SND-2 are ETL Listed under file number 3054804-001 and complies with UL710, ULC710 and ULC-S646 Standards.

### Sectional View SND-2 With PSP



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# SND-2 With AC-PSP & PSP Accessory

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- Front Make-Up Air (PSP Accessory) Featuring
  - Provides up to 80% Make-up Air
  - Low Discharge Velocities
  - Directs Make-up Air Into Hood’s Capture Area
  - Evenly distributes make-up air along the length of the hood
  - Stainless steel construction to match the ventilation hood
- Front Make-Up Air (AC-PSP Accessory) Featuring
  - Provides up to 80% Make-up Air
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  - Make-up plenum is located nearest the hood; the air conditioned plenum is away from the hood

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- Utility Cabinet
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- Removable grease cup to facilitate cleaning
- A built-in wiring chase for electrical controls on the front face of the hood designed to avoid penetration of the capture area and eliminate the need for an external chaseway.
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- UL Classified stainless steel baffle filters, with size and quantity determined by the hood's dimensional parameters, but extending the full length of the hood with filler panels not to exceed 6".

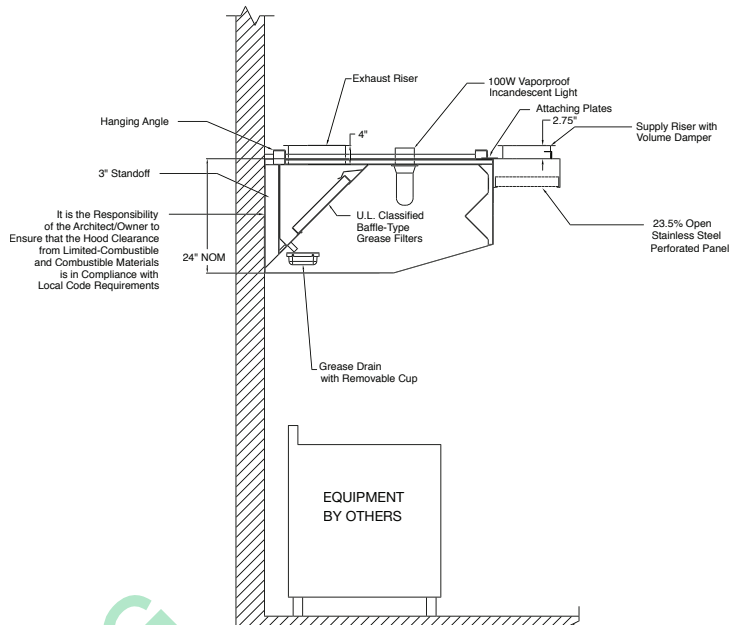
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Models SND-2 are ETL Listed under file number 3054804-001 and complies with UL710, ULC710 and ULC-S646 Standards.

## Sectional View SND-2 With PSP



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# CAPTIVE AIRE

www.captiveaire.com

## Blue Ridge

601 S Peters Rd #12, Knoxville, TN, 37922 PHONE: (865) 278-8089 FAX: (919) 227-5993 EMAIL: reg16@captiveaire.com



- #47---Refer to CaptiveAire Plans
- #48---Refer to CaptiveAire Plans
- #49---Refer to CaptiveAire Plans
- #50---Refer to CaptiveAire Plans
- #60---Refer to CaptiveAire Plans
- #61---Refer to CaptiveAire Plans

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- #61---Refer to CaptiveAire Plans

## ANGELO PO – TBFXA610



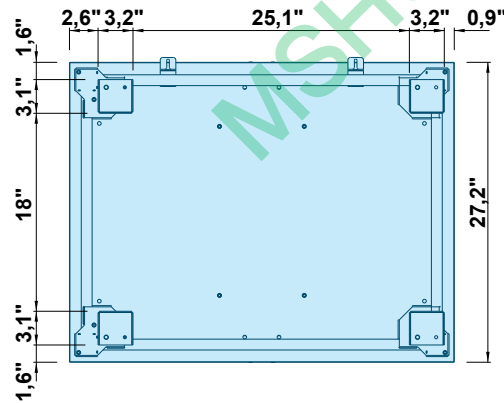
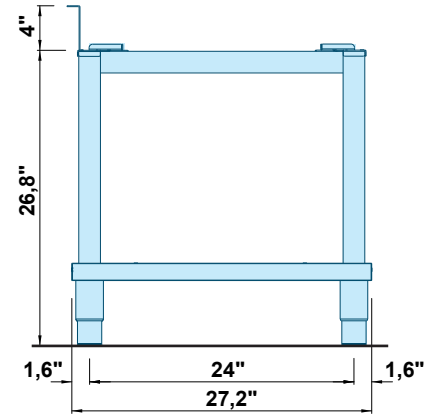
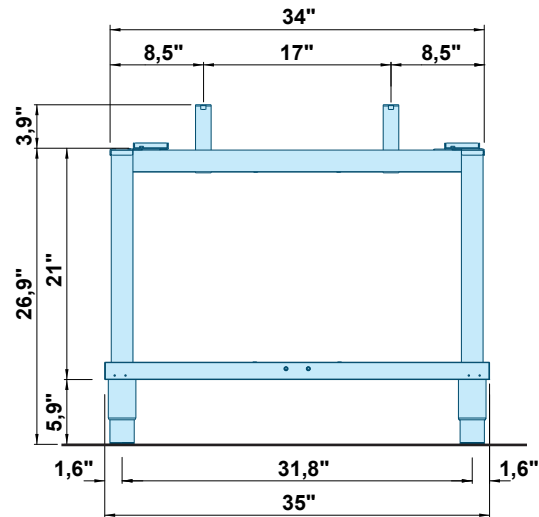
### OPEN STAND FOR OVENS FX61 - FX101

AISI 304 stainless steel structure with undershelf and height-adjustable feet. For a (18) 12"X20" Hotel Pan Capacity please add accessory TBFXA61V. Optional: KRTB610 wheels; KSTBFX space-saving tanks kit for detergent and brightener; KASX seismic feet kit, CPTX3 drawer for two tanks.

Net Dimensions WxDxH	34.96"x27.24"x26.9" (88.8x69.2x68.3 cm)
Shipping Dimensions WxDxH	35.5"x31.5"x33.5" (90x80x85 cm)

Call Angelo Po America customer care or technical service if there is any further clarification required.

ANGELO PO AMERICA - 2920 TURNPIKE DRIVE HATBORO, PA 19040 - 1-888-OVENS4



Progetto - Lay Out - Projet - Entwurf - Proyecto	Area - Area - Area - Zone - Area	Posizione - Item - Position - Position - Posiccion
Offerta - Offer - Offre - Angebot - Oferta	Area - Area - Area - Zone - Area	Posizione - Item - Position - Position - Posiccion

## COMBICARE All-In-One™ - COMBINATION OVEN/STEAMER



### ANGELO PO – FX101G3 Combistar™ / COMBICARE All-In-One™ Combi oven, Natural Gas, 71,000 Btu's, 120v/1 phase/60 Hz, Boilerless (10) 12"X20" Hotel Pan Capacity.

Programmable controls with touch display, 150 cooking programs with 18 steps each, 76 program automatic clever cooking icon files, Favorites menu, USB interface, AISI 316L marine grade stainless steel cavity, EHO ergonomic hands-free door handle, DCR humidity control and management sensor, auto-reverse 5-speed fan and 1 static mode, PDP progressive density 5 point multi-sensor probe, TAS fully automatic self-cleaning washing system, ADC patented drain cleaning system, WDC descale warning indicator, APM automatic power management, MCF steam cloud escape reduction, user manual onboard icon, RDC & EVOS boilerless and efficient steam generation system, EVC color graphic shatterproof control display panel, EASYSTAR film & video capability, Eco Function to reduce energy and water consumption, special cooking techniques programs: Holding, Delta T, Low Temperature Cooking, Rethermalization, HACCP Control Management, Hot and Cold Smoking, Vacuum Cooking, Drying and Advanced Cook & Chill Interface Technology.

- Convection Heat: 50°F↔572°F (10°C ↔ 300°C) - 0% ↔ 100% Humidity
- Steam: 86°F↔257°F (30°C ↔ 125°C)
- Combination: 86°F↔482°F (30°C ↔ 250°C) - 0% ↔ 90% Humidity

**COMBICARE All-In-One™ Package includes: certified installation (refer to installation criteria), water quality analysis test kit, reverse osmosis water treatment system, preventive maintenance program (one authorized service agent technical diagnostic review for each year of warranty), cleaning chemicals (one 10-liter container of detergent, and one 10-liter container of brightener), chef training, free freight within the U.S. contiguous states.**

COMBICARE All-In-One™ PACKAGE WARRANTY: 3-year parts and labor

**Optional "FMSX" Smoker.** An external independent accessory, positioned on the top of the oven, powered by a 120v standard outlet plug. The FMSX smoker, working in concert with the FX Combistar combi oven, allows for smoking of any product, in hot or cold condition, without taking up space within the combi oven cooking cavity.

**Optional "FMP" Pasteurization Kit.** Easy, safe and consistent quality in food pasteurization, thanks to the management of the thermal cycle realized by direct use of the cooking core probe.

Model	FX101G3 Combistar™
Description	COMBICARE All-in-One™ Combi oven, Natural Gas, 71,000 Btu's, 120v/1phase/60 Hz, Boilerless (10) 12"X20" Hotel Pan Capacity
Maximum Exterior Dimensions WxDxH	36-7/32" x 35-15/32" x 40-35/64" (920 x 901 x 1030 mm)
Minimum Exterior Dimensions WxDxH	36-7/32" x 30-9/16" x 34-1/2"+{4" feet} (920 x 776 x 875+{101,6 feet} mm)
Interior Dimensions WxDxH	25-25/64" x 25-19/32" x 29-23/32" (645 x 650 x 755 mm)
Net Weight	374 lb (170 Kg)
Shipping Weight	401 lb (182Kg)
Crate Dimensions WxDxH	39-49/64" x 37-63/64" x 49-29/64" (1010 x 965 x 1256 mm)
Full size (20"x12"x2-1/2") pan Capacity	ten (10)
1/1 GN (530x325x65mm) pan Capacity	ten (10)
Half size sheet (18"x13"x1") pan Capacity	ten (10) on wire shelves only (additional wire shelves required for maximum capacity)
2/1 GN (650x530x65mm) pan Capacity	-
Pan Module Distance	2-19/32" (66 mm)
Product Capacity	107 Quarts (101 l) - 127 lb (58 Kg) Max
Gas Power	71,000 BTU (20,8kW) Nat and LPG
Max Connected Pressure NG	10.5" WC
Min Connected Pressure NG	3.5" WC
Max Connected Pressure LPG	13" WC
Min Connected Pressure LPG	8" WC
Hook Up	3/4" NPT
Notes	All ovens can be converted between NG and LPG in the field
Electric Power	0,828 Kw
Voltage	120V
Phase	1 ph N
Amperes	6,9 A
Cycle/Hz	60 Hz
AWG	AWG12
Notes	Oven cannot work on any GFI outlet or breaker
WATER INLET (Drinking, Cold Water) for steam production	Inlet: 3/4" - Line Pressure: 30 to 60 psi (2 to 4 bar)
Required Chlorine	< 0,1 ppm (mg/l)
Required Chlorides	< 30 ppm (mg/l)
Required Sulphates	< 30 ppm (mg/l)
Recommended Iron	< 0,1 ppm (mg/l)
Recommended Copper	< 0,05ppm (mg/l)
Recommended Manganese	< 0,05ppm(mg/l)
Hardness	3 to 9°f (1,5 to 5 °d; 2,1 to 6,3 °e; 30 to 90 ppm)
Langelier Index	> 0,5
TDS	40 to 150 ppm
Flow Rate	: 4,6 Gallons/h
PH	7 to 8,5
WATER OUTLET	1-1/4" Drain with Air Gap
INSTALLATION REQUIREMENTS	Hood Installation is Required for Cooking Smoke
	The Oven Must Be Installed Level
	Install Water Supply Shut-Off Valve and Back-Flow Preventer
CLEARANCE REQUIREMENTS	Left side of equipment: 20" from heat source and 19" recommended for service access. Minimum clearance 6-1/2" - When left side clearance is less than 20" from a heat source, please inquire about a Angelo Po heat shield accessory.
	Right: Min. clearance 3-5/64"
	Top: Min. clearance 12"
	Bottom: Min. clearance 4" (also in the Counter Top installations)
	Back: 20" from heat cooking equipment (oven in the middle of the room) - Min. clearance 4"



Staking Solutions	FX101+FX61
(Max. Ext. Dimensions WxDxH)	36-7/32" x 37-1/64" x 72-1/4" (920 x 940 x 1835 mm)

It is highly recommended that the Angelo Po reverse osmosis water treatment systems (APWT100-CL), as well as Angelo Po brand cleaning chemicals (CL55XL detergent and BR55XL brightener) be used and incorporated into all Angelo Po Combistar combi oven installations.

It is the sole responsibility of the owner / operator / purchaser of the Angelo Po equipment, to verify that the incoming water supply is comprehensively tested to meet the Angelo Po water compliance standards, published in this document.

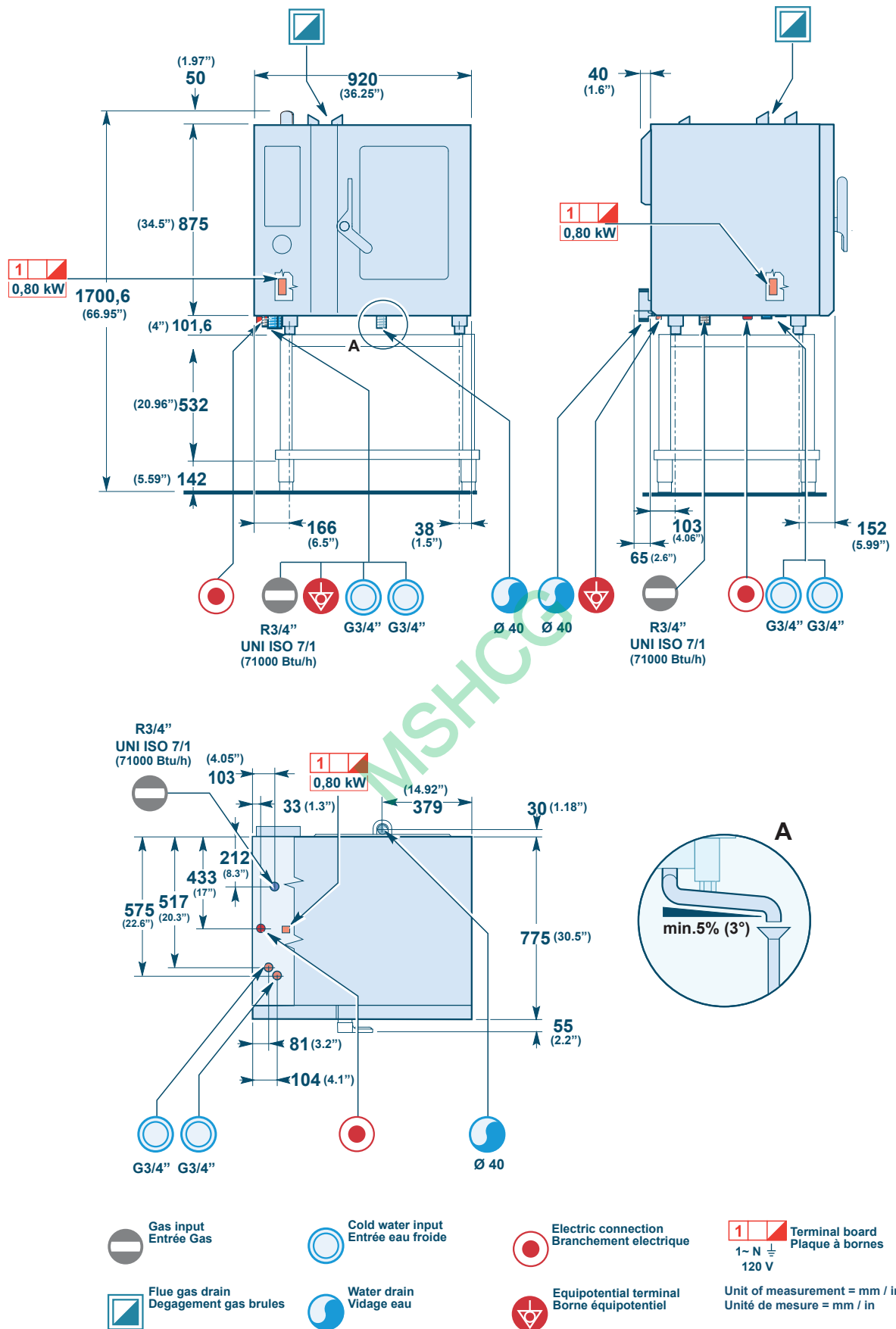
Non-compliance with the Angelo Po water standards noted herein could potentially damage the equipment and/or VOID the original manufacturer's standard warranty.

Call Angelo Po America customer care or technical service if there is any further clarification required.

ANGELO PO AMERICA - 2920 TURNPIKE DRIVE HATBORO, PA 19040 - 1-888-OVENS4U



# FX101G3







## COOK & HOLD CABINET Model CH1600U

Cook to Time or Product Temperature



CH1600U

CH1600U  
Front ViewCH1600U  
Top ViewCH1600U  
Side View

Carter-Hoffmann CAD Drawing Scale: 1/4" = 1'

Model Number	Capacity* 12"x20"x5" GN 1/1 Pans	Approximate Meat Capacity	Spacing		Inside Working Height		Overall Dimensions			Caster Diameter	Shipping Weight					
			in	mm	in	mm	Height in	Depth in	Width in		lbs	kg				
CH1600U	16	240 lbs	2 <sup>3</sup> / <sub>4</sub>	70	22 <sup>5</sup> / <sub>8</sub> **	575	76 <sup>3</sup> / <sub>8</sub>	1940	32 <sup>5</sup> / <sub>8</sub>	829	29 <sup>3</sup> / <sub>8</sub>	746	5	127	420	190

\*CH1600U accommodates (16) 12"x20"x2.5" and GN1/1 pans, side-loaded (2 per shelf), or (8) GN2/1 pans per cavity; will accommodate (8) 18"x26", end-loaded, on optional wire shelves, per cavity.

**CONSTRUCTION...** Completely welded cabinet construction with outer cabinet welded to base. All seams turned in to eliminate raw edges. Gray vinyl bumper set in channel on each side of cabinet.

**CABINET MATERIAL...** All stainless steel double-wall, insulated construction.

**BASE FRAME...** stainless steel full depth caster bolsters with stainless steel perimeter supports welded to bolsters.

**CASTERS/FEET...** 5" casters with rubber tread. Double ball bearing swivel. ZerK grease fittings. Plate mounted and bolted to base. Front casters fitted with brakes.

**INSULATION...** 2" thick high density wrap-around fiberglass insulation.

**DOORS...** Welded double panel stainless steel door; turned-in seam pocket construction. Filled with 2" thick high density fiberglass insulation. Field reversible. One door for each cavity.

**HINGES...** Adjustable self-closing, edgemount hinges with chrome plate finish.

**GASKET...** High temperature silicone gasket mounted to cabinet.

**LATCH...** Heavy-duty edgemount latch with magnetic catch.

**TRAY RACK ASSEMBLIES...** Removable stainless steel tray racks with solid stainless steel angle slides. Slides welded to assemblies and spaced on 2.75" centers. Can accommodate up to (8) 18"x26" sheet pans per cavity on optional wire shelves.

**THERMOMETER...** Digital thermometer with remote sensing bulb for cabinet operating temperature. Digital temperature displays in temperature window of current mode (cook or hold) by pushing "view actual temp" key.

**CONTROLS...** User-friendly digital controls with digital readout displays for settings. Dual cavity with dual controls. Includes meat probe. Cook to time or product temperature. Master on/off switch with "start/cancel" button for cook cycles. Touchpad to view actual temperature. Separate controls & displays for cook temperature and hold temperature. Eighteen hour digital timer display shows cook temperature in count down mode during cook cycle. During hold cycle, automatically switches to count up.

**HEATING SYSTEM...** Top mounted blower heater for even heat distribution. High impedance protected, internally cooled fan

motor. Full range thermostat and on/off switch with power indicating light and "start/cancel" button.

**HEAT DUCT SYSTEM...** Side-mounted precision engineered interior heat duct system to provide gentle heat circulation throughout cabinet to caramelize roasts for less food shrinkage and more attractive appearance.

**ELECTRICAL CHARACTERISTICS...** Operates on 240 volts, 6200 watts, 25.8 amps, 60 Hz, single phase. NEMA 6-30P plug.

**PERFORMANCE...** Capable of slow cooking to a maximum temperature of 325°F (161°C). Capable of holding at a range of 100°F (38°C) to 200°F (93°C). Preheat to 160°F (71°C) in approximately 25 minutes. Temperature variance less than 5°F (3°C), top to bottom.

#### ACCESSORIES/OPTIONS...

- Menu card holder
- Tamper resistant fasteners
- Locking door latch
- 208 volt operation
- 230 volt CE operation
- Wire shelves to accommodate 18"x26" pans

Specifications subject to change through product improvement & innovation.

### CARTER-HOFFMANN

1551 McCormick Ave., Mundelein, IL 60060  
(847) 362-5500 • (800) 323-9793 • Fax (847) 367-8981  
[www.carter-hoffmann.com](http://www.carter-hoffmann.com)



# FEATURES & BENEFITS

1551 McCormick Avenue, Mundelein, Illinois 60060  
 Tel. (847)362-5500 • (800)323-9793 • Fax (847)367-8981  
[www.carter-hoffmann.com](http://www.carter-hoffmann.com)



## COOK & HOLD CABINET Model CH1600U

*Since 1947, Foodservice Equipment That Delivers!*

**CARAMELIZATION IS KEY...** Precision engineered heating system with gentle, consistent blower heat caramelizes roasts and seals in juices for minimal shrinkage and more portions. And it produces a more natural, attractive product with superior taste.

**CONVECTION HEATING SYSTEM...** Fully contained heater with forced air cooking. Side air ducts for optimal air flow and even circulation throughout cabinet.

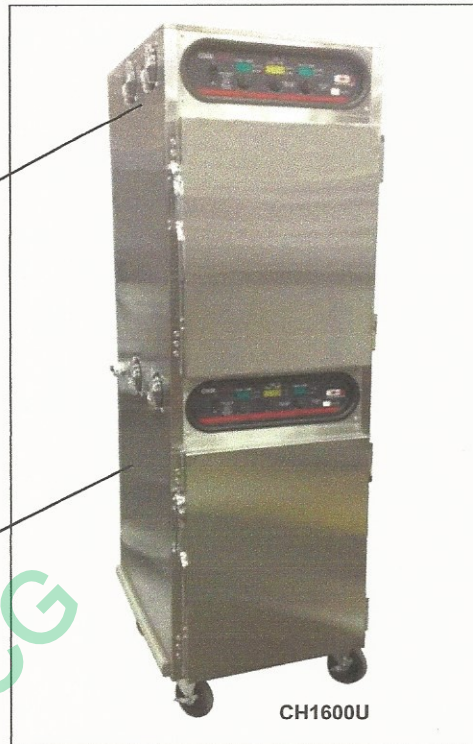
**VENTILATION HOOD NOT REQUIRED...** Because these cabinets cook at a lower temperature than standard convection ovens, a hood is not needed (check local codes).

**ALL STAINLESS STEEL CONSTRUCTION...** Welded, turned-in seam construction for long durable life and ease of cleaning and safety.



**EASY-TO-USE DIGITAL CONTROLS...** Control cooking and holding with separate dial controls and digital display. Cook according to time or according to product temperature with meat probe. Temperature range of 100°F to 200°F for hold cycle and 100°F to 325°F for cook cycle. Eighteen hour timer counts down in cook cycle. When cook cycle is over, cabinet automatically switches to hold cycle and timer counts up. Displays in Fahrenheit or Celcius scale.

**MEAT  
 PROBE  
 INCLUDED**



**UNIVERSAL PAN SLIDES...** Accommodates 12"x20"x2.5", GN 1/1 and GN 2/1 pans. Will accommodate 18"x26" sheet pans on optional wire shelves.





# ULTIMATE RESTAURANT RANGE 72" SERIES

## Standard Features

- Commercial gas range 73" wide with a 37" high cooking top
- 4" Stainless steel front rail, stainless steel front and sides
- (2) Front located, manual, gas shut-off valves for each side of the range
- One year No Quibble, 24/7 parts and labor warranty
- Factory installed Regulator
- Four (4) removable, cast iron grate tops (rear holds up to 14" stock pot)
- Standing pilot for open top burners
- Battery spark ignition for oven bases

### Optional 33K Non-clog Burners (Burner Option 1)

- (10) patented, one piece, lifetime clog free, cast iron burners
- 33,000 BTU NAT

### Optional 5 Burner configuration (Burner Option 5)

- Combine (2) Pyromax burners in the rear with (3) standard 33K burners in the front

### Optional Griddle Top (L or R)

- 36" Available
- 1/2" thick cold rolled steel griddle plate
- Manual or thermostatically controlled

### Optional Charbroiler (X or R)

- 36" Available
- Removable, cast iron grates

Refer to AutoQuotes for list pricing.



(4721DD shown with optional casters)

Job

Item#

## CONSTRUCTION SPECIFICATIONS

**Exterior Finish:** Stainless steel front, sides and shelf standard.

**RangeTop:** 27" deep cooking surface. Center-to-center measurements between burners not less than 12", side-to-side or front-to-back. Two (2) removable one piece drip trays are provided under burners to catch grease drippings.

**Flue Riser:** 22.5" flue riser standard with heavy duty shelf. Optional 10" and 5" flue riser available without shelf.

**Oven Door:** Spring assisted door.

**Oven Interior:** Double sided, full porcelain enamel oven cavity for superior cleanability and corrosion protection. Covered corners for easy cleaning and enhanced airflow eliminating hot/cold spots.

**Legs:** (6) total 6" stainless steel adjustable legs standard (casters optional)

**Pressure Regulator:** Factory installed.

### Standard Oven Models (D)

45,000 BTU NAT oven with standing pilot and thermostat range of 175°F to 550°F (79°C to 288°C). Porcelain enamel interior measuring 14" high x 26" wide x 26.5" deep. Full sized pans fit both ways. One rack with two position side rails.

### Convection Oven Models (A):

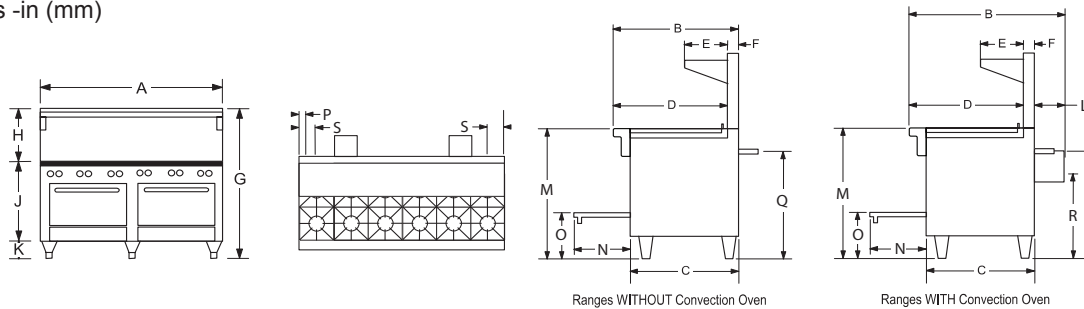
32,000 BTU NAT convection oven with standing pilot and thermostat range of 175°F to 550°F (79°C to 288°C). Porcelain enamel interior measuring 14" high x 26" wide x 24" deep. Three racks with five position side rails. 1/2 hp, 1710 rpm, 60 cycle, 115V AC, high efficiency, permanent split phase motor with permanent lubricated ball bearings, overload protection and Class "B" insulation. On/Off switch to allow CO base to operate as a standard oven.

### Available Base Combinations

AA, DD



## Dimensions -in (mm)



Ranges WITHOUT Convection Oven

Ranges WITH Convection Oven

MODELS	EXTERIOR											COOK TOP	DOOR OPENING	OVEN BOTTOM	3/4" GAS CONN.		ELECTRIC	
	WIDTH A	DEPTH B	C	D	E	F	G	H	J	K	L				M	N	O	P
472_DD	73" (1854)	34.00" (864)	29.75" (756)	31.00" (787)	10.00" (254)	2.75" (70)	59.50" (1511)	22.50" (572)	31.00" (787)	6.00" (152)	-	37.00" (940)	15.50" (394)	13.00" (330)	3.25" (83)	30.25" (768)	-	-
472_AA	73" (1854)	42.13" (1070)	29.75" (756)	31.00" (787)	10.00" (254)	2.75" (70)	59.50" (1511)	22.50" (572)	31.00" (787)	6.00" (152)	8.25" (210)	37.00" (940)	15.50" (394)	13.00" (330)	3.25" (83)	30.25" (768)	24.00" (610)	6.00" (152)

MODELS	OVEN INTERIOR			CRATE SIZE			CUBIC VOLUME	CRATED WEIGHT
	WIDTH	DEPTH	HEIGHT	WIDTH	DEPTH	HEIGHT		
472_DD	26.00" (660)	26.50" (673)	14.00" (356)	78" (1981)	48.00" (1219)	74.00" (1880)	160.3 cu. ft 4.54 cu.m.	1320 lbs. 600 kg.
472_AA	26.00" (660)	24.00" (610)	14.00" (356)					

## UTILITY INFORMATION

BTUs EACH BURNER	STD NON-CLOG	PYROMAX	(A) CNV OVEN PER CAVITY	(D) STD OVEN PER CAVITY	GRIDDLE 36"	CHARBROILER 36"	HOT TOP 12"	HOT TOP 24"
NAT	33K	40K	32K	45K	64K	96K	24K	48K
LP	24K	31K	30K	40K	64K	96K	24K	48K

**GAS:**

- One 3/4" female connection.
- Required minimum inlet pressure
  - Natural gas 7" W.C.
  - Propane gas 11" W.C.

**ELECTRICAL:** (for models with convection ovens)

- Standard -115/60/1 furnished with 6' cord with 3-prong plug. Total max amps 5.9 per convection oven base.
- Optional -208/60/1, 50/60/1 phase. Supply must be wired to junction box with terminal block located at rear. Total max amps 2.7

## MISCELLANEOUS

- If using Flex-Hose, the I.D. should not be smaller than 3/4" and must comply with ANSI Z 21.69
- If casters are used with flex hose, a restraining device should be used to eliminate undue strain on the flex hose
- For installation on combustible floors 6" high legs or casters are required. Minimum clearance from combustible construction is 10" on sides and rear for all units except charbroilers. Charbroiler units are for use in noncombustible locations ONLY.
- Rear clearance to noncombustible construction is 10" for charbroilers and 0" for all other tops and bases. Side clearance to noncombustible constructions is 0" on all units.
- Recommended - Install under vented hood
- Check local codes for fire, installation and sanitary regulations.
- If the unit is connected directly to the outside flue, an A.G.A approved down draft diverter must be installed at the flue outlet of the oven.
- Two speed motors are not available on Restaurant Range Convection Ovens.

**NOTICE:** Southbend has a policy of continuous product research and improvement. We reserve the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions or replacements for previously purchased equipment.

## OPTIONS AND ACCESSORIES

- 5" flue riser
- 10" Flue Riser
- 3/4" quick disconnect with flexible hose complies with ANSI Z 21.69 (specify 3ft, 4ft, 5ft)
- Hot Top plate - plate replaces 2 Open burners 1, 2 or 3
- Various salamander & cheesemelter mounts available. (salamanders and cheesemelters mounts cannot be interperped to a 72" range)
- Rear step up burners (4721AA & 4721DD ONLY)
- Flame Failure available (4721AA, 4721DD, 4721AA-3GL, 4721DD-3GL, 4721AA-3GR & 4721DD-3GR)
- Battery spark ignition for open tops, charbroilers, griddles and hot tops.
- Extra Oven Racks
- Casters-all swivel-front with locks

**INTENDED FOR COMMERCIAL USE ONLY.**

**NOT FOR HOUSEHOLD USE.**

1100 Old Honeycutt Road, Fuquay-Varina, NC 27526  
(919) 762-1000 www.southbendnc.com



JOB NAME:

QUANTITY:

ITEM NO.:

PRODUCT NAME:

**POT FILLER, HOSE STYLE, DECK MOUNT**

\_\_\_\_\_ SPECIAL CONFIGURATION  
(CHECK BASE MODEL AND OPTIONS)

MODEL:

2040

OPTIONS OR MODIFICATIONS:

- SUPPLY LINES (24" OR 36") CIRCLE LENGTH
- ADD-ON FAUCET (6",8",10",12",14",16") CIRCLE LENGTH
- IN-LINE DUAL CHECK VALVE
- VANDAL RESISTANT KIT
- HANDLES (CROSS OR WRIST) CIRCLE STYLE
- PIPE HOOK
- OTHER \_\_\_\_\_

FEATURES:

**CONTROL VALVE**

- \* SINGLE DECK
- \* TEMPERATURE CONTROL VALVE WITH INTERNAL SPRING LOADED CHECK VALVES
- \* STEM - LEFT HAND
- \* HOT & COLD INDEX BUTTONS
- \* SWIVELLING SEAT DISKS
- \* STAINLESS STEEL SEATS
- \* STAINLESS STEEL SEAT SCREWS
- \* STAINLESS STEEL HANDLE SCREWS

**HOSE**

- \* 60" LENGTH
- \* STAINLESS STEEL END FITTINGS
- \* STAINLESS STEEL EXTERNAL JACKET
- \* BRAIDED USDA APPROVED FOODGRADE INTERNAL HOSE
- \* REPAIRABLE IN FIELD WITH SIMPLE TOOLS

**POT FILLER VALVE**

- \* NON SCRATCHING/ MARRING TUBE
- \* 5.00 GPM AT 80 PSI
- \* AERATED STREAM

**SWIVEL ELBOW**

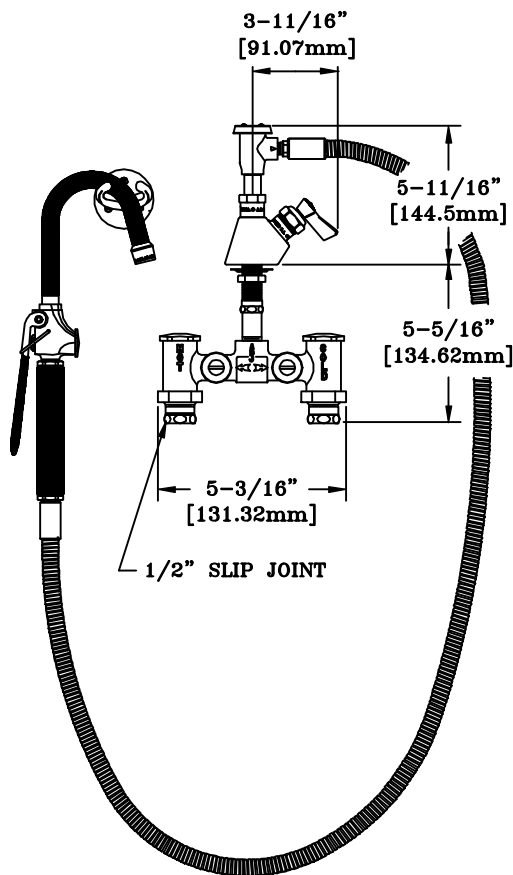
- \* 360° TURNING RADIUS
- \* ATMOSPHERIC VACUUM BREAKER

**SYSTEM LIMITS**

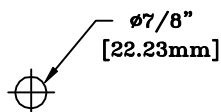
- \* TEMP: 40°F MIN. TO 140°F MAX.
- \* PRESSURE 200 PSI MAX. STATIC

**SHIPPING WEIGHT**

- \* 8.0 LBS



ROUGH-IN:



ANSI/A112.18.1M

FISHER MANUFACTURING COMPANY  
1900 SOUTH "O" STREET, TULARE, CALIFORNIA 93274  
MAILING ADDRESS: P.O. BOX 60, TULARE, CALIFORNIA 93275  
PHONE: (800) 421-6162 FAX: (800) 832-8238  
M A D E I N U. S. A.



## Accu-STEAM™ GRIDDLE GG SERIES

Gas/Steam-Heated,  
Stand-Mounted Griddle

Project: \_\_\_\_\_ Location: \_\_\_\_\_ Item #: \_\_\_\_\_ Quantity: \_\_\_\_\_

### Short Specification

Griddle shall be an Energy Star compliant gas-heated unit, with a hermetically-sealed vacuum chamber that produces steam that heats the 8-gauge stainless steel griddle plate. Efficient steam heat transfer provides 200–400°F (93–204°C) operating temperature range and uniform griddle surface temperatures of  $\pm 5^\circ\text{F}$  ( $\pm 3^\circ\text{C}$ ). Griddle fabricated from cold-rolled stainless steel with 4.5" high back splash, sides that taper from 4.5" to 1.7", a 4" wide by 1" deep full front grease trough and 1½–2 gallon grease drawer. Griddle to be mounted on heavy duty stainless steel stand with one undershelf and casters. Unit to be NSF and UL listed and manufactured in the USA.

### Construction Features

- Cold-rolled and annealed stainless steel griddle plate with polished stainless steel body and stand
- 8 gauge griddle plate
- 4" wide by 1" deep full front grease trough
- 2" x 4" drop chute to 1½–2 gallon capacity grease pan inside enclosed compartment
- Heavy duty stainless steel stand with bottom shelf

### Performance Features

- Hermetically-sealed steam chamber heats high efficiency griddle plate
- Infrared burners
- Steam transfers heat evenly to entire cooking surface with only  $\pm 5^\circ\text{F}$  ( $\pm 3^\circ\text{C}$ ) in temperature variation
- Rapid surface temperature recovery [10 seconds or less] allows turning product to same spot
- Smooth cold-rolled stainless steel griddle surface speeds and simplifies cleaning

### Standard Control Features

- Power-On switch & indicator light
- Heating indicator light
- 200–400°F (93–204°C) solid state thermostat
- Easy front service access to controls

### Cooking Capacity & Applications

Effective Cooking Area

Depth	24" Wide	36" Wide	48" Wide
29"	677 sq. in.	1017 sq. in.	1358 sq. in.
24"	558 sq. in.	838 sq. in.	1119 sq. in.

Griddle Applications include:

- Pancakes, Eggs, Sausage, French Toast
- Burgers, Grilled Onions, Toasted Buns
- Grilled Cheese, Sandwiches
- Fried Potatoes, Fish, Chicken Breasts, Philly Steaks, Liver and MORE

### Environmental Approvals & Programs



### Other Approvals



### Options & Accessories

- "U" Channel for connecting 2 griddles
- Front mounted prep shelf—8" wide stainless steel
- Condiment Board
- Control Guards
- Maritime Package (call for details)
- Correction Package (call for details)
- Chain Package (call for details)
- Quick disconnect with AGA approved restraint cable
- Propane available (call for details)

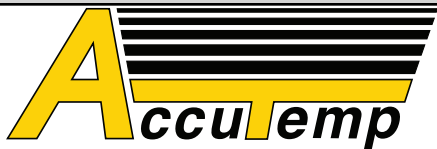


GGF-A36 Accu-STEAM™  
Stand-Mounted Griddle  
(also available with bullet  
or flanged feet)

MM5209-0912

AccuTemp Products, Inc.

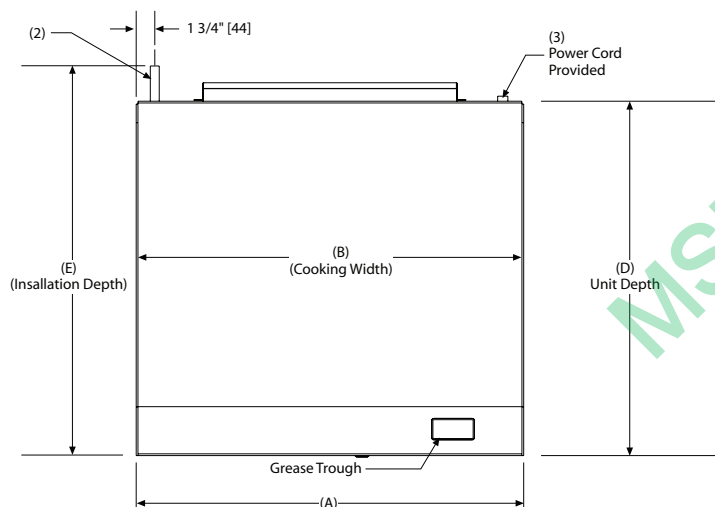
8415 North Clinton Park • Fort Wayne, IN 46825 • 800-210-5907 • 260-493-0415 • Fax 260-493-0318 • [accutemp.net](http://accutemp.net)



## Accu-STEAM™ GRIDDLE GG SERIES

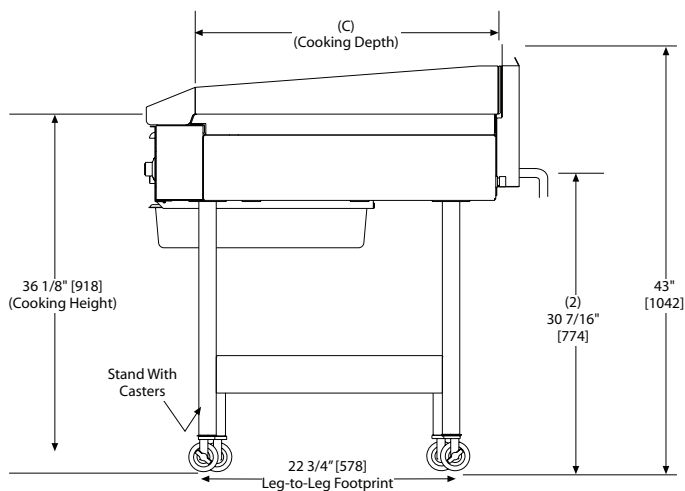
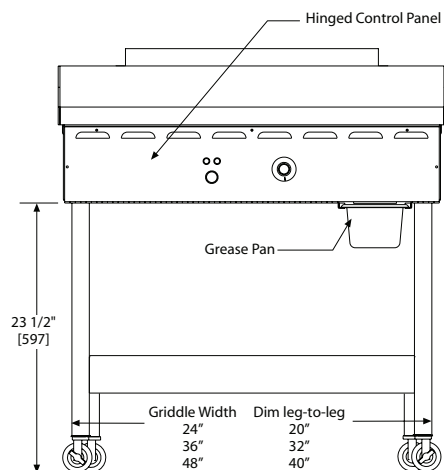
Gas/Steam-Heated,  
Stand-Mounted Griddle

Accu-Steam Gas Griddle Specifications						
Model #	GGF1201A2400-S2	GGF1201B2400-S2	GGF1201A3600-S2	GGF1201B3600-S2	GGF1201A4800-S2	GGF1201B4800-S2
BTU Firing Rate per Hour	50,000	50,000	70,000	70,000	96,000	96,000
Unit Width (A)	24.25 [616]	24.25 [616]	36.25 [921]	36.25 [921]	48.25 [1226]	48.25 [1226]
Unit Depth (D)	33.125 [841]	28.125 [714]	33.125 [841]	28.125 [714]	33.125 [841]	28.125 [714]
Cooking Surface Width (B)	23.875 [606]	23.875 [606]	35.875 [911]	35.875 [911]	47.875 [1216]	47.875 [1216]
Cooking Surface Depth (C)	28.375 [721]	23.375 [594]	28.375 [721]	23.375 [594]	28.375 [721]	23.375 [594]
Installation Depth (E)	38.0 [965]	33.5 [851]	38.0 [965]	33.5 [851]	38.0 [965]	33.5 [851]
Depth to Back Leg (F)	3.188 [81]	5.688 [144]	3.188 [81]	5.688 [144]	3.188 [81]	5.688 [144]
Effective Cooking Area	677 sq. in.	558 sq. in.	1017 sq. in.	838 sq. in.	1358 sq. in.	1119 sq. in.
Grease Pan Capacity	2 gal.	2 gal.	2 gal.	2 gal.	2 gal.	2 gal.
NEMA Plug	5-15	5-15	5-15	5-15	5-15	5-15



### Notes:

- 1.) Dimensions in brackets [ ] are metric.
- 2.) 3/4" NPT gas connection, 90° elbow provided.
- 3.) 4' 120 volt power cord.



MM5209-0912

AccuTemp Products, Inc.

8415 North Clinton Park • Fort Wayne, IN 46825 • 800-210-5907 • 260-493-0415 • Fax 260-493-0318 • [accutemp.net](http://accutemp.net)

PROJECT	QUANTITY	ITEM NO
---------	----------	---------

# Large capacity open fryers

MODEL **OFE-341** electric  
**OFG-341** gas



Large capacity open fryer, model OFE-341.

## General Information

The 340 series large capacity open fryers from Henny Penny are designed to offer maximum frying surface area within a reasonable footprint. These high volume open fryers feature a larger, shallower fry well that produces more consistent frying results with items that float when cooking.

Henny Penny's unique high-efficiency heat-exchange design produces extremely fast temperature recovery—typically in seconds—without requiring excess oil to retain heat. Fast recovery speeds up production, saves energy, and preserves frying oil quality by reducing temperature fluctuations.

Built-in filtration system filters hot frying oil in under 4 minutes, with no separate pumps or pans required.

Hot filtered oil returns directly to the fry well. Quick, easy and frequent filtering extends shortening life and can result in significant savings in time and direct shortening costs.

The OFE/OFG-341 open fryer features Henny Penny's heavy-duty stainless steel rectangular fry pot promotes fast, even cooking and comes with a 7-year warranty—the best in the business.

The **COMPUTRON™ 8000** control provides fully automatic, programmable operation, as well as energy-saving, filtration and cook management features.

The **COMPUTRON™ 1000** control offers programmability in a simple, easy to use digital control panel with LED display.

## Standard Features

- Stainless steel construction for easy-cleaning and long life.
- Heavy-duty stainless steel rectangular fry pot with 7-year warranty.
- Large fry well offers greater surface area and promotes more even cooking.
- Specially designed “beach” accommodates oil displacement when lowering basket.
- Fry pot protection system (gas.)
- Built-in filtration (additional charge)
- Easy basket set and release.
- Specially designed cold zone prevents scorching.
- 4 heavy-duty casters, 2 locking.
- **COMPUTRON™ 8000** control (additional charge.)
  - 12 programmable cook cycles
  - Melt mode
  - Idle mode
  - Load compensation
  - Proportional control
  - Optional filter prompt and customizable filter tracking
  - Clean-out mode.
  - 16-character digital display with multiple language settings.
- **COMPUTRON™ 1000** simple digital control.
  - Programmable
  - LED Time/Temp display
  - Simple UP/DOWN arrows

## Accessories shipped with unit

- Fry baskets—please select one
  - 1 full basket
  - 2 half baskets
- Basket support
- Lift tool for basket support
- Lift tool for electric elements

## Accessories and options available separately

- 3 third-size fry baskets per well
- Direct Connect shortening disposal (filtration equipped units, only)
- Shortening shuttle
- Filter rinse hose

<input type="checkbox"/> APPROVED	<input type="checkbox"/> APPROVED AS NOTED	<input type="checkbox"/> RESUBMIT
AUTHORIZED SIGNATURE		DATE

**HENNY PENNY®**  
Global Foodservice Solutions

Henny Penny Corporation  
PO Box 60 Eaton OH 45320 USA

+1 937 456.8400 800 417.8417  
+1 937 456.8434 Fax 800 417.8434 Fax

[www.hennypenny.com](http://www.hennypenny.com)

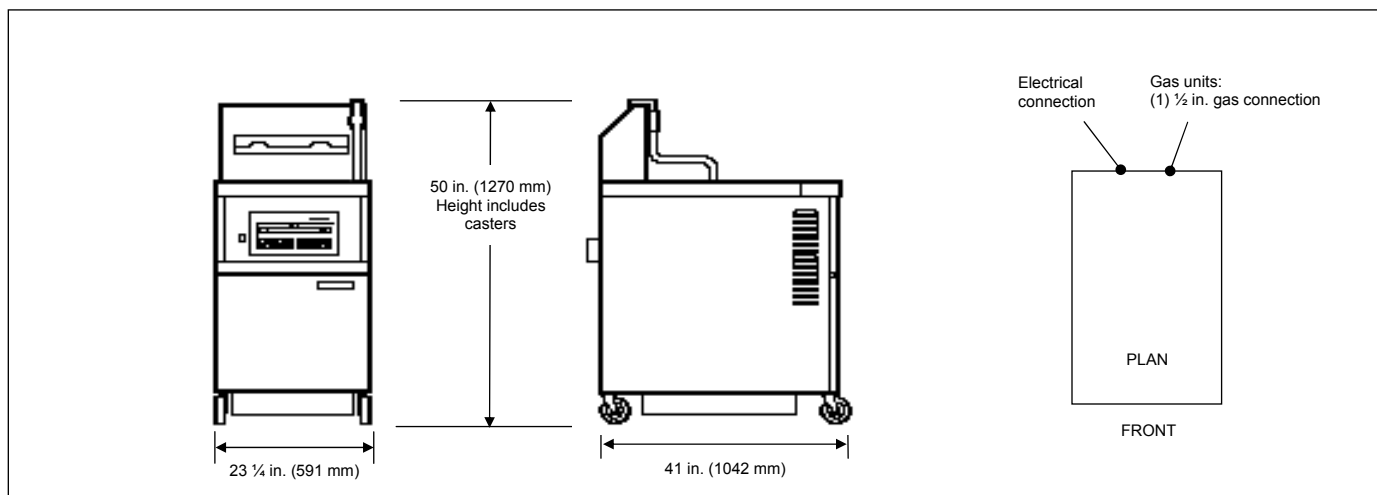


PROJECT

ITEM NO

# Large capacity open fryers

MODEL **OFE-341** electric  
**OFG-341** gas



## Dimensions

Width 23 1/4 in. (591 mm)  
Depth 41 in. (1042 mm)  
Height 50 in. (1270 mm)

## Required clearances

Sides: 6 in. (152 mm) air flow  
Back: 6 in. (152 mm) air flow, connections  
Front: 30 in. (762 mm) filter pan removal

## Crated dimensions

Length 46 in. (1169 mm)  
Depth 30 in. (762 mm)  
Height 65 1/2 in. (1664 mm)  
Volume 52.3 cu. ft. (1.48 m<sup>3</sup>)

**Net weight** N/A

## Crated weight

Electric 348 lbs. (158 kg)  
Gas 391 lbs. (177 kg)

## Heating

Electric Immersed elements, 22.0 kW  
Gas Natural or liquid petroleum  
(3) burners, 120,000 BTU/hr (35 kW)  
(1) 1/2 in. connection

## Capacity

Product 18 lbs. (8.2 kg) bone-in chicken pcs  
Oil 80 lbs. (36.0 kg) electric units  
90 lbs. (41.0 kg) gas units

## Electrical

Volts	Phase	Cycle/Hz	Watts	Amps	Wire
208	3	60	22000	61.0	3+G
240	3	60	22000	52.9	3+G
480	3	60	22000	26.5	3+G

Power cord and plug must be installed on site by a qualified electrician.

## Gas models

120	1	60	N/A	12.0	2+G
230	1	50	N/A	6.2	1NG

## Laboratory certifications



## Bidding Specifications

- Provide Henny Penny large capacity open fryer, model OFE-341 electric or model OFG-341 gas, 18 lbs. (8.2 kg) capacity per load and available built-in filtration system (additional charge.)
- Units shall incorporate either **COMPUTRON™ 1000** simple digital controls or **COMPUTRON™ 8000** control system with (additional charge.)
- Materials—cabinet, deck, exhaust stack, filter drain pan and various fittings are stainless steel. Fry pot is heavy duty stainless steel.
- Units shall incorporate high-efficiency heat-exchange design for extremely fast recovery.
- Frying well is designed for large surface frying area and incorporates a flat rim to accommodate oil displacement from load.
- Heating elements encircle the fry pot part-way up the side, and are not located at the bottom or below the pot. This design produces a “cold zone” that extends oil life.
- Unit’s controller provides for programmable or manual operation with press-key controls and LED digital display. **COMPUTRON™ 8000** control offers idle and melt modes, load compensation, filtration tracking and 7-day history.
- Units will include four heavy-duty casters, two locking.
- Units with filtration system ship with stainless steel **Max** filtration screen and 2 PHT filter envelopes. All units ship with lifting tools for basket support and electric elements, and choice of 1 full fry basket or 2 half baskets.

Continuing product improvement may subject specifications to change without notice.

**HENNY PENNY**  
Global Foodservice Solutions

[www.hennypenny.com](http://www.hennypenny.com)



## GAS CABINET BASE HYDRAULIC TILTING SKILLET



### SPECIFICATIONS:

Shall be a Southbend model \_\_\_\_\_, gas fired hydraulic tilting skillet, AGA/CGA and NSF certified. The unit shall have a spring assisted hinged stainless steel cover, complete with handle and a no drip condensate guide. The pan body shall have a sloped front, be front hinged for tilting and easy pour control and comes complete with removable pour lip strainer. The pan is formed from 10 gauge stainless steel with a #4 finish exterior and polished interior with covered corners for easy cleaning. The cooking surface shall be 5/8" thick stainless steel clad cooking plate for even heat distribution over entire cooking surface. The pan shall be mounted on a heavy duty welded angle constructed frame fitted with 6" (152 mm) stainless steel legs with adjustable bullet feet on the front and flanged, adjustable feet on the rear for securing to the floor. Enclosed with #4 finish type 304 stainless steel with removable side panels and two stainless steel front cabinet doors.

All controls are mounted in the cabinet base which include a solid state thermostat, temperature light, tilt switch, electronic ignition, tilt safety switch and hydraulic lift system powered by a 1/2 HP electric motor for smooth and precise tilting action. The high limit thermostat is located on the pan bottom. Cooking temperatures are between 100°F and 450°F (38°C and 232°C). Gas supply to the burners automatically shuts off when the pan is tilted.

MODEL	CAPACITY		
	BTU	GALLON	LITER
BGMTS-30	80,000	30	114
BGMTS-40	100,000	40	152

### OPERATION SHALL BE BY:

- Natural Gas
- Propane Gas

Gas fired skillet operating on 115 VAC, 1 Phase, 60Hz

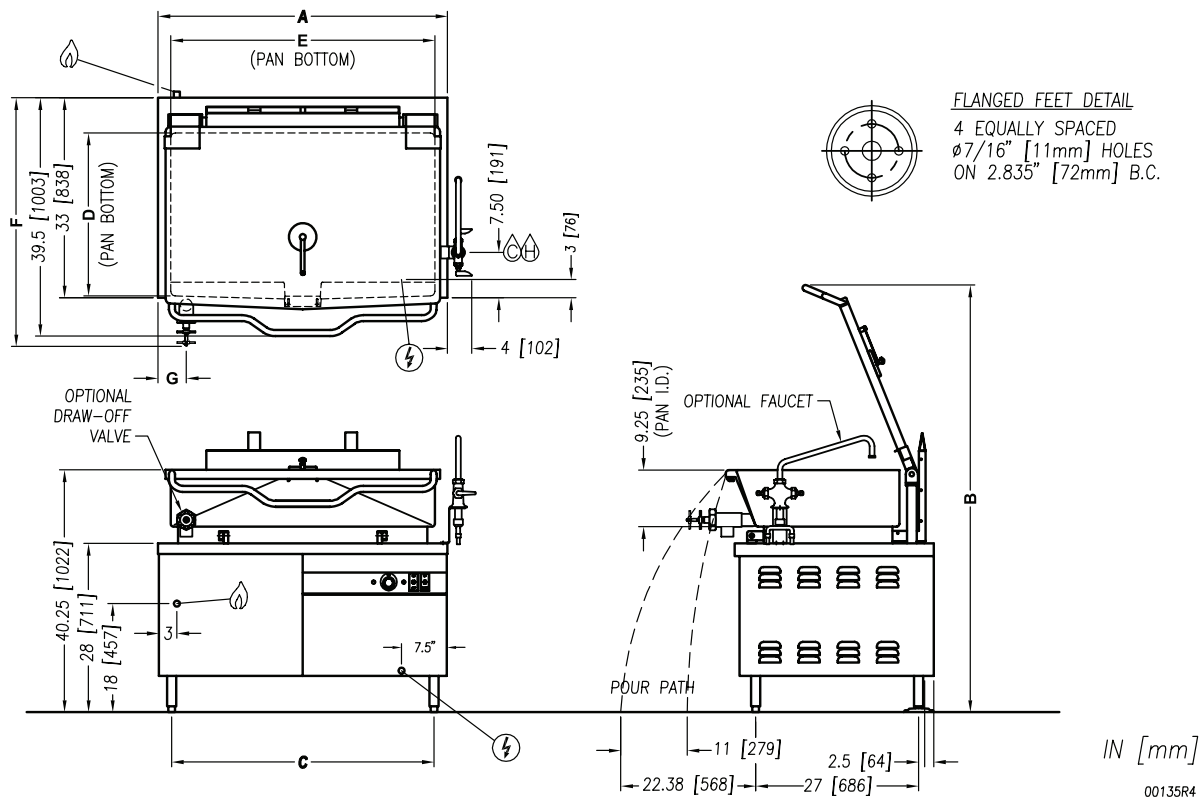
### OPTIONAL ITEMS AT EXTRA COST:

- 220 VAC, 1 phase, 50 Hz
- Etched gallon markings (GMS-30, GMS-40)
- Etched liter markings (LMS-114, LMS-152)
- 2" draw off valve with strainer, front or side mounted (TVT-2BP)
- 3" draw off valve with strainer, side mounted (TVT-3BP)
- Correctional Package

### ACCESSORIES:

- Pan carrier (PC-1)
- Pan carrier (PC-3)
- Steam pan insert (SPI-30, SPI-40)
- 12" Single pantry faucet with swing spout (SF-12)
- 12" Double pantry faucet with swing spout (DF-12)
- 3" Stainless steel faucet plumbing enclosure (3139-1)
- Single pantry faucet & bracket with 60" pot filler (SP-KF)
- Double pantry faucet & bracket with 60" pot filler (DP-KF)

 Job \_\_\_\_\_  
Item# \_\_\_\_\_


Models:  BGMTS-30  BGMTS-40

## DIMENSIONS

MODEL	CAPACITY	UNITS	A	B	C	D	E	F		G
BGMTS-30	30 Gallons (114 liters)	inches (millimeters)	36" (914 mm)	70.88" (1800 mm)	30" (762 mm)	23.5" (597 mm)	33.75" (857 mm)	Ø2	Ø3	3.75" (95 mm)
								41.13" (1045 mm)	46.75" (1187 mm)	
BGMTS-40	40 Gallons (152 liters)	inches (millimeters)	48" (1219 mm)	70.88" (1800 mm)	42" (1067 mm)	23" (584 mm)	43.75" (1111 mm)	41.63" (1057 mm)	46.13" (1172 mm)	4.75" (121 mm)

MODEL	SHIPPING WEIGHT	GAS SUPPLY				MINIMUM CLEARANCE *	
		BTU/HR	KW/HR	Supply Pipe Pressure (W.C)			
BGMTS-30	650 lbs. [295 kg]	80,000	23.4	Natural 6" - 14" (152 mm - 356 mm)	Propane 11" - 14" (279 mm - 356 mm)	Sides	3" (76 mm)
BGMTS-40	825 lbs. [374 kg]	100,000	29.3			Back	6" (152 mm)

\* For use on noncombustible floors only.

## SERVICE CONNECTIONS

- ELECTRICAL CONNECTION: Unless otherwise specified, Field Wire Electrical Connection to be 120 Volts, 60 Hz, single phase with grounding wire. 10 Amp minimum supply.
- GAS CONNECTION: Supply gas through 3/4" pipe.
- COLD WATER: 3/8" O.D. tubing to optional faucet
- HOT WATER: 3/8" O.D. tubing to optional faucet

**INTENDED FOR COMMERCIAL USE ONLY.  
NOT FOR HOUSEHOLD USE.**



1100 Old Honeycutt Road, Fuquay-Varina, NC 27526  
(919) 762-1000 www.southbendnc.com

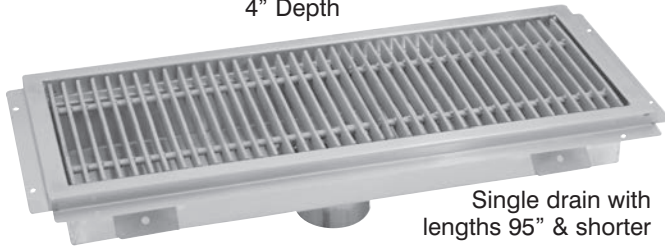


STAINLESS STEEL

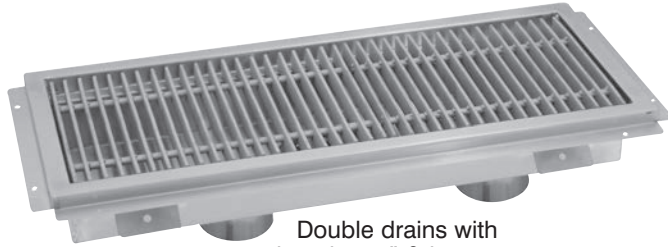
# FLOOR TROUGHS & FLOOR DRAINS

## Floor Troughs

4" Depth



Single drain with lengths 95" & shorter



Double drains with lengths 96" & longer



Item #: \_\_\_\_\_ Qty #: \_\_\_\_\_

Model #: \_\_\_\_\_

Project #: \_\_\_\_\_

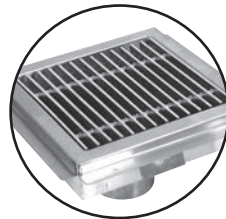


Cut-Out View of Anti-Splash

**FT-1**  
Optional Anti-Splash Guard  
(Per ft. Factory installed)

## Floor Drain

4" Depth



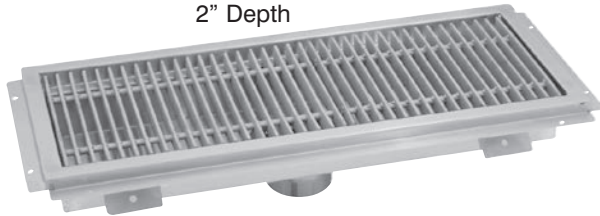
**FD-1**  
Optional Stainless Steel Grate for Floor Drains



**FT-2**  
Stainless Steel Strainer Basket with Handle (Included with all Floor Troughs, Water Receptacles & Floor Drains)

## Floor Water Receptacles

2" Depth



### OPTIONAL ACCESSORIES

Model #	Qty
FT-1 Anti-Splash Guard per ft.	
FT-2 Replacement Strainer Basket	
FD-1 Floor Drain Stainless Steel Grate	

### FEATURES:

- Waste receptacle will accommodate up to a 4" waste pipe.
- Includes 4" O.D. - 3" Long Plumbing Sleeve.
- Removable perforated stainless steel strainer basket with handle provided.
- Pitched towards waste.
- Includes "Subway Style" grating from 3/16" x 1" solid "304" stainless steel bar or fiberglass. (Not included with Floor Drains. Use Model FD-1)
- Grating is spaced 9/16" (Inside clearance) between bars to prevent casters from getting trapped.
- Troughs 96" or larger in length made with two (2) drains.
- Custom sizes available. Consult factory.

### CONSTRUCTION:

- All TIG welded.
- All external corners welded and polished to a satin finish.

### MECHANICAL:

- Creased design to ensure proper drainage.
- Perimeter flange mounts directly to sub floor.
- 3/4" vertical step designed to accommodate floor tile installation.

### MATERIAL:

- 14 gauge "304" type stainless steel polished stainless steel grating.
- Fiberglass grating: Gray fiberglass composite. Light weight, skid and corrosion resistant.



**Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.**

For Orders & Customer Service:

Email: customer@advancetabco.com or Fax: 631-242-6900

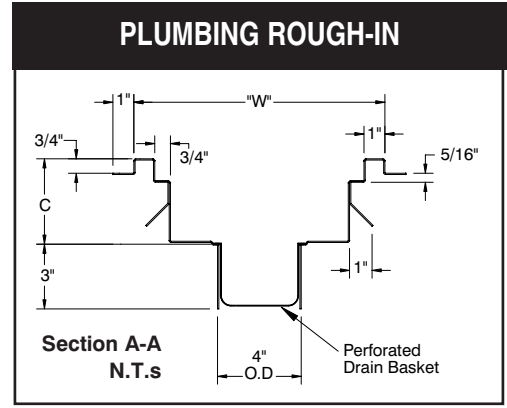
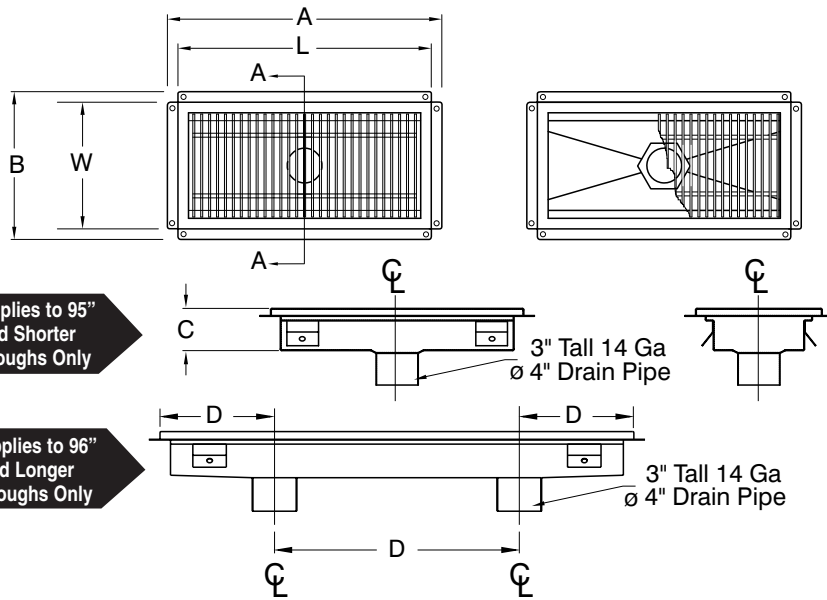
For Smart Fabrication™ Quotes:

Email: smartfab@advancetabco.com or Fax: 631-586-2933

# DIMENSIONS and SPECIFICATIONS

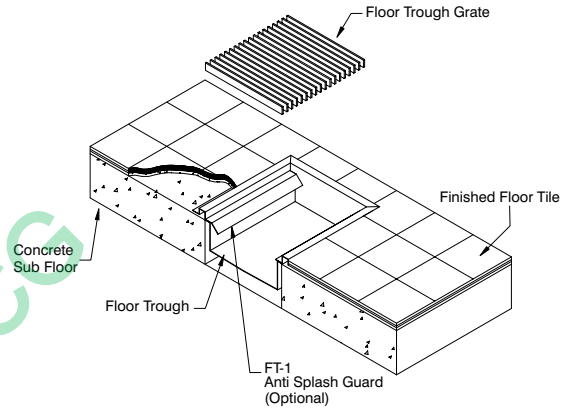
ALL DIMENSIONS ARE TYPICAL

TOL ± .500"



## FLOOR TROUGHS

Stainless Steel Grating	Wt.	Fiberglass Grating	Wt.	L	W	A	B	C	D
FTG-1224	46 lbs.	FFTG-1224	34 lbs.	24"	12"	26"	14"	4"	-
FTG-1230	56 lbs.	FFTG-1230	37 lbs.	30"	12"	32"	14"	4"	-
FTG-1236	66 lbs.	FFTG-1236	40 lbs.	36"	12"	38"	14"	4"	-
FTG-1242	76 lbs.	FFTG-1242	43 lbs.	42"	12"	44"	14"	4"	-
FTG-1248	86 lbs.	FFTG-1248	46 lbs.	48"	12"	50"	14"	4"	-
FTG-1254	96 lbs.	FFTG-1254	49 lbs.	54"	12"	56"	14"	4"	-
FTG-1260	106 lbs.	FFTG-1260	52 lbs.	60"	12"	62"	14"	4"	-
FTG-1272	116 lbs.	FFTG-1272	55 lbs.	72"	12"	74"	14"	4"	-
FTG-1284	126 lbs.	FFTG-1284	81 lbs.	84"	12"	86"	14"	4"	-
FTG-1296*	146 lbs.	FFTG-1296	90 lbs.	96"	12"	98"	14"	4"	32"
FTG-12108*	166 lbs.	FFTG-12108	99 lbs.	108"	12"	110"	14"	4"	36"
FTG-12120*	180 lbs.	FFTG-12120	108 lbs.	120"	12"	122"	14"	4"	40"
FTG-1824	62 lbs.	FFTG-1824	43 lbs.	24"	18"	26"	20"	4"	-
FTG-1830	74 lbs.	FFTG-1830	47 lbs.	30"	18"	32"	20"	4"	-
FTG-1836	86 lbs.	FFTG-1836	54 lbs.	36"	18"	38"	20"	4"	-
FTG-1842	98 lbs.	FFTG-1842	61 lbs.	42"	18"	44"	20"	4"	-
FTG-1848	110 lbs.	FFTG-1848	69 lbs.	48"	18"	50"	20"	4"	-
FTG-1854	122 lbs.	FFTG-1854	76 lbs.	54"	18"	56"	20"	4"	-
FTG-1860	134 lbs.	FFTG-1860	83 lbs.	60"	18"	62"	20"	4"	-
FTG-1872	146 lbs.	FFTG-1872	90 lbs.	72"	18"	74"	20"	4"	-
FTG-1884	165 lbs.	FFTG-1884	111 lbs.	84"	18"	86"	20"	4"	-
FTG-1896*	187 lbs.	FFTG-1896	125 lbs.	96"	18"	98"	20"	4"	32"
FTG-18108*	208 lbs.	FFTG-18108	138 lbs.	108"	18"	110"	20"	4"	36"
FTG-18120*	229 lbs.	FFTG-18120	150 lbs.	120"	18"	122"	20"	4"	40"
FTG-2424	69 lbs.	FFTG-2424	52 lbs.	24"	24"	26"	26"	4"	-
FTG-2430	81 lbs.	FFTG-2430	59 lbs.	30"	24"	32"	26"	4"	-
FTG-2436	104 lbs.	FFTG-2436	68 lbs.	36"	24"	38"	26"	4"	-
FTG-2442	118 lbs.	FFTG-2442	75 lbs.	42"	24"	44"	26"	4"	-
FTG-2448	131 lbs.	FFTG-2448	83 lbs.	48"	24"	50"	26"	4"	-
FTG-2454	145 lbs.	FFTG-2454	95 lbs.	54"	24"	56"	26"	4"	-
FTG-2460	162 lbs.	FFTG-2460	102 lbs.	60"	24"	62"	26"	4"	-
FTG-2472	195 lbs.	FFTG-2472	119 lbs.	72"	24"	74"	26"	4"	-
FTG-2484	218 lbs.	FFTG-2484	137 lbs.	84"	24"	86"	26"	4"	-
FTG-2496*	243 lbs.	FFTG-2496	153 lbs.	96"	24"	98"	26"	4"	32"
FTG-24108*	274 lbs.	FFTG-24108	168 lbs.	108"	24"	110"	26"	4"	36"
FTG-24120*	310 lbs.	FFTG-24120	188 lbs.	120"	24"	122"	26"	4"	40"



## FLOOR DRAINS

Model #	Length	Width	A	B	C	Wt.
FDR-1212	12"	12"	14"	14"	4"	26 lbs.

## FLOOR WATER RECEPTACLES

(2" Depth)

Model #	Length	Width	A	B	C	Wt.
FRG-24	24"	12"	26"	14"	2"	44 lbs.
FRG-36	36"	12"	38"	14"	2"	63 lbs.
FRG-48	48"	12"	50"	14"	2"	82 lbs.

**CUSTOM SIZES AVAILABLE!**

\*Troughs 96" or larger in length made with two (2) drains.





www.captiveaire.com

Blue Ridge

601 S Peters Rd #12, Knoxville, TN, 37922 PHONE: (865) 278-8089 FAX: (919) 227-5993 EMAIL: reg16@captiveaire.com



#47---Refer to CaptiveAire Plans  
#48---Refer to CaptiveAire Plans  
#49---Refer to CaptiveAire Plans  
#50---Refer to CaptiveAire Plans  
#60---Refer to CaptiveAire Plans  
#61---Refer to CaptiveAire Plans

# CAPTIVE AIRE

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## Blue Ridge

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- #61---Refer to CaptiveAire Plans



**Quote #: 2704781**

**From:**

Dennis Jaynes  
 CaptiveAire Systems  
 825-1 SOUTH POST RD.  
 SHELBY, NC 28152  
 Local: (704) 482-2795  
 Toll Free: (800) 445-1869  
 Fax: (704) 482-2797  
 reg70@captiveaire.com

**HEALING TRANSITIONS  
 GREENVILLE**

**Ship-To:**

GREENVILLE, NC 27834

CaptiveAire Systems proposes to furnish the following equipment. Production of listed items will commence upon receipt of an approved proposal, a purchase order, an approved submittal, and approved credit.

**EQUIPMENT**

**Hood #1 - LEFT SIDE H-1**

5424ND-2-PSP-F - 8ft 6" Long Exhaust-Only Wall Canopy Hood with Front Perforated Supply Plenum with Built-in 3" Back Standoff	x1
- 430 SS Where Exposed	x1
- FILTER - 20" tall x 16" wide Stainless Steel Captrate Solo filter with hook, ETL Listed. Particulate capture efficiency: 93% efficient at 9 microns, 72% efficient at 5 microns	x6
- L55 Series E26 Canopy Light Fixture - High Temp Assembly, Includes Clear Thermal and Shock Resistant Globe (L55 Fixture), Bulbs By Others	x3
- Extra Fixtures- L55 Series E26 Canopy Light Fixture - High Temp Assembly, Includes Clear Thermal and Shock Resistant Globe (L55 Fixture)	x3
- EXHAUST RISER - Factory installed 14" Diameter X 4" Height	x1
- SUPPLY RISER - 12"x 28" Supply Riser with Volume Dampers	x2
- 1/2 Pint Grease Cup New Style, Flanged Slotted	x2
- FIELD WRAPPER 17.00" High Front	x1
- BACKSPLASH 80.00" High X 291.00" Long 430 SS Vertical (Includes End Caps & Divider Bars)	x1
- LEFT END STANDOFF 1" Wide 54" Long Insulated	x1
- LEFT SIDESPLASH 80.00" High X 54.00" Long 430 SS Vertical (Includes End Caps & Divider Bars)	x1



- BACKSPLASH - INSIDE CORNER 80.00" High X 2.00" Leg Length x1  
430 SS Vertical (Includes End Caps & Divider Bars)

### Hood #2 - RIGHT SIDE H-1

5424ND-2-PSP-F - 8ft 6" Long Exhaust-Only Wall Canopy Hood with Front x1  
Perforated Supply Plenum with Built-in 3" Back Standoff

- 430 SS Where Exposed x1

- FILTER - 20" tall x 16" wide Stainless Steel Captrate Solo filter with hook, x6  
ETL Listed. Particulate capture efficiency: 93% efficient at 9 microns, 72%  
efficient at 5 microns

- L55 Series E26 Canopy Light Fixture - High Temp Assembly, Includes Clear x3  
Thermal and Shock Resistant Globe (L55 Fixture), Bulbs By Others

- Extra Fixtures- L55 Series E26 Canopy Light Fixture - High Temp Assembly, x3  
Includes Clear Thermal and Shock Resistant Globe (L55 Fixture)

- EXHAUST RISER - Factory installed 14" Diameter X 4" Height x1

- SUPPLY RISER - 12"x 28" Supply Riser with Volume Dampers x2

- 1/2 Pint Grease Cup New Style, Flanged Slotted x2

- FIELD WRAPPER 17.00" High Front x1

- RIGHT END STANDOFF 1" Wide 54" Long Insulated x1

- RIGHT SIDESPLASH 80.00" High X 54.00" Long 430 SS Vertical x1  
(Includes End Caps & Divider Bars)

- BACKSPLASH - INSIDE CORNER 80.00" High X 2.00" Leg Length x1  
430 SS Vertical (Includes End Caps & Divider Bars)

### Hood #3 - HOOD 2

5424ND-2-PSP-F - 7ft 0" Long Exhaust-Only Wall Canopy Hood with Front x1  
Perforated Supply Plenum with Built-in 3" Back Standoff

- 430 SS Where Exposed x1

- Fire Cabinet on the Left Side (Additional charges may apply for cabinet if x1  
not sold with fire system)

- FILTER - 20" tall x 16" wide Stainless Steel Captrate Solo filter with hook, x5  
ETL Listed. Particulate capture efficiency: 93% efficient at 9 microns, 72%  
efficient at 5 microns

- L55 Series E26 Canopy Light Fixture - High Temp Assembly, Includes Clear x2  
Thermal and Shock Resistant Globe (L55 Fixture), Bulbs By Others

- Extra Fixtures- L55 Series E26 Canopy Light Fixture - High Temp Assembly, x2  
Includes Clear Thermal and Shock Resistant Globe (L55 Fixture)

- EXHAUST RISER - Factory installed 14" Diameter X 4" Height x1

- SUPPLY RISER - 8"x 36" Supply Riser with Volume Dampers x2

- 1/2 Pint Grease Cup New Style, Flanged Slotted x2

- FIELD WRAPPER 17.00" High Front, Left x1

- BACKSPLASH 80.00" High X 104.00" Long 430 SS Vertical (Includes x1  
End Caps & Divider Bars)

- RIGHT SIDESPLASH 80.00" High X 54.00" Long 430 SS Vertical (Includes End Caps & Divider Bars) x1
- BACKSPLASH - INSIDE CORNER 80.00" High X 2.00" Leg Length 430 SS Vertical (Includes End Caps & Divider Bars) x1
- Electrical Package Installation in Utility Cabinet by Plant. x1

### Fire System #1

ANSUL-3.0/3.0/1.5 Ansul 7.5 gallon Fire System in Utility Cabinet (includes pre-piped hood(s) with detection, tank(s), release mechanism, microswitches and pull station). x1

Includes piping for hoods: 1, 2, 3.

- GAS VALVE - 1-1/2" Mechanical Shutoff Valve (Ansul) (27-55607) - Includes Upstream Strainer assembly; SUPPLIED BY DISTRIBUTOR x1

### Fan #1 NCA14FA - Exhaust Fan

NCA14FA Belt Drive Centrifugal Upblast Exhaust Fan with 15.75" wheel Exhaust Fan handles 1700 CFM @ -0.800" wc ESP, Fan runs at 1080 RPM. Exhaust Motor: 0.750 HP, 3 Phs, 208 V, 60Hz, 2.5 FLA, ODP (Open Drip Proof) x1

- Grease Cup for kitchen-duty centrifugal exhaust fans, Box Dimensions 17-1/8 L X 5-1/16 W X 3-3/4 H (18 GA.) (Includes Down Spout) x1
- Curb CRB23X20E On Fan # 1 3.000:12.000 Pitch x1
- Hinged Base for Curb. Standard Hinge attached to curb. Used on Fans with wheels 20 inches or smaller. 12 GA Galvanized. x1
- Vented Base for Curb x1

### Fan #2 NCA14FA - Exhaust Fan

NCA14FA Belt Drive Centrifugal Upblast Exhaust Fan with 15.75" wheel Exhaust Fan handles 1700 CFM @ -0.800" wc ESP, Fan runs at 1080 RPM. Exhaust Motor: 0.750 HP, 3 Phs, 208 V, 60Hz, 2.5 FLA, ODP (Open Drip Proof) x1

- Grease Cup for kitchen-duty centrifugal exhaust fans, Box Dimensions 17-1/8 L X 5-1/16 W X 3-3/4 H (18 GA.) (Includes Down Spout) x1
- Curb CRB23X20E On Fan # 2 3.000:12.000 Pitch x1
- Hinged Base for Curb. Standard Hinge attached to curb. Used on Fans with wheels 20 inches or smaller. 12 GA Galvanized. x1
- Vented Base for Curb x1

### Fan #3 A2-D.250-G15 - Heater (H1 & H2)

A2-D.250-G15 Direct Gas Fired Heated Make Up Air Unit with 15" Blower Supply Fan handles 3952 CFM @ 0.600" wc ESP, Fan runs at 966 RPM. x1

Heater supplies 234749 BTUs. 55°F Temperature Rise. [Fuel: Natural Gas]  
Supply Motor: 3.000 HP, 3 Phase, 208 V, 60Hz, 8.7 FLA, ODP (Open Drip Proof)

Down Discharge - Air Flow Right -> Left

- Sloped Filtered Intake for Size #2 Standard Untempered Make-Up Air Unit with 12" blower wheel. x1  
26.75" Wide x 29.25" Long x 31.5" High.  
Includes 2" MV EZ Kleen Metal Mesh Filters.
- RTC Solutions • 40-90°F Discharge Temp Control x1
- Gas Manifold for DF2 GM - BTU 0 - 825001 - 7 in. w.c. - 14 in. w.c., No Insurance Requirement (ANSI), BV250-88 x1
- Motorized Back Draft Damper 22.75" X 24" for Size 2 Standard & Modular Direct Fired Heaters w/Extended Shaft, Standard Galvanized Construction, 3/4" Rear Flange, LF120S Actuator Included x1
- Cooling Interlock Relay. 24VAC Coil. 120V Contacts. Locks out burner circuit when AC is energized. x1
- Low Fire Start. Allows the burner circuit to energize when the modulation control is in a low fire position. x1
- Gas Pressure Gauge, 0-35", 2.5" Diameter, 1/4" Thread Size x1
- Gas Pressure Gauge, -5 to +15 Inches Wc., 2.5" Diameter, 1/4" Thread Size x1
- H1 & H2 Curb CRB31X79X15INS Insulated On Fan # 3 3.000:12.000 Pitch x1
- Curb Corner Fully Welded. Base flange corners fully welded by factory. x1

#### Fan #5 NCA14FA - Exhaust Fan (HOOD 2)

NCA14FA Belt Drive Centrifugal Upblast Exhaust Fan with 15.75" wheel Exhaust Fan handles 1400 CFM @ -0.750" wc ESP, Fan runs at 1000 RPM. Exhaust Motor: 0.500 HP, 3 Phs, 208 V, 60Hz, 1.9 FLA, ODP (Open Drip Proof) x1

- Grease Cup for kitchen-duty centrifugal exhaust fans, Box Dimensions 17-1/8 L X 5-1/16 W X 3-3/4 H (18 GA.) (Includes Down Spout) x1
- hood 2 Curb CRB23X20E On Fan # 5 3.000:12.000 Pitch x1
- Hinged Base for Curb. Standard Hinge attached to curb. Used on Fans with wheels 20 inches or smaller. 12 GA Galvanized. x1
- Vented Base for Curb x1

#### Fan #6 DU33HFA - Exhaust Fan (Pant Leg fan)

DU33HFA High Speed Direct Drive Centrifugal Upblast Exhaust Fan with speed control (speed control included for single phase only), disconnect switch and 11-3/4" wheel. x1  
Exhaust Fan handles 1000 CFM @ -0.500" wc ESP, Fan runs at 1558 RPM.  
Exhaust Motor: 0.333 HP, 1 Phs, 115 V, 60Hz, 5.6 FLA, ODP (Open Drip Proof)

- Bird Screen - 1/2" X 1/2" (5" X 56") Wire Screen for Upblast & Downblast Fans x1  
DU/DR-25H/30H/33H, BDU/BDCR11, Galv after welded wire cloth.

- Pant Leg fan Curb CRB19.5X14E On Fan # 6 Flat Curb x1

### Electrical System #1

SC-331110FP 3 Phase w/ control for 3 Exhaust Fans, 1 Supply Fan, Exhaust on in Fire, Lights out in Fire, Fan(s) On/Off Thermostatically Controlled. Room temperature sensor shipped loose for field installation. Includes 3 Duct Thermostat kits. x1

- Digital Prewire Lighting Relay Kit. Includes hood lighting relay & terminal blocks. Allows for up to 1400W of lighting each. x2

- Thermistor CABLE - 18/2 AWG GREEN WHITE, plenum rated. USED for thermistor duct stat. Per Foot Price. x75

### Duct Run #1

(P1) DW1423LT Single Wall Duct 14" diameter, 23" long, flange at both ends. Stainless Steel. x1

(P2) DW1430AJDKIT Single Wall Duct Adjustable, 14" diameter, 29.5" long, flange at one end With a 14" Adjustable Collar - Stainless Steel. x1

(P3) DW14TEASY Single Wall Duct Tee, 14" Duct, Assembly. x1

(P4) DW1415ADIASY Duct Access Door - Insulated - Used With 14" Duct - Grease Dam Included - Assembly. x1

(P5) DW141350LT Single Wall Duct 14" diameter, 13.50" long, flange at both ends. Stainless Steel. x1

(P6) DW1424AJDKIT Single Wall Duct Adjustable, 14" diameter, 23.5" long, flange at one end With a 14" Adjustable Collar - Stainless Steel. x1

(P7) DW23514TP Duct to Curb Transition, 23.5" Curb to 14" Duct, 16 GA Aluminized. Misc. non-standard transition plate. x1

3M-2000PLUS Duct - 3M Fire Barrier 2000 Plus Silicone - Used as sealant to Seal Duct Joints. x2

DW14CLASY Duct "V" Clamp With new design 14 Ga Brackets, 14" Duct, Assembly. x6

### Duct Run #2

(P1) DW1423LT Single Wall Duct 14" diameter, 23" long, flange at both ends. Stainless Steel. x1

(P2) DW1430AJDKIT Single Wall Duct Adjustable, 14" diameter, 29.5" long, flange at one end With a 14" Adjustable Collar - Stainless Steel. x1

(P3) DW14TEASY Single Wall Duct Tee, 14" Duct, Assembly. x1

(P4) DW1415ADIASY Duct Access Door - Insulated - Used With 14" Duct - Grease Dam Included - Assembly. x1

(P5) DW141350LT Single Wall Duct 14" diameter, 13.50" long, flange at both ends. Stainless Steel. x1

(P6) DW1424AJDKIT Single Wall Duct Adjustable, 14" diameter, 23.5" long, flange at one end With a 14" Adjustable Collar - Stainless Steel. x1

(P7) DW23514TP Duct to Curb Transition, 23.5" Curb to 14" Duct, 16 GA x1

Aluminized. Misc. non-standard transition plate.

3M-2000PLUS Duct - 3M Fire Barrier 2000 Plus Silicone - Used as sealant to Seal Duct Joints. x2

DW14CLASY Duct "V" Clamp With new design 14 Ga Brackets, 14" Duct, Assembly. x6

### Duct Run #3

(P1) DW1421LT Single Wall Duct 14" diameter, 21" long, flange at both ends. Stainless Steel. x1

(P2) DW1430AJDKIT Single Wall Duct Adjustable, 14" diameter, 29.5" long, flange at one end With a 14" Adjustable Collar - Stainless Steel. x1

(P3) DW14TEASY Single Wall Duct Tee, 14" Duct, Assembly. x1

(P4) DW1415ADIASY Duct Access Door - Insulated - Used With 14" Duct - Grease Dam Included - Assembly. x1

(P5) DW143325LT Single Wall Duct 14" diameter, 33 1/4" long, flange at both ends. Stainless Steel. x1

(P6) DW1430AJDKIT Single Wall Duct Adjustable, 14" diameter, 29.5" long, flange at one end With a 14" Adjustable Collar - Stainless Steel. x1

(P7) DW23514TP Duct to Curb Transition, 23.5" Curb to 14" Duct, 16 GA Aluminized. Misc. non-standard transition plate. x1

3M-2000PLUS Duct - 3M Fire Barrier 2000 Plus Silicone - Used as sealant to Seal Duct Joints. x2

DW14CLASY Duct "V" Clamp With new design 14 Ga Brackets, 14" Duct, Assembly. x6

### Factory Services

Service Design Verification for Direct Fired Heater x1

Service Design Verification for Exhaust Fan x4

Service Design Verification for Hood x3

Service Design Verification for Standard Electrical Control Package x1

Service Design Verification for Untempered Supply Fan x1

Service Design Verification Mileage Charge: (65) x 2 = 130 total miles x1

**Optional Items****Hood #1 - LEFT SIDE H-1 Optional Items - (NOT INCLUDED IN Hood #1 - LEFT SIDE H-1 PRICE, PLEASE ADD IF DESIRED)**

- INSULATION FOR TOP OF HOOD (LEFT SIDE H-1)

**Hood Options Total Price (OPTIONAL - NOT INCLUDED IN QUOTE TOTAL):**

**Hood #2 - RIGHT SIDE H-1 Optional Items - (NOT INCLUDED IN Hood #2 - RIGHT SIDE H-1 PRICE, PLEASE ADD IF DESIRED)**

- INSULATION FOR TOP OF HOOD (RIGHT SIDE H-1)

**Hood Options Total Price (OPTIONAL - NOT INCLUDED IN QUOTE TOTAL):**

**Hood #3 - HOOD 2 Optional Items - (NOT INCLUDED IN Hood #3 - HOOD 2 PRICE, PLEASE ADD IF DESIRED)**

- INSULATION FOR TOP OF HOOD (HOOD 2)

**Hood Options Total Price (OPTIONAL - NOT INCLUDED IN QUOTE TOTAL):**

**Fan #4 A2-G12 - Supply Fan (OPTIONAL UNTEMPERED) (OPTIONAL - NOT INCLUDED IN QUOTE TOTAL, PLEASE ADD IF DESIRED)**

A2-G12 Untempered Supply Unit with 12" Blower in Size #2 Housing x1

Supply Fan handles 2720 CFM @ 0.500" wc ESP, Fan runs at 689 RPM.

Supply Motor: 1.500 HP, 3 Phase, 208 V, 60Hz, 4.6 FLA, ODP (Open Drip Proof)

Down Discharge - Air Flow Right -> Left (OPTIONAL UNTEMPERED)

- Sloped Filtered Intake for Size #2 Standard Untempered Make-Up Air Unit with 12" blower wheel. x1

26.75" Wide x 29.25" Long x 31.5" High.

Includes 2" MV EZ Kleen Metal Mesh Filters. (OPTIONAL UNTEMPERED)

- Curb CRB31X37X15INS Insulated On Fan # 4 3.000:12.000 Pitch x1

- Curb Corner Fully Welded. Base flange corners fully welded by factory. x1

**Fan #4 A2-G12 - Supply Fan (OPTIONAL UNTEMPERED) Total Price (OPTIONAL - NOT INCLUDED IN QUOTE TOTAL):**

**Duct Run #1 Optional Items - (NOT INCLUDED IN Duct Run #1 PRICE, PLEASE ADD IF DESIRED)**

834680600587XL Duct - Duct insulation for zero clearance to combustibles - 300" x 24" x 1-1/2" Roll. Pyroscat Wrap. \$232.64 x3

BANDING.5 Duct - Fire Barrier Wrap Stainless Steel Banding .5" Width - 200 FT Per Roll. \$88.38 x1

SEAL.50-50 Duct - Fire Barrier Wrap Stainless Steel Banding Seal .5" Width. Quantity of 50. \$5.65 x1

TAPEALUM Duct - Fire Barrier Wrap Aluminum Foil Tape - 3" x 150' Roll. \$19.90 x1

**Ductwork Options Total Price (OPTIONAL - NOT INCLUDED IN QUOTE TOTAL):**

**Duct Run #2 Optional Items - (NOT INCLUDED IN Duct Run #2 PRICE, PLEASE ADD IF DESIRED)**

834680600587XL Duct - Duct insulation for zero clearance to combustibles - 300" x 24" x 1-1/2" Roll. Pyroscat Wrap. \$232.64 x3

BANDING.5 Duct - Fire Barrier Wrap Stainless Steel Banding .5" Width - 200 FT Per Roll. \$88.38 x1

SEAL.50-50 Duct - Fire Barrier Wrap Stainless Steel Banding Seal .5" Width.  
Quantity of 50.

TAPEALUM Duct - Fire Barrier Wrap Aluminum Foil Tape - 3" x 150' Roll.

**Ductwork Options Total Price (OPTIONAL - NOT INCLUDED IN QUOTE TOTAL):**

**Duct Run #3 Optional Items - (NOT INCLUDED IN Duct Run #3 PRICE, PLEASE ADD IF DESIRED)**

834680600587XL Duct - Duct insulation for zero clearance to combustibles -  
300" x 24" x 1-1/2" Roll. Pyroscat Wrap.

BANDING.5 Duct - Fire Barrier Wrap Stainless Steel Banding .5" Width - 200  
FT Per Roll.

SEAL.50-50 Duct - Fire Barrier Wrap Stainless Steel Banding Seal .5" Width.  
Quantity of 50.

TAPEALUM Duct - Fire Barrier Wrap Aluminum Foil Tape - 3" x 150' Roll.

**Ductwork Options Total Price (OPTIONAL - NOT INCLUDED IN QUOTE TOTAL):**

**SERVICE DESIGN VERIFICATION DISCLAIMER**

Field Service Technician is responsible for one trip to site to ensure the above equipment is operating within design specifications. All equipment must be operational. Fire suppression system should be hooked-up and armed. Additional trips will result in charges to be covered by others.

**INSTALLATION BY OTHERS**

By Others: Installation, ductwork, patching, all electrical field wiring, start-up & balance, gas or electric shutdown for fire system hook-up.

Note: Customer is responsible for additional labor charges as a result of cooking equipment layout changes after the release of the order, union labor or prevailing wage charges, or additional trips by fire system distributor caused by jobsite delays, permits, fees or test required by local authority. Submittal will specify applicable testing and approval agencies.

**CaptiveAire Systems requirement for all field hook ups:** All fire system detection conduit must be half inch EMT. All conduit fittings must be compression type and fully tightened. All conduit ends must be reamed and deburred and blown clear of debris prior to assembly. All conduit must be fully and robustly supported to avoid accidental fire system discharge.

CaptiveAire Systems product must be installed in accordance with installation instructions provided with equipment or available on our web site at [www.captiveaire.com](http://www.captiveaire.com).

Ductwork must be designed and installed in accordance with AMCA and ASHRAE standards as presented in CaptiveAire Systems "Guide to Designing Air Flow Systems", available at:  
<http://www.captiveaire.com/MANUALS/AIRSYSTEMDESIGN/DESIGNAIRSYSTEMS.HTM>

**SHIPPING**

Freight includes one shipment only, delivered to the job site address listed on this proposal. Customer is responsible for freight charges on any items shipped early. This is an estimated freight charge and is subject to change based on current freight costs when the job is released for production.


**TRUE FOOD SERVICE  
EQUIPMENT, INC.**

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Fax (636)272-2408 • Toll Free (800)325-6152 • Intl Fax# (001)636-272-7546  
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Project Name: \_\_\_\_\_

A/A #

Location: \_\_\_\_\_

Item #: \_\_\_\_\_ Qty: \_\_\_\_\_

S/S #

Model #: \_\_\_\_\_

**Model:  
TUC-72**
**Undercounter:  
Solid Door Refrigerator**


Scan code for video

## TUC-72

- ▶ True's undercounter units are designed with enduring quality that protects your long term investment.
- ▶ Designed using the highest quality materials and components to provide the user with colder product temperatures, lower utility costs, exceptional food safety and the best value in today's food service marketplace.
- ▶ Oversized, environmentally friendly (134A) forced-air refrigeration system holds 33°F to 38°F (.5°C to 3.3°C).
- ▶ All stainless steel front, top and ends. Matching aluminum finished back.
- ▶ Interior - attractive, NSF approved, clear coated aluminum liner with stainless steel floor.
- ▶ Front breathing.
- ▶ Heavy duty PVC coated wire shelves.
- ▶ Foamed-in-place using Ecomate. A high density, polyurethane insulation that has zero ozone depletion potential (ODP) and zero global warming potential (GWP).

## ROUGH-IN DATA


Specifications subject to change without notice.  
Chart dimensions rounded up to the nearest 1/8" (millimeters rounded up to next whole number).

Model	Doors	Shelves	Cabinet Dimensions (inches) (mm)			HP	Voltage	Amps	NEMA Config.	Cord Length (total ft.) (total m)	Crated Weight (lbs.) (kg)
			L	D†	H*						
TUC-72	3	6	72 <sup>3</sup> / <sub>8</sub> 1839	30 <sup>1</sup> / <sub>8</sub> 766	29 <sup>3</sup> / <sub>4</sub> 756	1/3 1/2	115/60/1 230-240/50/1	8.5 6.7	5-15P ▲	7 2.13	405 184

† Depth does not include 1" (26 mm) for rear and 1/4" (7 mm) for front bumpers.

\* Height does not include 6 1/4" (159 mm) for castors or 6" (153 mm) for optional legs.

▲ Plug type varies by country.

	<b>APPROVALS:</b>	<b>AVAILABLE AT:</b>
2/15 Printed in U.S.A.		



Model:  
**TUC-72**

**Undercounter:**  
*Solid Door Refrigerator*

**TRUE**®

## STANDARD FEATURES

### DESIGN

- True's commitment to using the highest quality materials and oversized refrigeration systems provides the user with colder product temperatures, lower utility costs, exceptional food safety and the best value in today's food service marketplace.

### REFRIGERATION SYSTEM

- Factory engineered, self-contained, capillary tube system using environmentally friendly (CFC free) 134A refrigerant.
- Oversized, factory balanced refrigeration system with guided airflow to provide uniform product temperatures.
- Extra large evaporator coil balanced with higher horsepower compressor and large condenser; maintains cabinet temperatures of 33°F to 38°F (5°C to 3.3°C) for the best in food preservation.
- Sealed, cast iron, self-lubricating evaporator fan motor(s) and larger fan blades give True undercounter units a more efficient, low velocity, high volume airflow design. This unique design ensures faster temperature recovery and shorter run times in the busiest of food service environments.
- Condensing unit access in back of cabinet, slides out for easy maintenance.

### CABINET CONSTRUCTION

- Exterior - stainless steel front, top and ends. Matching aluminum finished back.
- Interior - attractive, NSF approved, clear coated aluminum liner. Stainless steel floor with coved corners.
- Insulation - entire cabinet structure and solid doors are foamed-in-place using Ecomate. A high density, polyurethane insulation that has zero ozone depletion potential (ODP) and zero global warming potential (GWP).

- 5" (127 mm) diameter stem castors - locks provided on front set. 36" (915 mm) work surface height.

### DOORS

- Stainless steel exterior with white aluminum liner to match cabinet interior.
- Each door fitted with 12" (305 mm) long recessed handle that is foamed-in-place with a sheet metal interlock to ensure permanent attachment.
- Positive seal self-closing door(s) with 90° stay open feature. Door(s) swing within cabinet dimensions.
- Magnetic door gasket(s) of one piece construction, removable without tools for ease of cleaning.

### SHELVING

- Six (6) adjustable, heavy duty PVC coated wire shelves 21 7/8" L x 16"D (548 mm x 591 mm). Four (4) chrome plated shelf clips included per shelf.
- Shelf support pilasters made of same material as cabinet interior; shelves are adjustable on 1/2" (13 mm) increments.

### MODEL FEATURES

- Evaporator is epoxy coated to eliminate the potential of corrosion.
- NSF-7 compliant for open food product.

### ELECTRICAL

- Unit completely pre-wired at factory and ready for final connection to a 115/60/1 phase, 15 amp dedicated outlet. Cord and plug set included.



115/60/1  
NEMA-5-15R

### OPTIONAL FEATURES/ACCESSORIES

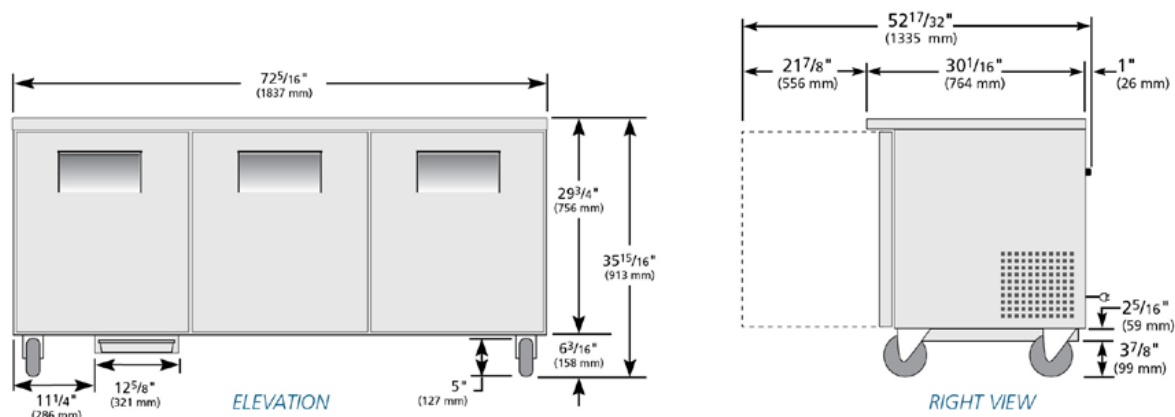
Upcharge and lead times may apply.

- 230 - 240V / 50 Hz.
- 6" (153 mm) standard legs.
- 6" (153 mm) seismic/flanged legs.
- 2 1/2" (64 mm) diameter castors.
- Barrel locks (factory installed). Requires one per door.
- Single overshelf.
- Double overshelf.
- TUC-27 Stacking collar.
- 30" (762 mm) deep, 1/2" (13 mm) thick, white polyethylene cutting board. Requires "L" brackets.
- 30" (762 mm) deep, 1/2" (13 mm) thick, composite cutting board. Requires "L" brackets.
- Heavy duty, 16 gauge tops.
- Exterior rectangular digital temperature display (factory installed).
- ADA compliant models with 34" (864 mm) work surface height.
- Low profile models with 31 7/8" (810 mm) work surface height.

### \*CABINET INTERIOR

Beginning in October of 2014, True Manufacturing began the process of changing the standard interior finishes on select products. The interior liners of these units have changed from the traditional NSF-approved white aluminum to an NSF-approved clear coated aluminum that is silver in color. In addition, the traditional white PVC coated shelves have been switched to a gray PVC coating. There are no functional differences created by any of these changes, the difference is only in the appearance. The following product lines are affected by this change: T-Series, TUC, TWT, TSSU, TFP, TPP, TMC, TRCB. A sticker will be placed on the outside packaging so that units with this change can be identified in inventory.

## PLAN VIEW



### WARRANTY\*

Three year warranty on all parts and labor and an additional 2 year warranty on compressor. (U.S.A. only)

METRIC DIMENSIONS ROUNDED UP TO THE NEAREST WHOLE MILLIMETER

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE



Model	Elevation	Right	Plan	3D	Back
TUC-72	TFQZ45E	TFQY02S	TFQZ45P	TFQZ453	

\*RESIDENTIAL APPLICATIONS: TRUE assumes no liability for parts or labor coverage for component failure or other damages resulting from installation in non-commercial or residential applications.

## TRUE FOOD SERVICE EQUIPMENT

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# STAINLESS STEEL OPEN BASE STYLE ENCLOSED BASE WORK TABLES



Item #: \_\_\_\_\_ Qty #: \_\_\_\_\_  
 Model #: \_\_\_\_\_  
 Project #: \_\_\_\_\_



Flat Top



1 1/2" Backsplash



5" Backsplash



FEATURING BOLT-ON  
STAINLESS STEEL LEG

**FEATURES:**

**FLAT TOP** is furnished with a 1 5/8" sanitary rolled rim on the front and 1 5/8" square bend edges on the 2 sides and rear.

**1 1/2" SPLASH** is furnished with a 1 5/8" sanitary rolled rim on the front side and 1 5/8" square bend edges on the 2 sides and a 1 1/2" splash of single metal thickness on the rear side.

**5" SPLASH** is furnished with a 1 5/8" sanitary rolled rim on the front side and 1 5/8" square bend edges on the 2 sides and a 5" splash with a 1" return on the rear side.

Rear flush panel along the rear of the base unit.

**CONSTRUCTION:**

All TIG welded. Exposed areas finished to match adjacent surfaces.

Entire Top is mechanically polished to a satin finish and is sound deadened.

Hat section secured to Top reinforces and maintains level working surface.

UNI-BODY DESIGN sides, back and fixed mid shelf (sold separately) are welded to form a single rigid structure.

Legs bolt on to table base.

**MATERIAL:**

TOP is 14 gauge stainless steel type "304" series with galvanized understructure.

BODY is 18 gauge stainless steel type "430" series.

LEGS are stainless steel and include 1 1/2" adjustable hex foot.

	L	FLAT TOP	1 1/2" SPLASH	5" SPLASH	Approx. Wt.	Approx. Cu. Ft.
24" WIDE	36"	EB-SS-243	EF-SS-243	EK-SS-243	135 lbs.	30
	48"	EB-SS-244	EF-SS-244	EK-SS-244	170 lbs.	38
	60"	EB-SS-245	EF-SS-245	EK-SS-245	205 lbs.	47
	72"	EB-SS-246	EF-SS-246	EK-SS-246	242 lbs.	56
	84"	EB-SS-247	EF-SS-247	EK-SS-247	282 lbs.	66
	96"	EB-SS-248	EF-SS-248	EK-SS-248	317 lbs.	74
	108"	EB-SS-249	EF-SS-249	EK-SS-249	360 lbs.	83
	120"	EB-SS-2410	EF-SS-2410	EK-SS-2410	400 lbs.	92
30" WIDE	144"	EB-SS-2412	EF-SS-2412	EK-SS-2412	470 lbs.	109
	36"	EB-SS-303	EF-SS-303	EK-SS-303	145 lbs.	35
	48"	EB-SS-304	EF-SS-304	EK-SS-304	182 lbs.	45
	60"	EB-SS-305	EF-SS-305	EK-SS-305	220 lbs.	55
	72"	EB-SS-306	EF-SS-306	EK-SS-306	260 lbs.	66
	84"	EB-SS-307	EF-SS-307	EK-SS-307	315 lbs.	76
	96"	EB-SS-308	EF-SS-308	EK-SS-308	358 lbs.	87
	108"	EB-SS-309	EF-SS-309	EK-SS-309	400 lbs.	97
36" WIDE	120"	EB-SS-3010	EF-SS-3010	EK-SS-3010	440 lbs.	107
	144"	EB-SS-3012	EF-SS-3012	EK-SS-3012	518 lbs.	128
	36"	EB-SS-363	EF-SS-363	EK-SS-363	160 lbs.	41
	48"	EB-SS-364	EF-SS-364	EK-SS-364	206 lbs.	53
	60"	EB-SS-365	EF-SS-365	EK-SS-365	252 lbs.	65
	72"	EB-SS-366	EF-SS-366	EK-SS-366	297 lbs.	77
	84"	EB-SS-367	EF-SS-367	EK-SS-367	342 lbs.	90
	96"	EB-SS-368	EF-SS-368	EK-SS-368	440 lbs.	102
108"	EB-SS-369	EF-SS-369	EK-SS-369	490 lbs.	114	
120"	EB-SS-3610	EF-SS-3610	EK-SS-3610	540 lbs.	126	
144"	EB-SS-3612	EF-SS-3612	EK-SS-3612	640 lbs.	151	

Mid Shelves Are Available.  
 To Add a Fixed Mid Shelf, Add "M" After each Model Number.  
 Upgrade to Adjustable Mid Shelf. Add TA-116.



Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.

For Orders & Customer Service:  
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For Smart Fabrication™ Quotes:  
 Email: smartfab@advancetabco.com or Fax: 631-586-2933

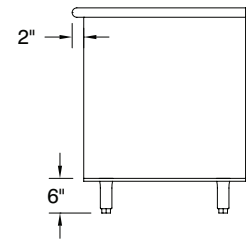
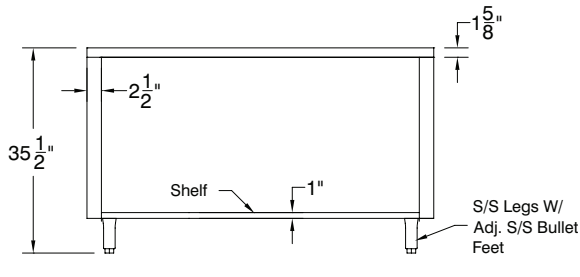
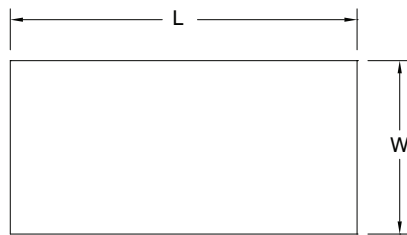
# DETAILS and SPECIFICATIONS

TOL ± .500"

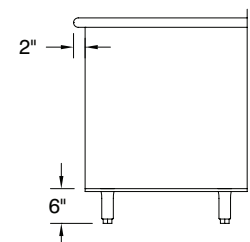
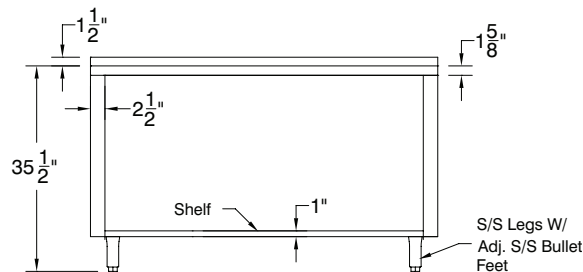
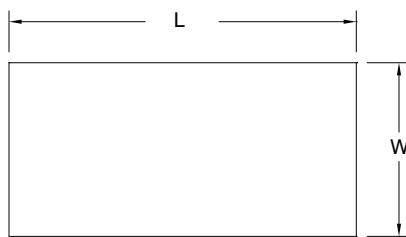
Units 7' and larger are furnished with 6 legs.

ALL DIMENSIONS ARE TYPICAL

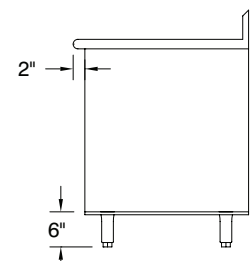
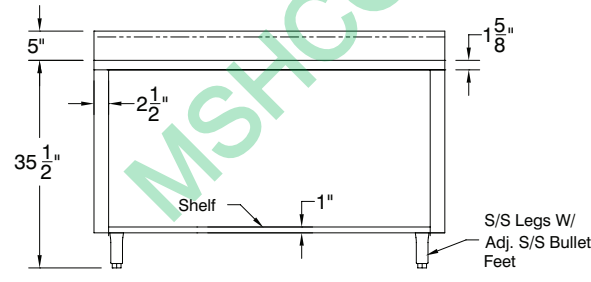
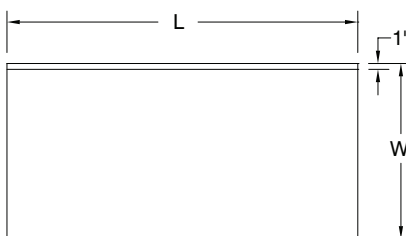
## EB-Series Flat Top



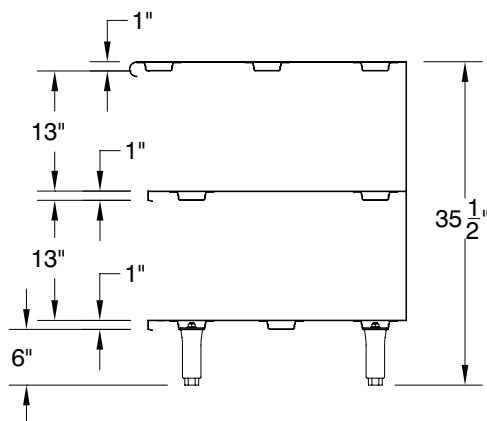
## EF-Series 1 1/2" Rear Splash



## EK-Series 5" Rear Splash



### OPTIONAL MID SHELF DETAILS



### OPTIONAL ENCLOSED BASE ACCESSORIES

- **TA-20L** ..... Replacement Bolt-on Leg
- **TA-19L** ..... Replacement Bolt-on Leg  
With Flanged Bullet Foot
- **TA-255P** ..... 5" Heavy Duty Polyurethane Casters  
(set of 4 - 2 w/ Brakes)
- **TA-255AP**.... 5" Heavy Duty Polyurethane Casters  
(set of 6 - 2 w/ Brakes)
- **TA-46** ..... Door Locks
- **TA-54** ..... Removable Kick Plate

### TA-116 ADJUSTABLE ENCLOSED BASE CABINET MID SHELF (Sold Separately)

*Shelves Over 36" In Length Require Multiple Sections With Center Partition.*





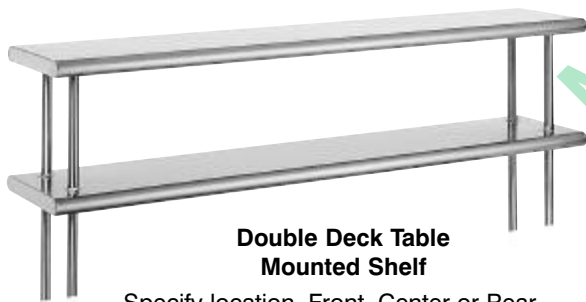
TABLE MOUNTED  
**ALL WELDED  
 STAINLESS STEEL SHELVING**



*Item #:* \_\_\_\_\_ *Qty #:* \_\_\_\_\_  
*Model #:* \_\_\_\_\_  
*Project #:* \_\_\_\_\_



**Single Deck Table Mounted Shelf**  
 Specify location. Front, Center or Rear.



**Double Deck Table Mounted Shelf**  
 Specify location. Front, Center or Rear.

**For 18" Wide Shelves, See PT Shelving**

**SINGLE DECK**

L	10" Wide	Wt	12" Wide	Wt	15" Wide	Wt
36"	OTS-10-36	17 lbs	OTS-12-36	20 lbs.	OTS-15-36	24 lbs.
48"	OTS-10-48	20 lbs	OTS-12-48	25 lbs.	OTS-15-48	25 lbs.
60"	OTS-10-60	24 lbs	OTS-12-60	31 lbs.	OTS-15-60	31 lbs.
72"	OTS-10-72	29 lbs	OTS-12-72	37 lbs.	OTS-15-72	37 lbs.
84"	OTS-10-84	35 lbs	OTS-12-84	43 lbs.	OTS-15-84	43 lbs.
96"	OTS-10-96	41 lbs	OTS-12-96	50 lbs.	OTS-15-96	50 lbs.
108"	OTS-10-108	49 lbs	OTS-12-108	59 lbs.	OTS-15-108	59 lbs.
120"	OTS-10-120	57 lbs	OTS-12-120	68 lbs.	OTS-15-120	68 lbs.
132"	OTS-10-132	68 lbs	OTS-12-132	82 lbs.	OTS-15-132	82 lbs.
144"	OTS-10-144	79 lbs	OTS-12-144	98 lbs.	OTS-15-144	98 lbs.

Units 8 ft. and larger are furnished with three (3) sets of tubing supports.

For 1" Rear Turn Up, add "R" after model # (Example: OTS-12-60R)

**DOUBLE DECK**

L	10" Wide	Wt	12" Wide	Wt	15" Wide	Wt
36"	ODS-10-36	28 lbs.	ODS-12-36	32 lbs.	ODS-15-36	37 lbs.
48"	ODS-10-48	36 lbs.	ODS-12-48	40 lbs.	ODS-15-48	44 lbs.
60"	ODS-10-60	45 lbs.	ODS-12-60	50 lbs.	ODS-15-60	55 lbs.
72"	ODS-10-72	54 lbs.	ODS-12-72	60 lbs.	ODS-15-72	66 lbs.
84"	ODS-10-84	63 lbs.	ODS-12-84	70 lbs.	ODS-15-84	77 lbs.
96"	ODS-10-96	72 lbs.	ODS-12-96	80 lbs.	ODS-15-96	88 lbs.
108"	ODS-10-108	81 lbs.	ODS-12-108	90 lbs.	ODS-15-108	99 lbs.
120"	ODS-10-120	90 lbs.	ODS-12-120	101 lbs.	ODS-15-120	110 lbs.
132"	ODS-10-132	102 lbs.	ODS-12-132	112 lbs.	ODS-15-132	121 lbs.
144"	ODS-10-144	114 lbs.	ODS-12-144	121 lbs.	ODS-15-144	132 lbs.

Units 8 ft. and larger are furnished with three (3) sets of tubing supports.

For 1" Rear Turn Up, add "R" after model # (Example: ODS-12-60R)

**FEATURES:**

All welded stainless steel shelving.  
 Stainless steel legs: 10" & 12" wide - 1" tubing.  
 15" wide - 1-5/8" tubing.  
 Shelves have front & rear rolled edges and sides have square edges.

**CONSTRUCTION:**

All TIG welded.  
 Exposed surfaces polished to a satin finish.

**MATERIAL:**

All Shelves are 18 gauge type "430" stainless steel.  
 Holes are required in Table Top.

**MODIFICATIONS:**

Use **TA-47** for special mounting hardware to easily add to existing tables. (for special modifications, consult factory)  
 Use **TA-99** for 16 Gauge, 304 Stainless Steel Upgrade.



**Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.**  
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**TEXAS**  
 Fax: (972) 932-4795

**NEVADA**  
 Fax: (775) 972-1578

# DETAILS and SPECIFICATIONS

TOL  $\pm$  .500"

ALL DIMENSIONS ARE TYPICAL

## SINGLE DECK TABLE MOUNTED

Specify location. Front, Center or Rear.



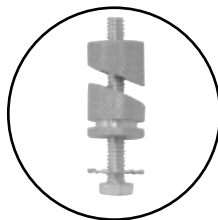
For 18" Wide Shelves,  
See PT Shelving

## DOUBLE DECK TABLE MOUNTED

Specify location. Front, Center or Rear.



For 18" Wide Shelves,  
See PT Shelving



Brass Expander Table  
Mounting Hardware Included  
with OTS & ODS Shelving



Only from NEMCO!

# The NEW CanPRO<sup>®</sup> Compact

Turns the old chore of opening cans completely around!



**CanPRO** leaves the circumference and lip of the lid intact, so the lid doesn't fall into the can.

**NEW!**

Gearless drive means no gear breakdown.

**NEW!**

Cutter design alleviates metal slivers.

**NEW!**

Cutter module makes a quick change in a busy kitchen.



Under Clamp Mount  
Model # 56050-2

# Smooth Operator

Say goodbye for good to the “lift, slam, puncture and rip” can-opening techniques that have been overstressing elbows for 100 years. The NEW redesigned CanPRO® Compact runs smarter and easier and longer than ever.

## Think Outside the Can

Unlike conventional can openers that puncture and cut down into the lid from the top, NEMCO's new CanPRO cuts from the side, along the lid's outer seam.

- The cutter never makes contact with the inside of the can.
- No metal shavings fall into the food.
- The lid comes off clean with no jagged edges.

## Seams So Smooth

As a result of NEW engineering, the compression of the CanPRO's cutter has been carefully fine-tuned to improve performance.

- The cutter's new design won't penetrate past the first layer of metal on the lid's seam, alleviating the potential for producing metal slivers if the user overrotates the can.
- When the cutter runs its life cycle, it won't cut at all, clearly indicating it should be replaced.

## Cut and Run...and Keep Running

The NEW CanPRO is specially designed to minimize downtime and costly repairs. Plus, the entire unit is dishwasher-safe.

- No more gear breakage or wear, thanks to a completely gearless handle.
- The cutter housing is a quick-change module—switch out a used for a new with just a pull of a pin. Keep an extra new modular cutter on hand, and you're never down.
- Stainless steel and aluminum nickel-plated components translate into a long, virtually maintenance-free life.

**Can-locking feature**  
(holds up to #10 cans)—  
easily orients and holds  
the cutter to the lid.



**Stainless steel permanent mount model**—screws into the countertop. The security model option (shown) includes a locking capability. (Lock not included.)



**Stainless steel under clamp model**—easily and securely affixes to any counter up to 2¾" thick.



**Tough, lasting, precision-ground stainless steel cutter**—cuts up to 5,000 lids, and is easy to replace.



**Separate cutter housing assembly**—When you purchase your CanPRO, be sure to order an extra, easy-to-replace cutter housing assembly to minimize downtime.

Model	Description
56050-1	CanPRO Compact, Permanent
56050-2	CanPRO Compact, Under Clamp
56050-3	CanPRO Compact, Security Model
56022	Cutter Housing Assembly
56029	Cutter

## Dimensions

Max. height	9½" (holds up to #10 can)
Handle radius	6"

## Recommended handle turns per can size:

Can size	Diameter	Handle turns
#2	3"	3 revolutions
#5	5"	5 revolutions
#10	6"	6 revolutions

*Note:* Too many rotations—going beyond the point of initial cut—may produce metal slivers.

Replacement parts are available through NEMCO's 24-hour Zip Program.



**NEMCO**  
FOOD EQUIPMENT

"Exceeding your expectations"

NEMCO™ Food Equipment, Ltd.  
301 Meuse Argonne  
Hicksville, Ohio 43526  
1.800.782.6761  
419.542.7751  
419.542.6690, fax  
www.nemcofoodequip.com



401A  
Front Load



411A  
Side Load



401S  
Front Load

**Options:**

- /011 Caster Brakes
- /052 5" X 2" Caster Upgrade
- /5B HD Caster Brakes
- /CC Card Clip Aluminum
- /022 Corner Bumpers (2)
- /024 Corner Bumpers (4)
- /PB Perimeter Bumper
- /VB Vertical Bumper
- /009 Pan Stop Aluminum
- /010 Pan Stop Stainless
- /PG Pan Stop Gravity
- /015 Pan Stop Web-Strap
- /BA Solid Bottom Aluminum
- /A Solid Top Aluminum

Item No. \_\_\_\_\_

Quantity \_\_\_\_\_

Job Name \_\_\_\_\_

Spec No. \_\_\_\_\_

**BUN PAN RACKS**  
**FULL SIZE ALL WELDED**  
 ALUMINUM OR STAINLESS CONSTRUCTION

Custom Sizes Available

ALUMINUM		STAINLESS		Spacing/Capacity	H	W	D
Model	Wt.	Model	Wt.				
400A	45	400S	75	FL 2"/ 30 Pans	70¼"	20½"	26"
401A	36	401S	57	FL 3"/ 20 Pans	70¼"	20½"	26"
402A	32	402S	47	FL 4"/ 15 Pans	70¼"	20½"	26"
403A	30	403S	41	FL 5"/ 12 Pans	70¼"	20½"	26"
404A	28	404S	35	FL 6"/ 10 Pans	70¼"	20½"	26"
405A	43	405S	70	FL 2"/ 27 Pans	64"	20½"	26"
406A	35	406S	53	FL 3"/ 18 Pans	64"	20½"	26"
410A	43	410S	70	SL 2"/ 30 Pans	70¼"	28½"	18"
411A	33	411S	55	SL 3"/ 20 Pans	70¼"	28½"	18"
412A	30	412S	44	SL 4"/ 15 Pans	70¼"	28½"	18"
413A	28	413S	38	SL 5"/ 12 Pans	70¼"	28½"	18"
414A	26	414S	33	SL 6"/ 10 Pans	70¼"	28½"	18"
415A	40	415S	65	SL 2"/ 27 Pans	64"	28½"	18"
416A	35	416S	50	SL 3"/ 18 Pans	64"	28½"	18"

**APPLICATIONS:** Mobile multi-purpose racks for holding, storing and transporting both plastic and aluminum. 18" X 26" Bun Pans, 18" X 13" Pans, and 17" X 25" Fryer Screens.

**CONSTRUCTION:** **Aluminum:** Heavy duty, high tensile extruded aluminum. Type 6063-T5 alloy. Lifetime guarantee against rust and corrosion. **Stainless:** 18 Gauge, 304 Series stainless steel.

**TRAY SLIDES:** Slides are 1" X 1-1/2" extruded aluminum angle heli-arc welded to frame. Bottom load ledge design.

**FRAME AND CROSS SUPPORTS:** Vertical and horizontal frame sections are 1" extruded aluminum tubing and 1" solid flat bar extruded aluminum or stainless.

**CASTERS:** Standard 5" full swivel non-marking casters. Casters are securely bolted to frame to facilitate replacements.



Notes

55 Channel Drive • Port Washington, NY 11050-2216  
 8891 NW 102nd Street • Medley, FL 33178  
 Tel: 516-944-6271 • Fax: 516-944-0625  
 Toll Free: 866-712-7283  
 www.channelmfg.com • Email: sales@channelmfg.com





## "BT3S" Maple Top Work Tables

w/ 1 3/4" thick Hard Rock Maple Top  
w/ 3- Drawer Tier Unit  
w/ Stainless Steel Base



BT3S w/ 1-3/4" Flat Top w/ 4" Coved Riser Back & Both Ends	
30" WIDE	Qty
BT3S01	
BT3S02	
BT3S03	
BT3S04	

### FEATURES:

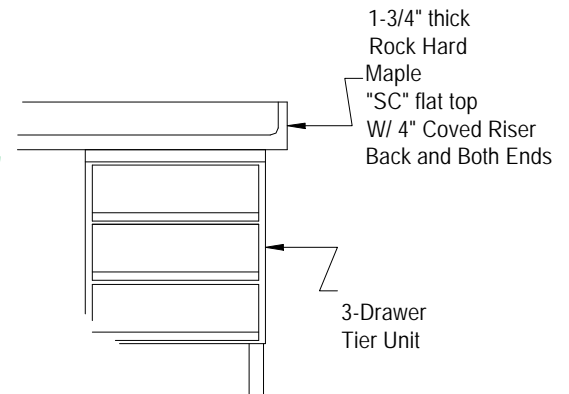
- \* 1 3/4" Thick Hard Rock Maple Top top style "SC" flat top w/ 4" Coved Riser Back and Both Ends
- \* Maple top is finished with penetrating oil with optional natural clear Varnique Finish
- \* Stainless Steel Base and Bracing Type 300 stainless steel with # 3 polish, satin finish
- \* Adjustable bullet feet
- \* Shipped Standard Welded Set-Up
- \* Optional drawers, casters, pot racks, etc. available
- \* All models are approved by the National Sanitation Foundation

### CONSTRUCTION:

Base: Stainless Steel Bases are TIG welded, Exposed welds are polished to match adjacent surface.

### MATERIAL:

Top: Laminated Hard Rock Maple  
 Drawer Panels - 22 gauge  
 Unit: Front Drawer Pulls - 14 gauge  
 Reinforced with 1-1/2" Square O.D. tubing  
 \*All type 300 stainless steel. # 3 polish, satin finish  
 Bracing: 1 1/4" Round O.D. 18 gauge type 300 tubular stainless steel  
 # 3 polish, satin finish  
 Legs: 1 5/8" Round O.D., 16 gauge type 300 tubular stainless steel  
 # 3 polish, satin finish  
 Gussets: Stainless Steel  
 Feet: 1" adjustable galvanized bullet feet



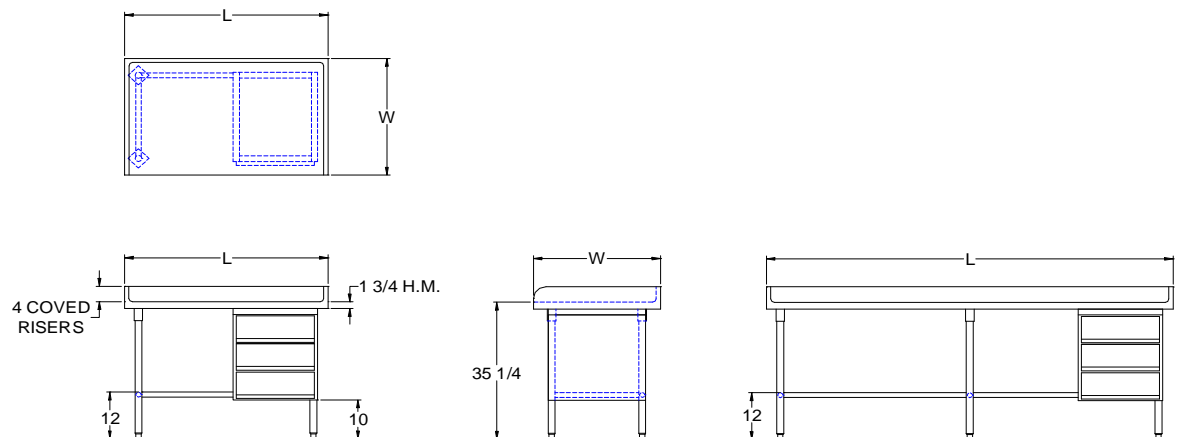
### OPTIONAL ACCESSORIES

	MODEL #	Qty
STAINLESS STEEL FEET		
DRAWER LOCK		
CASTERS		
OVERSHELVES		
POT RACK		

## John Boos & Co

315 South First Street - Effingham, IL 62401  
 Phone: 217-347-7701 - Fax: 217-347-7705  
 Email: sales@johnboos.com - Web-site: www.johnboos.com

## DETAILED SPECIFICATIONS



Shipped Welded Set-Up  
 Units 7 ft. and larger are furnished with six legs.  
 All dimensions are typical.  
 Tolerance +/- .500".

**BT3S**  
**w/ 1-3/4" Flat Top**  
**w/ 4" Coved Riser Back**  
**& Both Ends**

48	BT3S01	165
60	BT3S02	190
72	BT3S03	215
96	BT3S04	267

### John Boos & Co

315 South First - Effingham, IL 62401 Phone: 217-347-7701 - Fax: 217-347-7705

Email: sales@johnboos.com - Web-site: www.johnboos.com



May 2002

**John Boos** is constantly engaged in a program of improving products and therefore reserves the right to change specification without prior notice

**HOBART**701 S Ridge Avenue, Troy, OH 45374  
1-888-4HOBART • www.hobartcorp.com**LEGACY®  
HL600 MIXER****HOBART****STANDARD FEATURES**

- Heavy-Duty 2.7 H.P. Motor
- Gear Transmission
- Four Fixed Speeds Plus Stir Speed
- Shift-on-the-Fly™ Controls
- Patented soft start Agitation Technology
- 20-Minute SmartTimer™
- Automatic Time Recall
- Large, Easy-To-Reach Controls
- Single Point Bowl Installation
- Ergonomic Swing-Out Bowl
- Power Bowl Lift
- #12 Taper Attachment Hub
- Open Base
- Stainless Steel Bowl Guard
- Metallic Gray Hybrid Powder Coat Finish

**ACCESSORY PACKAGE - featuring Hobart Quick Release™ Agitators**

- Standard Accessory Package Includes:**
  - 60 Quart Stainless Steel Bowl
  - 60 Quart "B" Beater
  - 60 Quart "D" Wire Whip
  - 60 Quart "ED" Dough Hook

**MODELS**

- HL600 – 60-Quart All Purpose Mixer
- HL600C – 60-Quart All Purpose Mixer with Maximum Security Correctional Package

Specifications, Details and Dimensions on Inside and Back.

**LEGACY® HL600 MIXER**

# LEGACY® HL600 MIXER

# HOBART

701 S Ridge Avenue, Troy, OH 45374  
1-888-4HOBART • www.hobartcorp.com

## SOLUTIONS/BENEFITS

### 2.7 H.P. Motor

#### Durability

- Heavy-duty to meet the most demanding operations

### Gear Transmission

#### Durability, Reliability

- Ensures consistent performance and minimum downtime under heavy loads

### Four Fixed Speeds plus Stir Speed

#### Flexibility, Reliability, Consistency

- For incorporating, blending, mixing ingredients
- Supports consistent results and thorough mixing

### Shift-on-the-Fly™ Controls

#### Flexibility

- Allows operator to change speeds while mixer is running

### Patented soft start Agitation Technology

#### Sanitation

- Each speed has a soft transition into a higher speed to reduce the chances of product splash-out

### 20-Minute SmartTimer™

#### Convenience, Ease of Use, Consistency

- Supports recipe mixing times
- Provides accurate results and eliminates overmixing

### Automatic Time Recall

#### Productivity, Consistency

- Remembers the last time set for each speed
- Great for multiple batches

### Ergonomic Swing-Out Bowl

#### Ease of Use, Convenience

- Easy loading and unloading of products
- Single Point Bowl Installation allows for simple mounting and removal of bowl
- Bowl Lock ensures mixer bowl is properly in place for mixer to operate

### Stainless Steel Bowl Guard

#### Protection

- Safety interlock prevents operation when front portion of guard is out of position

### Hobart Accessories

#### Durability, Flexibility, Simplicity

- Hobart Quick Release™ agitators allow for simple installation and removal from agitator shaft
- Hobart accessories are designed for long-term usage under heavy-duty conditions
- Large array of accessories provide multiple uses for recipe and product processing

## HL600 MIXER CAPACITY CHART

Recommended Maximum Capacities - dough capacities based on 70°F. water and 12% flour moisture.

PRODUCT	AGITATORS SUITABLE FOR OPERATION	HL600
CAPACITY OF BOWL (QTS. LIQUID)		60
Egg Whites	D	2 qts.
Mashed Potatoes	B & C	40 lbs.
Mayonnaise (Qts. of Oil)	B or C or D	18 qts.
Meringue (Qts. of Water)	D	1½ qts.
Waffle or Hot Cake Batter	B	24 qts.
Whipped Cream	D or C	12 qts.
Cake, Angel Food (8-10 oz. cake)	C or I	45
Cake, Box or Slab	B or C	50 lbs.
Cake, Cup	B or C	60 lbs.
Cake, Layer	B or C	60 lbs.
Cake, Pound	B	55 lbs.
Cake, Short (Sponge)	C or I	45 lbs.
Cake, Sponge	C or I	36 lbs.
Cookies, Sugar	B	40 lbs.
Dough, Bread or Roll (Lt.-Med.) 60% AR	§ ED	80 lbs.*
Dough, Heavy Bread 55% AR	§ ED	60 lbs.*
Dough Pie	B & P	50 lbs.
Dough, Thin Pizza 40% AR (max. mix time 5 min.)	§‡ ED	40 lbs.□
Dough, Med. Pizza 50% AR	§‡ ED	70 lbs.□
Dough, Thick Pizza 60% AR	§‡ ED	70 lbs.*
Dough, Raised Donut 65% AR	ED	30 lbs.†
Dough, Whole Wheat 70% AR	ED	70 lbs.
Eggs & Sugar for Sponge Cake	B & C or I	24 lbs.
Icing, Fondant	B	36 lbs.
Icing, Marshmallow	C or I	5 lbs.
Shortening & Sugar, Creamed	B	48 lbs.
Pasta, Basic Egg Noodle (max. mix time 5 min.)	ED	30 lbs.

NOTE: % AR (% Absorption Ratio) - Water weight divided by flour weight. Capacity depends on moisture content of dough. Above capacities based on 12% flour moisture at 70°F water temperature.

□ 1st Speed

\* 2nd Speed

† 3rd Speed

§ If high gluten flour is used, reduce above dough batch size by 10%.

‡ 2nd Speed should never be used on 50% AR or lower products.

**USE OF ICE REQUIRES A 10% REDUCTION IN BATCH SIZE.**

**1 gallon of water weighs 8.33 lbs.**

NOTE: Attachment hub should not be used while mixing.

**HOBART**701 S Ridge Avenue, Troy, OH 45374  
1-888-4HOBART • www.hobartcorp.com**LEGACY®  
HL600 MIXER****SPECIFICATIONS****MOTOR:**

2.7 H.P. high torque motor.

200-240/50/60/3/1	18.0 (1 Phase) Amps
	10.0 (3 Phase) Amps
380-460/50/60/3	6.5 Amps

**ELECTRICAL:**

200-240/50/60/3/1, 380-460/50/60/3 – UL Listed.

**CONTROLS:**

Magnetic contactor with thermal overload protection. Internally sealed “Start-Stop” and Power Bowl Lift push buttons. Reduced voltage pilot circuit transformer is supplied for 380-460/50/60/3 machines. A 20-minute SmartTimer™ is standard. SmartTimer™ includes **Automatic Time Recall**, which remembers the last time set for each speed.

**TRANSMISSION:**

A rated 5.4 H.P. poly-V belt transfers power from motor to the input shaft then geared down to desired reduction with a constant gear mesh. Gears and shafts are heat-treated hardened alloy steel along with anti-friction ball bearings. Circulating oil and grease lubricants furnished to all gears and shafts.

**SPEEDS:**

	Agitator (RPM)	Attachment (RPM)
Stir	36	71
First	71	138
Second	123	241
Third	206	401
Fourth	362	707

**BOWL GUARD:**

Heavy-duty stainless steel wire front and solid stainless steel rear portion. Front portion of guard rotates easily to add ingredients and install or remove agitator. It detaches in seconds for cleaning in dishwasher or sink. Rear portion of guard can be quickly cleaned in position. Guard must be in closed position before mixer will operate. Bowl support interlock provides further protection.

**POWER BOWL LIFT:**

Powered by an electric motor, the bowl may be raised or lowered by fingertip control through the conveniently located switch. Bowl will remain in position until switch is activated. **Stir-on-Lift Feature:** Allows the agitator to run in Stir Speed while the mixer bowl is being raised. Once the bowl is in the raised position, the mixer automatically shifts into the preselected speed.

**FINISH:**

Metallic Gray Hybrid Powder Coat finish.

**FOOTPADS:**

Neoprene footpads are standard.

**ATTACHMENT HUB:**

Comes with front-mounted Hobart standard #12 taper attachment hub for use with #12 size attachments.

**ATTACHMENTS AND ACCESSORIES:**

The following are available at extra cost:

Stainless Steel Bowl	Bowl Splash Cover
“B” Flat Beater	Bowl Scraper
“C” Wing Whip	Bowl Truck
“D” Wire Whip	40 Quart Accessories
“ED” Dough Hook	Ingredient Chute
“P” Pastry Knife	9" Vegetable Slicer
“I” Heavy Duty Wire Whip	Meat Chopper Attachment
Bowl Extension Ring	

**Hobart Bowl Scraper****Hobart Ingredient Chute**

Listed by Underwriters Laboratories Inc. and certified by NSF International.

# LEGACY® HL600 MIXER

## HOBART

701 S Ridge Avenue, Troy, OH 45374  
1-888-4HOBART • www.hobartcorp.com

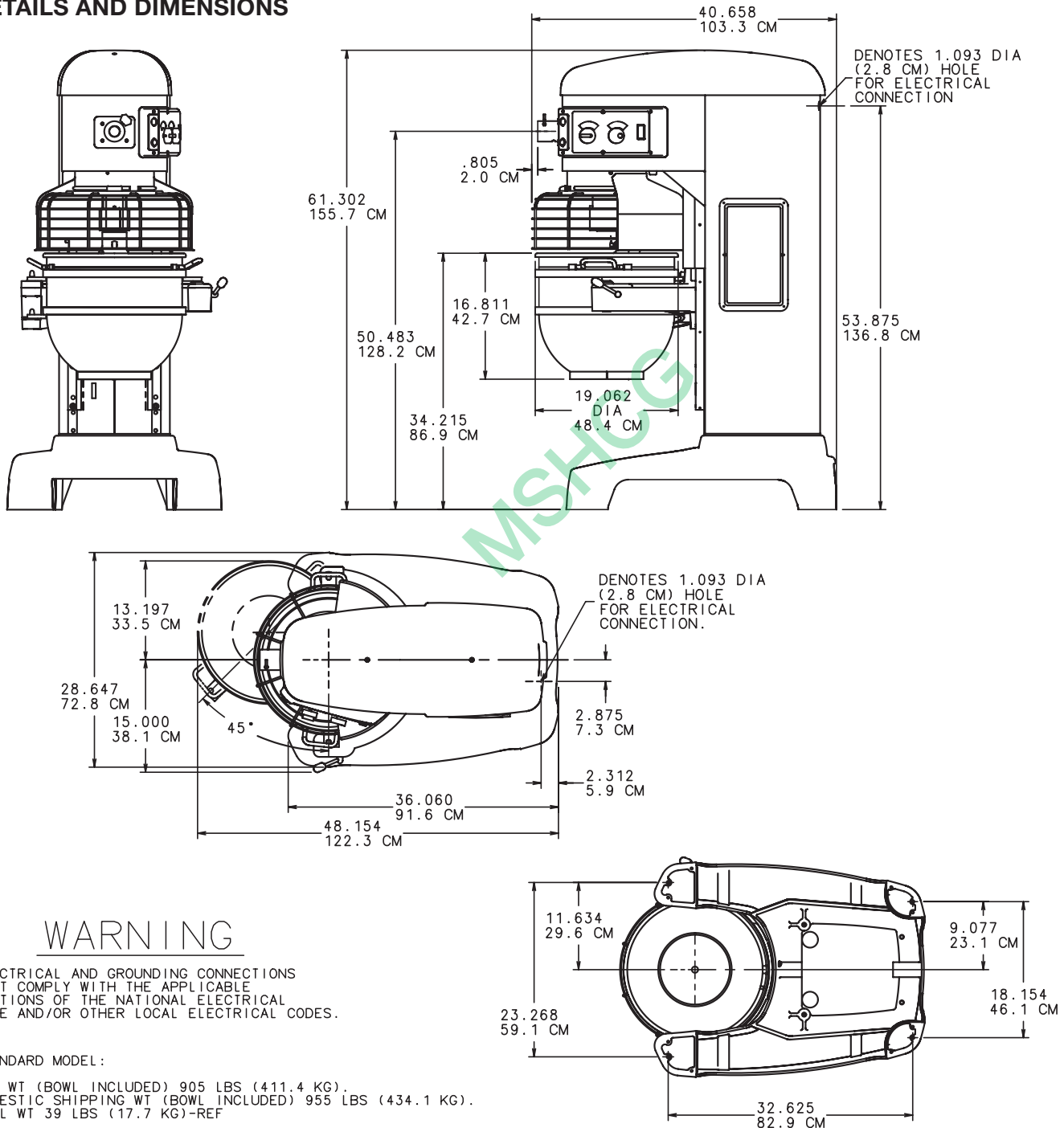
### SPECIFICATIONS

**ELECTRICAL SPECIFICATIONS:** 200-240/50/60/3/1,  
380-460/50/60/3 – UL Listed.

**WEIGHT:** 866 lbs. net; 916 lbs. domestic shipping.

**WARRANTY:** Unit has full one-year warranty on parts,  
labor and mileage against manufacturer's defects.  
Service contracts are available.

### DETAILS AND DIMENSIONS



## WARNING

ELECTRICAL AND GROUNDING CONNECTIONS  
MUST COMPLY WITH THE APPLICABLE  
PORTIONS OF THE NATIONAL ELECTRICAL  
CODE AND/OR OTHER LOCAL ELECTRICAL CODES.

STANDARD MODEL:

NET WT (BOWL INCLUDED) 905 LBS (411.4 KG).  
DOMESTIC SHIPPING WT (BOWL INCLUDED) 955 LBS (434.1 KG).  
BOWL WT 39 LBS (17.7 KG)-REF

As continued product improvement is a policy of Hobart, specifications are subject to change without notice.

# iT0500 Ice Cube Machine

## Models

- IRT0500A    IDT0500A    IYT0500A    IRT0500W    IDT0500W  
 IYT0500W    IDT0500N    IYT0500N



Indigo NXT Series iT0500 Ice Machine on D570 Bin

Designed for operators who know that ice is critical to their business, the Indigo NXT Series ice machine's preventative diagnostics continually monitor itself for reliable ice production. Improvements in cleanability and programmability make your ice machine easy to own and less expensive to operate.

- **New levels of Performance** – Showcasing an average of 12% lower energy consumption and a 23% reduction in condenser water usage. This translates into lower cost of ownership over the life of your machine.
- **easyTouch® Display** – New icon based touch screen takes the guess work out of owning and operating an ice machine.
- **Programmable Ice Production** – Now its super easy to program your ice machine to be off at certain times of the day to save money with fluctuating electrical rates. Also programmable by daily ice production volume.
- **Easy to Clean Foodzone** – Hinge front door swing out for easy access. Removable water-trough, distribution tube, curtain, water probe and water pump for fast and efficient cleaning. Selected components are made with AlphaSan® antimicrobial.
- **Intelligent Diagnostics** – Provides 24 hour preventative maintenance and diagnostic feedback for trouble free operation.
- **Acoustical Ice Sensing Probe** – Unique patented technology allows for reliable operation in challenging water conditions and environments
- **DuraTech® Exterior** – Provides superior corrosion resistant above stainless steel. Innovative clear-coat resists fingerprints and dirt making it easier to keep clean.
- Available **LuminIce® II Growth Inhibitor** – Controls the growth of bacteria and yeast within the Food zone keeping the machine cleaner longer. A new indicator in the display keeps you abreast of the operational status.

## Ice Machine Electric

115/60/1 standard  
(208-230/60/1 also available)

### Minimum circuit ampacity:

Air-cooled: 115v : 11.5, 208-230v : 5.1  
Water-cooled: 115v : 10.8  
Remote 115v : 13.7

### Maximum fuse size:

Air Cooled: 15 amps  
Water cooled: 15 amps  
Remote: 20 amps

## Specifications

**BTU Per Hour:**  
3,800 (average),  
and 6,000 (peak)

### Refrigerant:

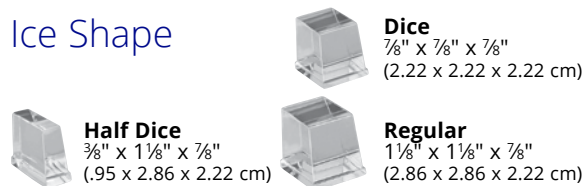
R410A CFS - Free  
Lowers global warming  
by 48%

### Operating Limits:

- Ambient Temperature Range: 40° to 110°F (4.4° to 43.3° C)  
Water Temperature Range: 40° to 90°F (4.4° to 32.2° C)
- Water Pressure Ice Maker Water In:  
Min. 20 psi (137.9 kPa)  
Max. 80 psi (551.1 kPa)



## Ice Shape



2110 South 26th Street  
Manitowoc, WI 54220

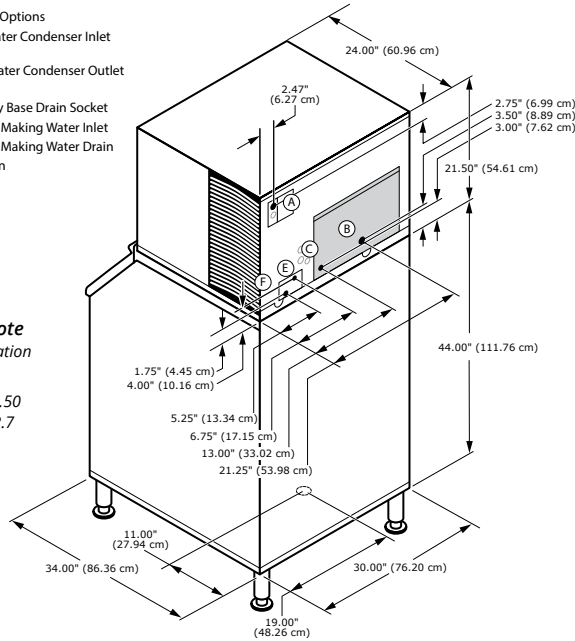
Tel: 1.920.682.0161  
Fax: 1.920.683.7589

[www.manitowocice.com](http://www.manitowocice.com)



iT0500 on D-570  
Storage Bin

- Ⓐ Electrical Entrance (2) Options
- Ⓑ 3/8" (0.95 cm) F.P.T. Water Condenser Inlet (water-cooled units)
- Ⓒ 1/2" (1.27 cm) F.P.T. Water Condenser Outlet (water-cooled units)
- Ⓓ 1/2" (1.27 cm) Auxiliary Base Drain Socket
- Ⓔ 3/8" (0.95 cm) F.P.T. Ice Making Water Inlet
- Ⓕ 1/2" (1.27 cm) F.P.T. Ice Making Water Drain
- Ⓖ 3/4" (1.91 cm) Bin Drain



**Installation Note**  
Minimum installation clearance:  
Top/side: 12" (30.50 cm)  
Back is 5" (12.7 cm)

Space-Saving Design



	iT0500 D-400	iT0500 D-570
Height	59.50" 151.13 cm	71.50" 181.61 cm
Width	30.00" 76.2 cm	30.00" 76.2 cm
Depth	34.00" 86.30 cm	34.00" 86.30 cm
Bin Storage	365 lbs. 165.7 kgs.	543 lbs. 241.1 kgs.

Height includes adjustable bin legs 6.00" to 8.00", (15.24 to 20.32 cm) set at 6.00" (15.24 cm).  
Bin capacity is based on 90% of the volume x 33 lbs/ft<sup>3</sup> average density of ice.

Specifications

	Model	Ice Shape	Ice Production 24 Hours		Power Usage kWh/100 lbs. @90°Air/70°F 1 Ph	Potable Water Usage/100 lbs. 45.4 kgs. of Ice
			70°Air/ 50°F Water	90°Air/ 70°F Water		
AIR COOLED	IRT0500A	Regular	500 lbs.	386 lbs.	5.04 ★	19 Gal. 71.9 L
			227 kgs	175 kgs		
	IDT0500A	dice	520 lbs.	400 lbs.	5.25 ★	19 Gal. 71.9 L
WATER COOLED	IYT0500A	half-dice	550 lbs.	440 lbs.	4.58 ★	19 Gal. 71.9 L
			249 kgs	200 kgs		
	IRT0500W	Regular	500 lbs.	406 lbs.	4.30	19 Gal. 71.9 L
			227 kgs	184 kgs		
IDT0500W	dice	500 lbs.	400 lbs.	4.41	19 Gal. 71.9 L	
		227 kgs	181 kgs			
IYT0500W	half-dice	535 lbs.	460 lbs.	3.90	19 Gal. 71.9 L	
		243 kgs.	209 kgs			
* Water-cooled Condenser Water Usage / 100 lbs. /45.4 kgs. Of Ice: 130 gal/ 492 L. *Water-cooled models are excluded from ENERGY STAR qualification.						
REMOTE COOLED	IDT0500N	half-dice	510 lbs.	450 lbs.	6.11	19 Gal. 71.9 L
			231 kgs	204 kgs		
IYT0500N	dice	585 lbs.	500 lbs.	5.59 ★	19 Gal. 71.9 L	
		265 kgs.	227 kgs			

Ice storage bin and JCT0500 remote condenser for remote units must be ordered separately

Order separately, ice storage bin units for "N" models remote condenser JCT0500  
★ENERGY STAR<sup>®</sup> 3.0

Accessories

**LuminIce<sup>®</sup> II Growth Inhibitor**  
reduces yeast and bacteria growth for a cleaner ice machine.



**External Scoop holder**  
Protect the ice scoop with the NSF approved versatile scoop holder.



**Arctic Pure<sup>®</sup> Water Filters**  
Reduces sediment and chlorine odors for better tasting ice.



**iAuCS<sup>®</sup>**  
schedules and performs routine ice machine cleaning automatically.



Welbilt reserves the right to make changes to the design or specifications without prior notice.

2110 South 26th Street  
Manitowoc, WI 54220

Tel: 1.920.682.0161  
Fax: 1.920.683.7589

www.manitowocice.com  
6479 01/18







**Model - IS-10 TWIN**  
**Part # - 310012**



Job Name: \_\_\_\_\_

Item#: \_\_\_\_\_ Qty: \_\_\_\_\_

## System Summary

The IceSpec™ IS-10 Twin System provides excellent sediment filtration, chlorine removal and mineral scale control for ice machines.

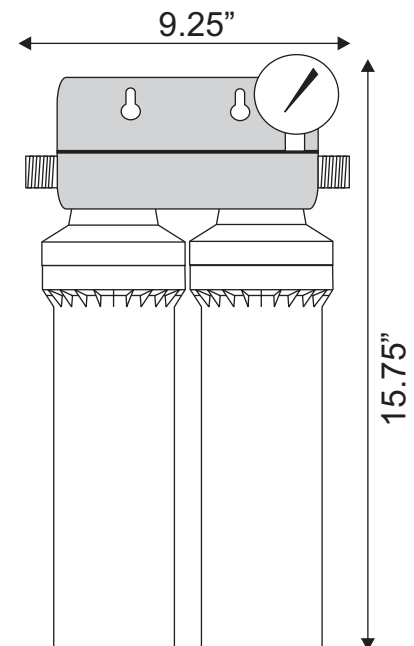
The IS-10 Twin System incorporates the patented HydroBlend™/ScaleStick™ scale control insert providing unparalleled mineral scale prevention and corrosion control for predictable treatment periods.

## Benefits and Features

- \* Removes chlorine improving taste and reducing potential corrosion issues.
- \* Mineral scale build up responsible for increased maintenance is reduced.
- \* Removes sediment that causes cloudy ice and plugs distribution tubes and float valves.
- \* Energy efficiency and machine life are increased while reducing costly service calls.
- \* Bayonet Style Quick Disconnect cartridge makes filter replacement quick & easy.
- \* Compact design facilitates system placement and installation.
- \* Patented HydroBlend™/ScaleStick™ insert provides optimum scale prevention.
- \* NSF Certified Under Standard 42.



System Specifications	
Rated Service Flow	3.3 gpm / (12.5 lpm)
Rated Capacity	20,000 Gal. / Chlorine Removal Only
Connection Size	1/2" Male Thread
Operating Pressure	30-125 psi / (2-8.6 bar)
Operating Inlet Temperature	35°-100°F / (2°-38°C)
Dimensions	9.25"x15.75"x5.5" (WxHxD)
Shipping Weight	7 lbs
Replacement Cartridge	(2) IS-10 Cartridge #310035



## Installation Summary

- \* Cold water inlet feed only.
- \* Do not over tighten fittings onto the connections.
- \* Ensure the unit is mounted vertically as pictured.
- \* Allow 3" clearance under the unit for filter replacement.
- \* Place where the unit is accessible for filter replacement.

For commercial use only. Do not use where water is microbiologically unsafe or of unknown quality without disinfection before or after the system.

## Warranty

Systems have a limited 1 year warranty against defects in material or workmanship.



System Tested and Certified by NSF International  
against NSF/ANSI Standard 42 for the reduction of  
Chlorine, Taste and Odor.

**WaterSpec Filter Systems**  
158 Railroad Street  
Canton, GA 30114  
800-935-8500  
www.waterspec.com



STAINLESS STEEL  
**WORK TABLES**

**PREMIUM Series - 5" Backsplash - Open Base Style**



Item #: \_\_\_\_\_ Qty #: \_\_\_\_\_  
 Model #: \_\_\_\_\_  
 Project #: \_\_\_\_\_



**Rolled Rim Edges on Front & Splash on Back and Square Side Edges**



**1-5/8" LEG STRETCHERS Ensure Stability**

**FEATURES:**

Top is furnished with 1 5/8" sanitary rolled rim edge on front and square sides, and a 5" splash with a 1" return on the rear side.

24" wide tables supplied with TWO hat channels stud welded to reinforce and maintain a level working surface. 30" and 36" wide tables supplied with THREE hat channels.

Pre-engineered welded angle adapters insure ease of future drawer installation.

Front to back Stretchers are welded to legs. Left to right Stretcher bolted to legs and requires assembly.

**CONSTRUCTION:**

All TIG welded. Exposed weld areas polished to match adjacent surfaces.

Entire top mechanically polished to a satin finish.

Top is sound deadened.

Roll formed embossed galvanized hat channels are secured to top by means of structural adhesive and weld studs.

Gussets welded to support hat sections.

**MATERIAL:**

**TKSS-SERIES: Stainless Steel Legs - Open Base**

**TOP:** 14 gauge stainless steel type "304" series.

**STRETCHERS:** 1 5/8" dia. tubular stainless steel.

**LEGS:** 1 5/8" diameter tubular stainless steel.  
 1" adjustable stainless steel bullet feet.  
 Stainless steel gussets.

**TKLG-SERIES: Galvanized Legs - Open Base**

**TOP:** 14 gauge stainless steel type "304" series.

**STRETCHERS:** 1 5/8" dia. tubular galvanized steel.

**LEGS:** 1 5/8" diameter tubular galvanized steel.  
 1" adjustable plastic bullet feet.  
 Galvanized steel gussets.

**TKSS-Series:  
Stainless Steel Legs & Stretchers**

L	24" Wide	30" Wide	36" Wide
30"	TKSS-240	TKSS-300	
24"	TKSS-242	TKSS-302	
36"	TKSS-243	TKSS-303	TKSS-363
48"	TKSS-244	TKSS-304	TKSS-364
60"	TKSS-245	TKSS-305	TKSS-365
72"	TKSS-246	TKSS-306	TKSS-366
84"	TKSS-247	TKSS-307	TKSS-367
*96"	TKSS-248	TKSS-308	TKSS-368
*108"	TKSS-249	TKSS-309	TKSS-369
*120"	TKSS-2410	TKSS-3010	TKSS-3610
*132"	TKSS-2411	TKSS-3011	TKSS-3611
*144"	TKSS-2412	TKSS-3012	TKSS-3612

**TKLG-Series:  
Galvanized Steel Legs & Stretchers**

L	24" Wide	30" Wide	36" Wide
30"	TKLG-240	TKLG-300	
24"	TKLG-242	TKLG-302	
36"	TKLG-243	TKLG-303	TKLG-363
48"	TKLG-244	TKLG-304	TKLG-364
60"	TKLG-245	TKLG-305	TKLG-365
72"	TKLG-246	TKLG-306	TKLG-366
84"	TKLG-247	TKLG-307	TKLG-367
*96"	TKLG-248	TKLG-308	TKLG-368
*108"	TKLG-249	TKLG-309	TKLG-369
*120"	TKLG-2410	TKLG-3010	TKLG-3610
*132"	TKLG-2411	TKLG-3011	TKLG-3611
*144"	TKLG-2412	TKLG-3012	TKLG-3612



\*Units 8 ft. and larger are furnished with six (6) legs

**Create Your Own Efficient Workstation with the Available Standard Accessories (Visit Section**



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Email: customer@advancetabco.com or Fax: 631-242-6900

For Smart Fabrication™ Quotes:

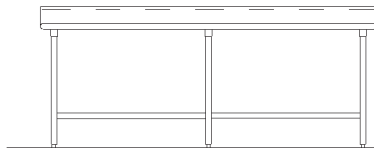
Email: smartfab@advancetabco.com or Fax: 631-586-2933

# DETAILS and SPECIFICATIONS

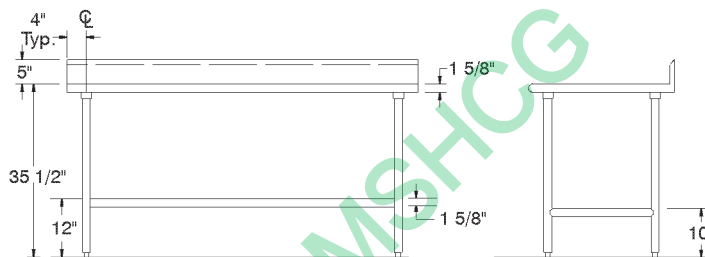
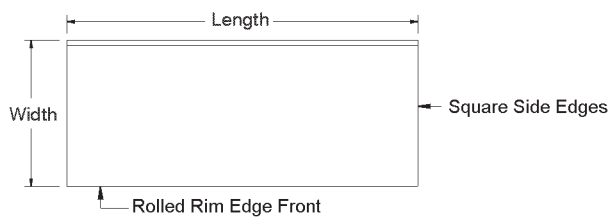
ALL DIMENSIONS ARE TYPICAL TOL ± .500"

All Units Shipped Unassembled (KD) for Reduced Shipping Costs.

## TKSS & TKLG Series Open Base Style 5" Backsplash



Units 8ft. and larger are furnished with six (6) legs



### TKSS-Series: Stainless Steel Legs & Stretchers

L	24" Wide	Wt.	30" Wide	Wt.	36" Wide	Wt.
30"	TKSS-240	49 lbs.	TKSS-300	55 lbs.		
24"	TKSS-242	43 lbs.	TKSS-302	48 lbs.		
36"	TKSS-243	55 lbs.	TKSS-303	62 lbs.	TKSS-363	80 lbs.
48"	TKSS-244	67 lbs.	TKSS-304	75 lbs.	TKSS-364	85 lbs.
60"	TKSS-245	77 lbs.	TKSS-305	89 lbs.	TKSS-365	99 lbs.
72"	TKSS-246	89 lbs.	TKSS-306	97 lbs.	TKSS-366	112 lbs.
84"	TKSS-247	107 lbs.	TKSS-307	118 lbs.	TKSS-367	131 lbs.
96"	TKSS-248	119 lbs.	TKSS-308	131 lbs.	TKSS-368	145 lbs.
108"	TKSS-249	135 lbs.	TKSS-309	150 lbs.	TKSS-369	165 lbs.
120"	TKSS-2410	234 lbs.	TKSS-3010	249 lbs.	TKSS-3610	268 lbs.
132"	TKSS-2411	258 lbs.	TKSS-3011	276 lbs.	TKSS-3611	298 lbs.
144"	TKSS-2412	273 lbs.	TKSS-3012	291 lbs.	TKSS-3612	313 lbs.

### TKLG-Series: Galvanized Steel Legs & Stretchers

L	24" Wide	Wt.	30" Wide	Wt.	36" Wide	Wt.
30"	TKLG-240	49 lbs.	TKLG-300	55 lbs.		
24"	TKLG-242	43 lbs.	TKLG-302	48 lbs.		
36"	TKLG-243	55 lbs.	TKLG-303	62 lbs.	TKLG-363	80 lbs.
48"	TKLG-244	67 lbs.	TKLG-304	75 lbs.	TKLG-364	85 lbs.
60"	TKLG-245	77 lbs.	TKLG-305	89 lbs.	TKLG-365	99 lbs.
72"	TKLG-246	89 lbs.	TKLG-306	97 lbs.	TKLG-366	112 lbs.
84"	TKLG-247	107 lbs.	TKLG-307	118 lbs.	TKLG-367	131 lbs.
96"	TKLG-248	119 lbs.	TKLG-308	131 lbs.	TKLG-368	145 lbs.
108"	TKLG-249	135 lbs.	TKLG-309	150 lbs.	TKLG-369	165 lbs.
120"	TKLG-2410	234 lbs.	TKLG-3010	249 lbs.	TKLG-3610	268 lbs.
132"	TKLG-2411	258 lbs.	TKLG-3011	276 lbs.	TKLG-3611	298 lbs.
144"	TKLG-2412	273 lbs.	TKLG-3012	291 lbs.	TKLG-3612	313 lbs.





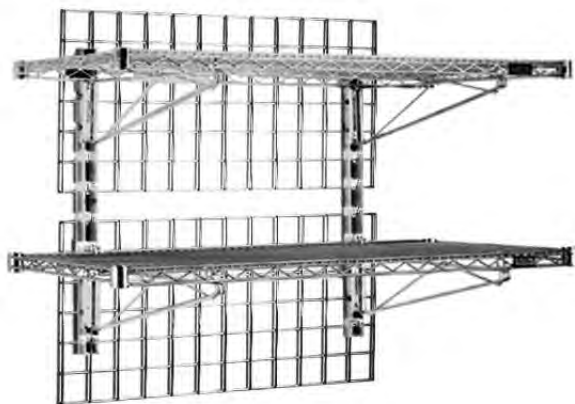
Profit from the Eagle Advantage®

## Specification Sheet

### Short Form Specifications

Eagle Walstor® Single Shelf Kit, model \_\_\_\_\_.  
Consists of one EAGLEbrite® zinc-coated patented Quad-Truss® design open-grid wire shelf, one pair of 30" vertical uprights one wire mat, and one pair of 18" wire shelf brackets.

Eagle Walstor® Double Shelf Kit, model \_\_\_\_\_.  
Consists of two EAGLEbrite® zinc-coated patented Quad-Truss® design open-grid wire shelves, one pair of 45" vertical uprights, two wall mats, and two pairs of wire shelf brackets.



double shelf kit

### Options / Accessories\*

- Pan holders
- Hooks
- Bins
- Racks
- Baskets

\* See spec sheet #EG02.00B for Walstor® accessories.  
See spec sheet #EG02.00C for Wall Grid Shelving.

### EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

For custom configuration or fabrication needs, contact our SpecFAB® Division.

Phone: 302-653-3000 • Fax: 302-653-3091 • e-mail: specfab@eaglegrp.com

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Item No.: \_\_\_\_\_  
Project No.: \_\_\_\_\_  
S.I.S. No.: \_\_\_\_\_

## Walstor® Modular Wall System

### MODELS:

- |                                     |                                 |                                 |                                 |
|-------------------------------------|---------------------------------|---------------------------------|---------------------------------|
| <input type="checkbox"/> WAL-1-1836 | <input type="checkbox"/> WM1848 | <input type="checkbox"/> WM2496 | <input type="checkbox"/> PR45VU |
| <input type="checkbox"/> WAL-1-1848 | <input type="checkbox"/> WM1860 | <input type="checkbox"/> WM3354 | <input type="checkbox"/> PR14B  |
| <input type="checkbox"/> WAL-2-1836 | <input type="checkbox"/> WM2448 | <input type="checkbox"/> WM4848 | <input type="checkbox"/> PR18B  |
| <input type="checkbox"/> WAL-2-1848 | <input type="checkbox"/> WM2472 | <input type="checkbox"/> PR12VU | <input type="checkbox"/> PR21B  |
| <input type="checkbox"/> WM1836     | <input type="checkbox"/> WM2484 | <input type="checkbox"/> PR30VU | <input type="checkbox"/> PR24B  |

### Design and Construction Features

- Walstor® design provides for placement of wire shelves where you want them.
- Unique design positions vertical uprights at stud locations, while shelf brackets lock shelves once shelf is in place.
- Provides the ability to add, remove, or adjust shelves quickly and easily.
- Features EAGLEbrite® zinc finish, sealed with MasterSeal®.
- WalStor® accessories\* can be mounted anywhere on wall mat without fasteners.
- Eagle wire shelves feature patented QuadTruss® design (patent #5,390,803), making shelves up to 25% stronger and providing a retaining ledge for increased stability and product retention.

### Shelf Kits

- Single Shelf Kits:
  - One wire shelf with patented Quad-Truss® design (patent # 5,390,803) and EAGLEbrite® zinc finish
  - One wall mat
  - One pair of 30" (762mm) vertical wall uprights
  - One pair of 18" (457mm) wire shelf brackets
- Double Shelf Kits:
  - Two wire shelves with patented Quad-Truss® design (patent # 5,390,803) and EAGLEbrite® zinc finish
  - Two wall mats
  - One pair of 45" (1143mm) vertical wall uprights
  - Two pairs of 18" (457mm) wire shelf brackets

### Components (all of which are zinc-plated)

- Wall Mats:
  - Required only for hanging accessories\*
  - 3" x 3" (76 x 76mm) grids
- Vertical Wall Uprights (pair)
- Wire Shelf Brackets (pair)

### Certifications / Approvals



AUTOQUOTES



EG02.00A Rev. 07/11



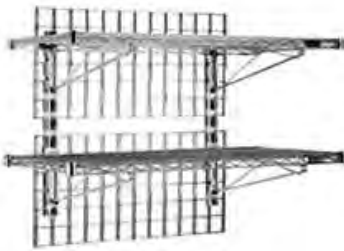
Profit from the Eagle Advantage®

Item No.: \_\_\_\_\_  
 Project No.: \_\_\_\_\_  
 S.I.S. No.: \_\_\_\_\_

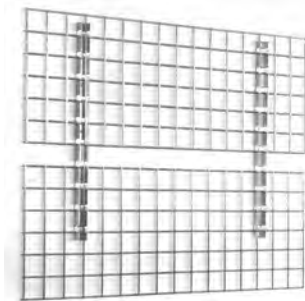
## Walstor® Modular Wall System



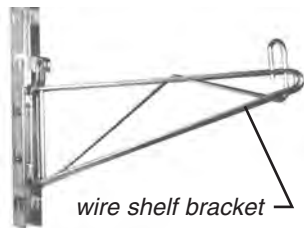
single shelf kit



double shelf kit



wall mats and  
vertical wall uprights



wire shelf bracket

### SINGLE SHELF KITS

model #	weight		shelf & wall matt size			
	lbs.	kg	width		length	
	in.	mm	in.	mm	in.	mm
WAL-1-1836	35	15.9	18"	457	36"	915
WAL-1-1848	36	16.3	18"	457	48"	1219

### DOUBLE SHELF KITS

model #	weight		shelf dimensions			
	lbs.	kg	width		length	
	in.	mm	in.	mm	in.	mm
WAL-2-1836	41	18.6	18"	457	36"	915
WAL-2-1848	49	22.2	18"	457	48"	1219

### WALL MATS

model #	weight		height		length	
	lbs.	kg	in.	mm	in.	mm
WM1836	9	4.1	18"	457	36"	915
WM1848	11	5.0	18"	457	48"	1219
WM1860	14	6.4	18"	457	60"	1524
WM2448	13	5.8	24"	610	48"	1219
WM2472	19	8.6	24"	610	72"	1828
WM2484	22	9.9	24"	610	84"	2133
WM2496	25	11.3	24"	610	96"	2438
WM3354	22	9.9	33"	838	54"	1372
WM4848	19	8.6	48"	1219	48"	1219

### VERTICAL WALL UPRIGHTS

model #	weight		height	
	lbs.	kg	in.	mm
PR12VU	2	0.9	12"	305
PR30VU	4	1.8	30"	762
PR45VU	5	2.3	45"	1143

### WIRE SHELF BRACKETS

model #	weight		depth	
	lbs.	kg	in.	mm
PR14B	3	1.5	14"	356
PR18B	4	1.8	18"	457
PR21B	4	1.8	21"	533
PR24B	5	2.3	24"	610

**Please note:** Walstor® must be mounted to a solid surface or studs in a wall. User needs to determine installation materials and methods suitable to hold and support the Walstor® system.

### EAGLE GROUP

100 Industrial Boulevard, Clayton, DE 19938-8903 USA

Phone: 302-653-3000 • Fax: 302-653-2065

www.eaglegrp.com

Foodservice Division: Phone 800-441-8440

MHC/Retail Display Divisions: Phone 800-637-5100

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**BLITZ Blast Chiller**


## ANGELO PO – BC51MU Multifunction Blast Chiller/Freezer, Electric 1.08 kW 208-240v/60/1-ph, 7.0 amps, (6) 12"X20" Full Size Sheet Pans Capacity.

Blitz Blast Chiller, reach-in, self-contained, (5) 12" x 20" x 2-1/2" pan capacity, programmable controls, 48 lbs. from 194°F to 37°F in 90 minutes chilling cycle, electric defrost, IFR system with multipoint temperature probe, USB, multicolor LED bar, HACCP software, removable drip tray, stainless steel wire rack, legs, stainless steel front, sides & top, R-404A, 1/2 HP, 1.08 kW, 208-240v/60/1-ph, 7.0 amps, cETLus

- Lowest reachable temperature on chamber by blast chilling cycle: -35°F (-37°C)
- Highest reachable temperature on chamber by heating element / thawing mode use: 104°F (+40°C)

Model	BLITZ Blast Chiller
Description	Electric 1.08 kW 208-240v/60/1-ph, 7.0 amps, (6) 12"X20" Full Size Sheet Pans Capacity
Net Dimensions WxDxH	29.4"x29.2"x38.2" (74.65x74.15x97 cm)
Shipping Dimensions WxDxH	31.9"x30.3"x43.3" (81x77x110 cm)
Net Weight	254 lb (115 kg)
Shipping Weight	302 lb (137 kg)
12"X20" Hotel Pan Capacity	5
1/1 GN (530x325 mm) pan Capacity	6
18"X26" Full Size Sheet Pans Capacity	-
2/1 GN (650x530 mm) pan Capacity	-
Chill Capacity (194°F → 37°F)	48 lb
Freeze Capacity (194°F → 0°F)	-
Electric Power	1.051 kW
Voltage	208-240V
Phase	1 ph
Amperes	6.5 amps
Cycle/Hz	60Hz
Unit H.P.	0.5

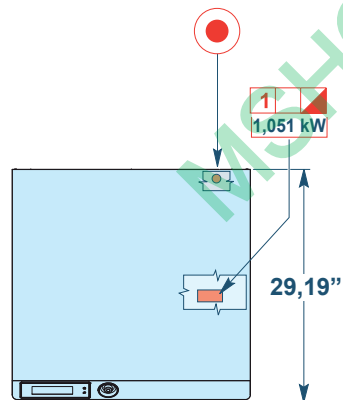
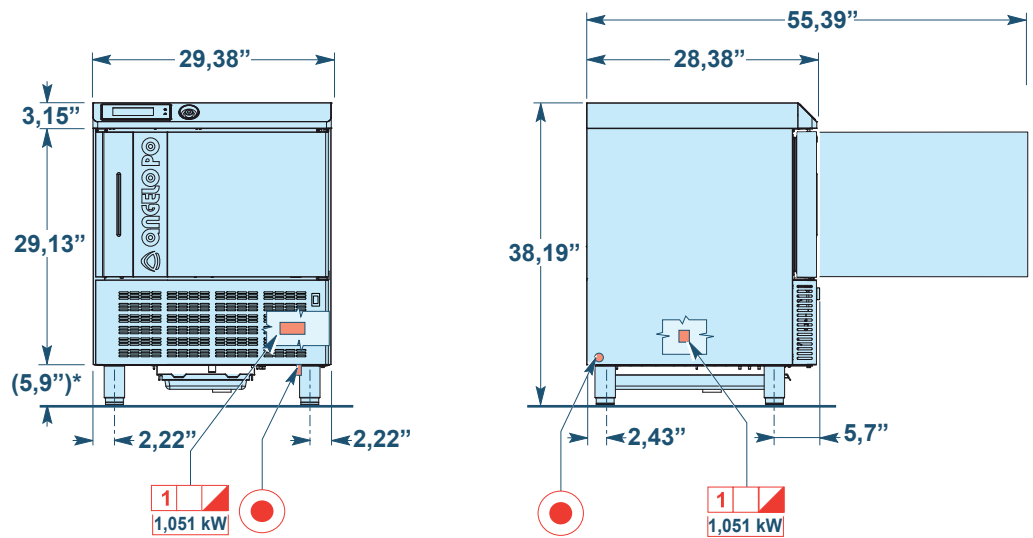
 Staking Solutions	-
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COOK&CHILL SYSTEM: Combi Oven Compatibility	FX61; FX101
--	-------------

Call Angelo Po America customer care or technical service if there is any further clarification required.

ANGELO PO AMERICA - 2920 TURNPIKE DRIVE HATBORO, PA 19040 - 1-888-OVENS4U





\* Feet height-adjustable from 5,9" to 7,9"

 Allacciamento elettrico  
Electric connection  
Branchement électrique  
Elektroanschluss  
Conexión eléctrica

 Morsettiera  
Terminal board  
Plaque à bornes  
Klemmbrett  
Tablero de bornes  
1~ N   
220 V

Progetto - Lay Out - Projet - Entwurf - Proyecto	Area - Area - Area - Zone - Area	Posizione - Item - Position - Position - Posiccion
Offerta - Offer - Offre - Angebot - Oferta	Area - Area - Area - Zone - Area	Posizione - Item - Position - Position - Posiccion


**TRUE FOOD SERVICE  
EQUIPMENT, INC.**

2001 East Terra Lane • O'Fallon, Missouri 63366-4434 • (636)240-2400  
Fax (636)272-2408 • Toll Free (800)325-6152 • Intl Fax# (001)636-272-7546  
Parts Dept. (800)424-TRUE • Parts Dept. Fax# (636)272-9471 • www.truemfg.com

Project Name: \_\_\_\_\_

A/A #

Location: \_\_\_\_\_

Item #: \_\_\_\_\_ Qty: \_\_\_\_\_

S/S #

Model #: \_\_\_\_\_

Model:

**T-49F**
**T-Series:**

Reach-In Solid Swing Door -10°F Freezer


**T-49F**

- ▶ True's solid door reach-in's are designed with enduring quality that protects your long term investment.
- ▶ Designed using the highest quality materials and components to provide the user with colder product temperatures, lower utility costs, exceptional food safety and the best value in today's food service marketplace.
- ▶ Extra large evaporator coil balanced with higher horsepower compressor and large condenser maintains -10°F (-23.3°C) cabinet temperatures. Ideally suited for both frozen foods and ice cream.
- ▶ Stainless steel solid doors and front. The very finest stainless with higher tensile strength for fewer dents and scratches.
- ▶ Adjustable, heavy duty PVC coated shelves.
- ▶ Positive seal self-closing doors. Lifetime guaranteed door hinges and torsion type closure system.
- ▶ Automatic defrost system time-initiated, temperature-terminated. Saves energy consumption and provides shortest possible defrost cycle.

**Bottom mounted units feature:**

- ▶ "No stoop" lower shelf.
- ▶ Storage on top of cabinet.
- ▶ Compressor performs in coolest, most grease free area of kitchen.
- ▶ Easily accessible condenser coil for cleaning.



Scan code for video

**ROUGH-IN DATA**

 Specifications subject to change without notice.  
Chart dimensions rounded up to the nearest 1/8" (millimeters rounded up to next whole number).

Model	Doors	Shelves	Cabinet Dimensions (inches) (mm)			HP	Voltage	Amps	NEMA Config.	Cord Length (total ft.) (total m)	Crated Weight (lbs.) (kg)
			L	D	H*						
T-49F	2	6	54 1/8	29 1/2	78 3/8	3/4	115/60/1	11.0	5-15P	9	480
			1375	750	1991						

\* Height does not include 5" (127 mm) for castors or 6" (153 mm) for optional legs.

▲ Plug type varies by country.



2/15

Printed in U.S.A.

**APPROVALS:**
**AVAILABLE AT:**



Model:  
**T-49F**

**T-Series:**  
Reach-In Solid Swing Door -10°F Freezer

**TRUE**®

## STANDARD FEATURES

### DESIGN

- True's commitment to using the highest quality materials and oversized refrigeration systems provides the user with colder product temperatures, lower utility costs, exceptional food safety and the best value in today's food service marketplace.

### REFRIGERATION SYSTEM

- Factory engineered, self-contained, capillary tube system using environmentally friendly (CFC free) R404A refrigerant.
- Extra large evaporator coil balanced with higher horsepower compressor and large condenser; maintains -10°F (-23.3°C). Ideally suited for both frozen foods and ice cream.
- Sealed, cast iron, self-lubricating evaporator fan motor(s) and larger fan blades give True reach-in's a more efficient low velocity, high volume airflow design. This unique design ensures faster temperature recovery and shorter run times in the busiest of food service environments.
- Bottom mounted condensing unit positioned for easy cleaning. Compressor runs in coolest and most grease free area of the kitchen. Allows for storage area on top of unit.
- Automatic defrost system time-initiated, temperature-terminated. Saves energy consumption and provides shortest possible defrost cycle.

### CABINET CONSTRUCTION

- Exterior - Stainless steel front. Anodized quality aluminum ends, back and top.
- Interior - attractive, NSF approved, clear coated aluminum liner. Stainless steel floor with coved corners.

- Insulation - entire cabinet structure and solid doors are foamed-in-place using Ecomate. A high density, polyurethane insulation that has zero ozone depletion potential (ODP) and zero global warming potential (GWP).
- Welded, heavy duty steel frame rail, black powder coated for corrosion protection.
- Frame rail fitted with 4" (102 mm) diameter stem castors - locks provided on front set.

### DOORS

- Stainless steel exterior with white aluminum liner to match cabinet interior. Doors extend full width of cabinet shell. Door locks standard.
- Lifetime guaranteed recessed door handles. Each door fitted with 12" (305 mm) long recessed handle that is foamed-in-place with a sheet metal interlock to ensure permanent attachment.
- Positive seal self-closing doors. Lifetime guaranteed door hinges and torsion type closure system.
- Magnetic door gaskets of one piece construction, removable without tools for ease of cleaning.

### SHELVING

- Six (6) adjustable, heavy duty PVC coated wire shelves 24 $\frac{3}{16}$ "L x 22 $\frac{3}{8}$ "D (624 mm x 569 mm). Four (4) chrome plated shelf clips included per shelf.
- Shelf support pilasters made of same material as cabinet interior; shelves are adjustable on  $\frac{1}{2}$ " (13 mm) increments.

### LIGHTING

- Incandescent interior lighting - safety shielded. Lights activated by rocker switch mounted above doors.

### MODEL FEATURES

- Exterior temperature display.

- Evaporator is epoxy coated to eliminate the potential of corrosion.
- Rear airflow guards prevent product from blocking optimal airflow.
- NSF-7 compliant for open food product.

### ELECTRICAL

- Unit completely pre-wired at factory and ready for final connection to a 115/60/1 phase, 15 amp dedicated outlet. Cord and plug set included.



115/60/1  
NEMA-5-15R

### OPTIONAL FEATURES/ACCESSORIES

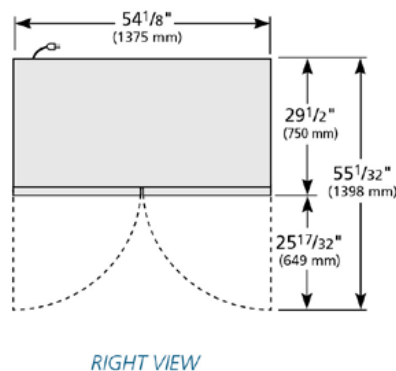
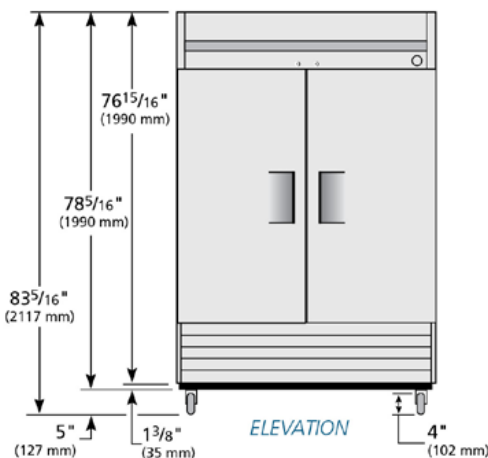
Upcharge and lead times may apply.

- 230 - 240V / 50 Hz.
- 6" (153 mm) standard legs.
- 6" (153 mm) seismic/flanged legs.
- Alternate door hinging (factory installed).
- Novelty baskets.
- Additional shelves.
- Half door bun tray racks. Each holds up to eleven 18"L x 26"D (458 mm x 661 mm) sheet pans (sold separately) (airflow guards need to be removed).
- Full door bun tray racks. Each holds up to twenty-two 18"L x 26"D (458 mm x 661 mm) sheet pans (sold separately) (airflow guards need to be removed).

#### \*CABINET INTERIOR

Beginning in October of 2014, True Manufacturing began the process of changing the standard interior finishes on select products. The interior liners of these units have changed from the traditional NSF-approved white aluminum to an NSF-approved clear coated aluminum that is silver in color. In addition, the traditional white PVC coated shelves have been switched to a gray PVC coating. There are no functional differences created by any of these changes, the difference is only in the appearance. The following product lines are affected by this change: T-Series, TUC, TWT, TSSU, TFP, TPP, TMC, TRCB. A sticker will be placed on the outside packaging so that units with this change can be identified in inventory.

## PLAN VIEW



#### WARRANTY\*

Three year warranty on all parts and labor and an additional 2 year warranty on compressor. (U.S.A. only)

METRIC DIMENSIONS ROUNDED UP TO THE NEAREST WHOLE MILLIMETER

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE



Model	Elevation	Right	Plan	3D	Back
T-49F	TFGY36E	TFEY03S	TFEY02P	TFGY363	

\*RESIDENTIAL APPLICATIONS: TRUE assumes no liability for parts or labor coverage for component failure or other damages resulting from installation in non-commercial or residential applications.

## TRUE FOOD SERVICE EQUIPMENT

2001 East Terra Lane • O'Fallon, Missouri 63366-4434 • (636)240-2400 • Fax (636)272-2408 • Toll Free (800)325-6152 • Intl. Fax# (001)636-272-7546 • www.truefmfg.com



**TRUE FOOD SERVICE EQUIPMENT, INC.**

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 Parts Dept. (800)424-TRUE • Parts Dept. Fax# (636)272-9471 • www.truemfg.com

Project Name: \_\_\_\_\_

Location: \_\_\_\_\_

Item #: \_\_\_\_\_ Qty: \_\_\_\_\_

Model #: \_\_\_\_\_

A/A #

S/S #

Model:  
**T-49**

**T-Series:**  
Reach-In Solid Swing Door Refrigerator



MSHCG

**T-49**

- ▶ True's solid door reach-in's are designed with enduring quality that protects your long term investment.
- ▶ Designed using the highest quality materials and components to provide the user with colder product temperatures, lower utility costs, exceptional food safety and the best value in today's food service marketplace.
- ▶ Oversized, factory balanced, refrigeration system holds 33°F to 38°F (.5°C to 3.3°C) for the best in food preservation.
- ▶ Stainless steel solid doors and front. The finest stainless available with higher tensile strength for fewer dents and scratches.
- ▶ Adjustable, heavy duty PVC coated shelves.
- ▶ Positive seal self-closing doors. Lifetime guaranteed door hinges and torsion type closure system.

**Bottom mounted units feature:**

- ▶ "No stoop" lower shelf.
- ▶ Storage on top of cabinet.
- ▶ Compressor performs in coolest, most grease free area of kitchen.
- ▶ Easily accessible condenser coil for cleaning.



Scan code for video

**ROUGH-IN DATA**

Specifications subject to change without notice.  
 Chart dimensions rounded up to the nearest 1/8" (millimeters rounded up to next whole number).

Model	Doors	Shelves	Cabinet Dimensions (inches) (mm)			HP	Voltage	Amps	NEMA Config.	Cord Length (total ft.) (total m)	Crated Weight (lbs.) (kg)
			L	D	H*						
T-49	2	6	54 1/8	29 1/2	78 3/8	1/3	115/60/1	5.8	5-15P	9	425
			1375	750	1991	1/2	230-240/50/1	5.4	▲	2.74	193

\* Height does not include 5" (127 mm) for castors or 6" (153 mm) for optional legs.

▲ Plug type varies by country.

2/15 Printed in U.S.A.

**APPROVALS:** \_\_\_\_\_

**AVAILABLE AT:** \_\_\_\_\_

Model:  
**T-49**

**T-Series:**  
Reach-In Solid Swing Door Refrigerator

**TRUE**®

## STANDARD FEATURES

### DESIGN

- True's commitment to using the highest quality materials and over sized refrigeration systems provides the user with colder product temperatures, lower utility costs, exceptional food safety and the best value in today's food service marketplace.

### REFRIGERATION SYSTEM

- Factory engineered, self-contained, capillary tube system using environmentally friendly (CFC free) 134A refrigerant.
- Extra large evaporator coil balanced with higher horsepower compressor and large condenser; maintains 33°F to 38°F (5°C to 3.3°C) for the best in food preservation.
- Sealed, cast iron, self-lubricating evaporator fan motor(s) and larger fan blades give True reach-in's a more efficient low velocity, high volume airflow design. This unique design ensures faster temperature recovery and shorter run times in the busiest of food service environments.
- Bottom mounted condensing unit positioned for easy maintenance. Compressor runs in coolest and most grease free area of the kitchen. Allows for storage area on top of unit.

### CABINET CONSTRUCTION

- Exterior - Stainless steel front. Anodized quality aluminum ends, back and top.
- Interior - attractive, NSF approved, clear coated aluminum liner. Stainless steel floor with coved corners.

- Insulation - entire cabinet structure and solid doors are foamed-in-place using Ecomate. A high density, polyurethane insulation that has zero ozone depletion potential (ODP) and zero global warming potential (GWP).
- Welded, heavy duty steel frame rail, black powder coated for corrosion protection.
- Frame rail fitted with 4" (102 mm) diameter stem castors - locks provided on front set.

### DOORS

- Stainless steel exterior with white aluminum liners to match cabinet interior. Doors extend full width of cabinet shell. Door locks standard.
- Lifetime guaranteed recessed door handles. Each door fitted with 12" (305 mm) long recessed handle that is foamed-in-place with a sheet metal interlock to ensure permanent attachment.
- Positive seal self-closing doors. Lifetime guaranteed door hinges and torsion type closure system.
- Magnetic door gaskets of one piece construction, removable without tools for ease of cleaning.

### SHELVING

- Six (6) adjustable, heavy duty PVC coated wire shelves 24 $\frac{5}{16}$ "L x 22 $\frac{3}{8}$ "D (624 mm x 569 mm). Four (4) chrome plated shelf clips included per shelf.
- Shelf support pilasters made of same material as cabinet interior; shelves are adjustable on  $\frac{1}{2}$ " (13 mm) increments.

### LIGHTING

- Incandescent interior lighting - safety shielded. Lights activated by rocker switch mounted above doors.

### MODEL FEATURES

- Exterior temperature display.
- Evaporator is epoxy coated to eliminate the potential of corrosion.
- NSF-7 compliant for open food product.

### ELECTRICAL

- Unit completely pre-wired at factory and ready for final connection to a 115/60/1 phase, 15 amp dedicated outlet. Cord and plug set included.



115/60/1  
NEMA-5-15R

### OPTIONAL FEATURES/ACCESSORIES

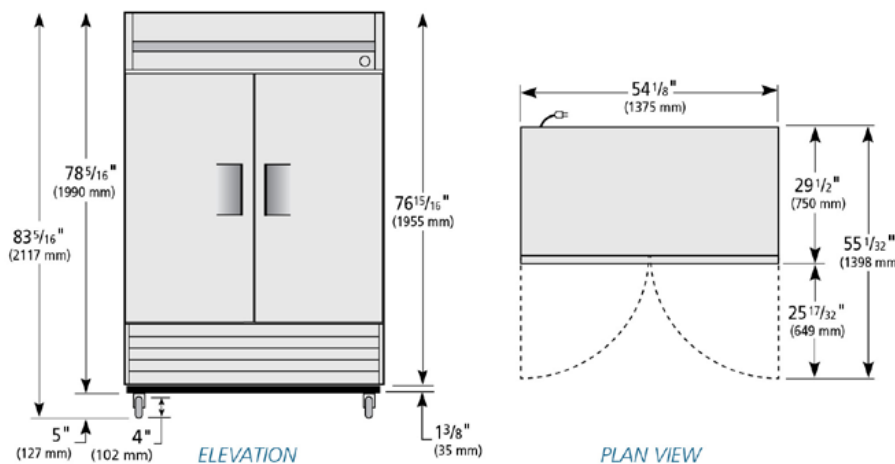
Upcharge and lead times may apply.

- 230 - 240V / 50 Hz.
- 6" (153 mm) standard legs.
- 6" (153 mm) seismic/flanged legs.
- Alternate door hinging (factory installed).
- Additional shelves.
- Half door bun tray racks. Each holds up to eleven 18"L x 26"D (458 mm x 661 mm) sheet pans (sold separately).
- Full door bun tray racks. Each holds up to twenty-two 18"L x 26"D (458 mm x 661 mm) sheet pans (sold separately).

#### \*CABINET INTERIOR

Beginning in October of 2014, True Manufacturing began the process of changing the standard interior finishes on select products. The interior liners of these units have changed from the traditional NSF-approved white aluminum to an NSF-approved clear coated aluminum that is silver in color. In addition, the traditional white PVC coated shelves have been switched to a gray PVC coating. There are no functional differences created by any of these changes, the difference is only in the appearance. The following product lines are affected by this change: T-Series, TUC, TWT, TSSU, TFP, TPP, TMC, TRCB. A sticker will be placed on the outside packaging so that units with this change can be identified in inventory.

## PLAN VIEW



#### WARRANTY\*

Three year warranty on all parts and labor and an additional 2 year warranty on compressor. (U.S.A. only)

METRIC DIMENSIONS ROUNDED UP TO THE NEAREST WHOLE MILLIMETER

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE



Model	Elevation	Right	Plan	3D	Back
T-49	TFGY36E	TFEY03S	TFEY02P	TFGY363	

\*RESIDENTIAL APPLICATIONS: TRUE assumes no liability for parts or labor coverage for component failure or other damages resulting from installation in non-commercial or residential applications.

## TRUE FOOD SERVICE EQUIPMENT

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Project \_\_\_\_\_

Item # \_\_\_\_\_

Quantity \_\_\_\_\_

## Powermite® Gas Booster Water Heaters

Model: PMG-100, -200

The Hatco Powermite® Gas Booster Water Heater provides 180°F (82°C) sanitizing hot water and long life dependability. Designed to fit under the dishtable, near the dishwasher, to minimize the heat loss that can occur when heaters are installed in a remote location. They can operate on either natural or propane gas and feature a burner system that utilizes both primary and secondary air for consistent ignition.

### Standard features

- Stainless steel tanks
- Stainless steel front and top, with powdercoat sides and back (stainless steel body available)
- Finned tube copper heat exchanger
- Spark to light with standing pilot
- Three tube type burners in the PMG-100, six tube type burners in the PMG-200
- Temperature/pressure relief valve
- Pressure reducing valve
- Two temperature/pressure gauges
- Low-water cut-off
- Blended phosphate water treatment system
- Shock absorber



### Options (available at time of purchase only)

- Stainless steel body and base
- Security package (Torx® screws and control cover)

### Accessories

- Brass Pressure Reducing Valve
- Stainless steel floor mounting leg assembly
- 6"-7" (152-178 mm) Adjustable Stainless Steel Legs (4)
- Air Interlock Switch
- Back Pressure Relief Valve
- High Altitude Orifice Kit (PMG-200 only)

### BOOSTER SIZING

#### Water Temperature Recovery Table in GPH (LPH) and °F (°C)

Model	Input MBH (1,000 BTU/HR)	Temperature Rise				
		30° (16°)	40° (22°)	50° (28°)	60° (33°)	70° (39°)
PMG-100	105	321 (1215)	241 ( 912)	193 ( 731)	161 ( 610)	138 (522)
PMG-200	195	602 (2279)	452 (1711)	361 (1367)	301 (1139)	258 (977)

**Note:** Installations above 2,000 ft. (610 m) will reduce the above capacities and may require orifice changes to meet IAS safety compliance. Consult "Installation and Operating Manual" for sizing adjustments and orifice changes.

### WATER QUALITY REQUIREMENTS

Incoming water in excess of 3.0 grains of hardness per gallon (GPG) (.75 grains of hardness per liter) must be treated and softened before being supplied to booster heater(s). Water containing over 3.0 GPG (.75 GPL) will decrease the efficiency and reduce the operating life of the unit.

**Note: Product failure caused by liming or sediment buildup is not covered under warranty.**



ANSI/NSF 5



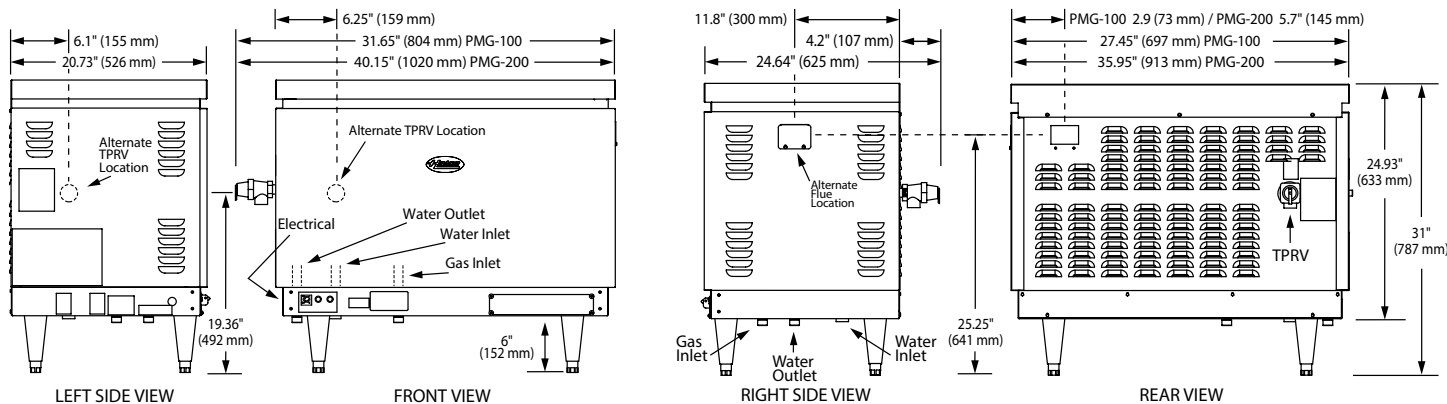
HATCO CORPORATION | P.O. Box 340500 Milwaukee, WI 53234-0500 U.S.A.

(800) 558-0607 | (414) 671-6350 | www.hatcocorp.com | equipmentsales@hatcocorp.com | intl@hatcocorp.com



# Powermite® Gas Booster Water Heaters

Model: PMG-100, -200



Models PMG-100 & PMG-200

## SPECIFICATIONS

### Atmospheric Hot Water Dispenser

Model	Dimensions (Width x Depth x Height*)	Capacity	Fuel	Vent <sup>^</sup>	Ship Weight*
PMG-100	27.45" x 20.73" x 31" (720 x 625 x 787 mm)	Input 105,000 BTUs/Hour Output - 84,800 = 24.8kW	Natural at 3.5" (89 mm) high burn or Propane/LP at 10" (254 mm) high burn	Forced draft system with 4" (102 mm) diameter vent pipe adapter	180 lbs. (82 kg) dry
PMG-200	35.95" x 24.64" x 31" (913 x 625 x 787 mm)	Input 195,000 BTUs/Hour Output - 156,000 = 45.7kW			215 lbs. (98 kg) dry

\* Shipping weight includes packaging.

\* Height includes 6" (152 mm) legs.

If using supplied right angle duct adaptor, add 6" (152 mm) to width or depth of unit.

<sup>^</sup> Before installing any method of venting you should contact the local code authority or your gas supplier to make sure that the final installation will be acceptable to the authorities who have jurisdiction. The proper method of venting a power vented gas appliance is too complicated to cover in this specification sheet and is explained in detail in the National Fuel Gas Code. Before installing the venting system, the person or agency making the installation must be familiar and experienced with the guidelines of the National Fuel Gas Code.

**ALL INSTALLATIONS MUST BE MADE BY A QUALIFIED INSTALLER IN ACCORDANCE WITH THE NATIONAL FUEL GAS CODE OR LOCAL CODES.**

### Electrical

120 VAC, 360 watt, 3.00 amps

### Connections

Gas - 3/4" NPT, Water - 3/4" NPT  
Electric - 120 VAC, 15 amp

### Fluing

Direct - combustion air enters bottom, flue gasses exit right side or back at top of unit. 4" (102mm) flue round

### Operating Water Pressure

150 PSI (1034 kPa) max. Relief valve set at 150 PSI (1034 kPa), 210° F (99° C)

### Operating Pressure Specifications at Manifold

Gas Type	Water Column at Pressure Tap	
	High Burn	
Natural	3.5" ( 89 mm)	
Propane/LP	10" (254 mm)	

### Gas Inlet Pressure

Gas Type	Water Column	
	Minimum	Maximum
Natural	5" (127 mm)	10.5" (267 mm)
Propane/LP	11" (254 mm)	13" (330 mm)

## PRODUCT SPECS

### Gas Booster Water Heater

The Gas Booster Water Heater to supply the final 180°F (82°C) rinse for the dishwasher shall be a Hatco Powermite® Model ... as manufactured for commercial use by the Hatco Corporation, Milwaukee, WI 53234 U.S.A.

The booster shall have the capacity to heat ... gph (lph) from 110°F to 180°F (43°C to 82°C) and it shall berated at ... btu, 120 volts, single phase. The stainless steel tank shall be designed for a working pressure of 150 psi (1034 kPa) and hydrostatically tested at 300 psi (2069 kPa).

The heater shall be complete with all internal plumbing, including 3/4" NPT pipe and fittings from inlet and outlet. All controls shall be built-in, and carry safety approval in accordance with ANSI 21.10.3. Sanitary approval shall be in accordance with NSF Standard 5. Proper surface mounting circuit breaker or fused disconnect switch shall be provided by electrical contractor.

The gas fired heating system shall be controlled by close tolerance immersion thermostats. The booster shall be protected with high temperature limit switch (ECO) and low water cut-off.

The heater shall consist of stainless steel front, top and stainless steel adjustable legs or stainless steel front and silver-gray hammertone sides and back with standard 6" (152 mm) legs.

The heater shall include a temperature/pressure relief valve, high-temperature limit, pressure reducing valve with bypass, indicating temperature/pressure gauge, shock absorber, and blended phosphate water treatment system.

Warranty consists of 24/7 parts and service assistance (US and Canada only).

**HATCO CORPORATION** | P.O. Box 340500 Milwaukee, WI 53234-0500 U.S.A.

(800) 558-0607 | (414) 671-6350 | www.hatcocorp.com | equipsales@hatcocorp.com | intl@hatcocorp.com

### MASTER-FIT® BTR

The Master-Fit® BTR series provides outstanding performance and maximum installation flexibility for both new construction and replacement applications. Multiple options for placement of water connections and low installation clearances are additional installer-friendly features.

#### FACTORY-INSTALLED DRAFT DIVERTER AND AUTOMATIC FLUE DAMPER (BTR-120-400 MODELS)

- Low-profile draft diverter helps for installation in tight spaces
- Automatic motorized flue damper helps minimize standby heat loss
- BTR-500 Model features induced draft design and no damper

#### THREE WATER CONNECTION OPTIONS FOR ADDED FLEXIBILITY

- Hot and cold water connections can be made through front, top or back of unit
- Eliminator™ system operates when cold water is connected through front

#### PERMAGLAS® ULTRA COAT™ GLASS LINING

- Exclusive process provides superior protection against corrosion
- CoreGard™ anode rods with stainless steel core provide additional corrosion protection

#### INTERMITTENT ELECTRONIC IGNITION

- Eliminates standing pilot, saves energy
- Includes power ON/OFF switch
- Provides flame failure response in less than one second

#### FACTORY-INSTALLED, CSA CERTIFIED AND ASME RATED T&P RELIEF VALVE

#### MAXIMUM HYDROSTATIC WORKING PRESSURE: 160 PSI

#### CODES AND STANDARDS

- Design-certified by UL (Underwriters Laboratories), according to ANSI Z.21.10.3 - CSA 4.3 standards governing storage-type water heaters
- Meets the thermal efficiency and standby loss requirements of the U. S. Department of Energy and current edition of ASHRAE/IESNA 90.1
- Design-certified by Underwriters Laboratories Sanitation to NSF Standard 5 for 180°F (82°C) water
- Optional ASME tank construction available on select models

#### THE ELIMINATOR™ SELF-CLEANING SYSTEM

- Designed to significantly reduce or eliminate sediment build-up inside the tank
- Reduced sediment build-up maintains rated thermal efficiency and reduces water heating costs
- Self-cleaning system maximizes tank life

#### 3-YEAR LIMITED TANK / 1-YEAR LIMITED PARTS WARRANTY

- For complete warranty information, consult written warranty or go to [hotwater.com](http://hotwater.com).



BTR-120 THROUGH BTR-500(A)



ON SELECT MODELS



THE ELIMINATOR™ SELF-CLEANING SYSTEM





# Commercial Gas Water Heaters

## OTHER MASTER-FIT® FEATURES

### FULLY AUTOMATIC CONTROL SYSTEM

- Manual-reset gas shut-off device prevents excessive water temperature
- Adjustable thermostat with 120°F — 180°F range
- Gas pressure regulator and pilot filter

### HANDHOLE CLEANOUT

- Allows easy access to tank interior for cleaning

### PLUG KITS

- Pipe nipples and caps included to plug unused water connections MASTER-FIT® OPTIONS:

### MANIFOLD KITS FOR MULTIPLE HEATER INSTALLATIONS

- 2-unit kit, Part Number 9003426205
- 3-unit kit, Part Number 9003427205
- 4-unit kit, Part Number 9003428205

### OPTIONAL LEG KIT TO MEET NSF STANDARD 5

- For all BTR models, Part Number 9003425205

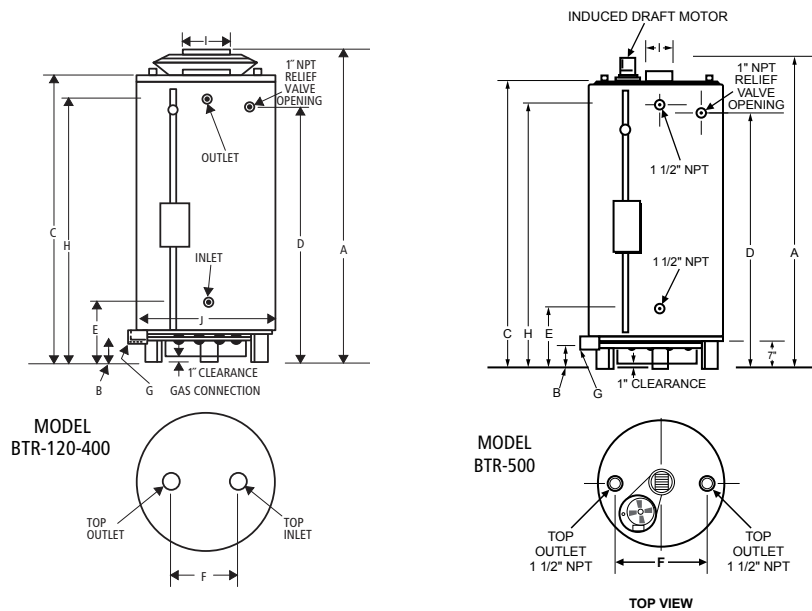
### MECHANICAL VENTING KITS

- For BTR-120 through BTR-200, Part Number 9005381205
- For BTR-250 through BTR-400, Part Number 9003434205
- For installation of approved power venter to operate in conjunction with water heater thermostat
- Field wiring should conform to latest version of the National Electric Code ANSI/NFPA No.70
- For more information, consult manual shipped with water heater or contact the A. O. Smith Technical Support Center at 1-800-527-1953

Water Connections in Inches						
Model Number	Inlet			Outlet		
	Top	Front	Back	Top	Front	Back
BTR-120	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
BTR-154	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
BTR-180	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
BTR-197	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
BTR-198	1-1/2	1-1/2	2	1-1/2	1-1/2	2
BTR-199	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
BTR-200(A)	1-1/2	2	2	1-1/2	2	2
BTR-250(A)	1-1/2	2	2	1-1/2	2	2
BTR-251(A)	N/A	1-1/2	1-1/2	N/A	1-1/2	1-1/2
BTR-275(A)	1-1/2	2	2	1-1/2	2	2
BTR-305(A)	N/A	1-1/2	1-1/2	N/A	1-1/2	1-1/2
BTR-365(A)	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
BTR-400(A)	1-1/2	2	2	1-1/2	2	2
BTR-500(A)	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2



# Commercial Gas Water Heaters



## Dimensions

Model Number	Inches or CM	Dimensions										Approx. Shipping Weight	
		A	B	C	D	E	F	G	H	I	J	Standard	ASME
BTR-120*	Inches	69-3/4"	4-1/4"	59-1/2"	50-7/8"	19-11/16"	19"	1 1/2"	51-7/8"	6"	27-3/4"	400 lbs.	-
	CM	177	11	151	129	50	48	-	132	15	71	182 Kg	-
BTR-154	Inches	73"	4-1/4"	66-1/2"	57-7/8"	19-11/16"	19"	1 1/2"	59"	6"	27-3/4"	470 lbs.	-
	CM	185	11	169	147	50	48	-	150	15	71	213 Kg	-
BTR-180	Inches	67-1/2"	4-1/2"	62"	53-1/2"	20-1/2"	21"	1 1/2"	54-5/8"	6"	27-3/4"	470 lbs.	-
	CM	171	12	157	136	52	53	-	139	15	71	213 Kg	-
BTR-197	Inches	75"	4-1/2"	70"	61-1/2"	20-1/2"	21"	1 1/2"	62-5/8"	6"	27-3/4"	603 lbs.	-
	CM	192	12	178	157	52	53	-	159	15	71	273 Kg	-
BTR-198	Inches	75"	4-1/2"	70"	61-1/2"	20-1/2"	21"	1 1/2"	61-1/2"	6"	27-3/4"	603 lbs.	-
	CM	192	12	178	157	52	53	-	150	15	71	273 Kg	-
BTR-199	Inches	67-1/2"	4-1/2"	62"	53-1/2"	20-1/2"	21"	1 1/2"	54-1/8"	6"	27-3/4"	470 lbs.	-
	CM	171	12	157	136	52	53	-	139	15	71	213 Kg	-
BTR-200(A)	Inches	72"	4-1/2"	65-1/8"	55-7/8"	19-3/4"	23"	1 1/2"	56-3/8"	8"	30-1/4"	630 lbs.	725 lbs.
	CM	183	12	165	142	50	58	-	143	20	77	286 Kg	329 Kg
BTR-250(A)**	Inches	72"	4-1/2"	65-1/8"	55-7/8"	19-3/4"	23"	1 1/2"	56-3/8"	8"	30-1/4"	630 lbs.	725 lbs.
	CM	183	12	165	142	50	58	-	143	20	77	286 Kg	329 Kg
BTR-251(A)**	Inches	75"	4-1/2"	65-3/4"	57-1/4"	20"	N/A	1 1/2"	58-3/4"	8"	27-3/4"	750 lbs.	862 lbs.
	CM	191	12	167	145	51	N/A	-	149	20	70	341 Kg	391 Kg
BTR-275(A)**	Inches	72"	4-1/2"	65-1/8"	55-7/8"	19-3/4"	23"	1 1/2"	56-3/8"	8"	30-1/4"	630 lbs.	725 lbs.
	CM	183	12	165	142	50	58	-	143	20	77	286 Kg	329 Kg
BTR-305(A)	Inches	75"	4-1/2"	6-3/4"	57-1/4"	20"	N/A	1 1/2"	58-3/4"	8"	27.75	750 lbs.	862 lbs.
	CM	191	12	167	145	51	N/A	-	149	20	70	341 Kg	391 Kg
BTR-365(A)	Inches	79-1/2"	4-1/2"	70-1/4"	62-1/2"	22-1/2"	23"	3/4"	63"	8"	27-3/4"	725 lbs.	833 lbs.
	CM	202	12	178	159	57	58	-	160	20	71	329 Kg	379 Kg
BTR-400(A)	Inches	75-1/2"	4-1/2"	67-1/2"	58-1/4"	26-3/4"	23"	3/4"	59"	8"	30-1/4"	760 lbs.	874 lbs.
	CM	192	12	171	148	68	58	-	150	20	77	345 Kg	396 Kg
BTR-500(A)†**	Inches	81-1/2"	17.5"	77-1/4"	67-1/2"	27-1/8"	21"	1"	67-1/2"	8"	27-3/4"	812 lbs.	857 lbs.
	CM	209	44	196	171	69	53	3	171	20	70	368 Kg	389 Kg

Specify when ordering propane (LP) gas.

\*Model BTR 120 is shipped with a 6" x 5" flue outlet adapter.

\*\*Models BTR 250, 251, 275 and 500 are shipped with a 8" x 6" flue outlet adapter.

Standard models certified for sea level to 2,000 ft. elevation. Order SMR 554 for elevations up to 8,000 ft.

† BTR-500 model features induced draft design and no damper.

Back side water connections, Inlet and outlet, are represented by "E" and "H" respectively for height dimensions.

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# Commercial Gas Water Heaters

## CAPACITY, INPUT AND OUTPUT

Model Number	Input BTU/HR	Gallons or Litres	Tank Size	Litres	Recovery - Gallons or Litres Per Hour at Degree Rise		
					40°F	100°F	140°F
					22°C	56°C	78°C
BTR-120*	120,000	U.S. Gallons	71	GPH	291	116	83
		Litres	268	LPH	1102	439	314
BTR-154	154,000	U.S. Gallons	81	GPH	373	149	107
		Litres	307	LPH	1412	564	405
BTR-180	180,000	U.S. Gallons	81	GPH	434	174	124
		Litres	307	LPH	1643	659	469
BTR-197	199,000	U.S. Gallons	100	GPH	482	193	132
		Litres	379	LPH	1825	731	500
BTR-198	199,000	U.S. Gallons	100	GPH	482	193	132
		Litres	379	LPH	1825	731	500
BTR-199	199,000	U.S. Gallons	81	GPH	482	193	132
		Litres	307	LPH	1825	731	500
BTR-200(A)	199,000	U.S. Gallons	100	GPH	482	193	132
		Litres	379	LPH	1825	731	500
BTR-250(A)**	250,000	U.S. Gallons	100	GPH	606	242	173
		Litres	379	LPH	2294	918	655
BTR-251(A)**	251,000	U.S. Gallons	65	GPH	608	243	174
		Litres	246	LPH	2303	921	658
BTR-275(A)**	275,000	U.S. Gallons	100	GPH	667	267	190
		Litres	379	LPH	2524	1009	721
BTR-305(A)	305,000	U.S. Gallons	65	GPH	739	296	211
		Litres	246	LPH	2799	1120	800
BTR-365(A)	365,000	U.S. Gallons	85	GPH	885	354	253
		Litres	322	LPH	3349	1340	957
BTR-400(A)	390,000	U.S. Gallons	100	GPH	970	388	277
		Litres	379	LPH	3671	1468	1049
BTR-500(A)†**	500,000	U.S. Gallons	85	GPH	1212	485	346
		Litres	322	LPH	4588	1835	1311

Specify when ordering propane (LP) gas.

\*Model BTR 120 is shipped with a 6" x 5" flue outlet adapter.

\*\*Models BTR 250, 251, 275 and 500 are shipped with a 8" x 6" flue outlet adapter.

Standard models certified for sea level to 2,000 ft. elevation. Order SMR S54 for elevations up to 8,000 ft.

† BTR-500 model features induced draft design and no damper.

Recovery based on 80% efficiency.

## SPECIFICATION

(Natural or Propane) gas water heater(s) shall be A. O. Smith Master-Fit® model # \_\_\_\_\_ or equal, with a storage capacity of \_\_\_\_\_ gallons, an input rating of \_\_\_\_\_ BTUs per hour, a recovery rating of \_\_\_\_\_ gallons per hour (gph) at 100°F rise and a maximum hydrostatic working pressure of 160 psi. Water heater(s) shall be protected against overheating caused by the buildup of scale, film and other sediment by a self-cleaning device, positioned inside the tank so that it directs the flow of inlet water to keep precipitated solids in suspension so that they are removed from the water heater on that or successive draws. Glasslined water heater(s) shall also be protected against electrolytic corrosion by multiple factory-installed anode rods. In addition, water heater(s) shall: 1) Be equipped with an integrated control system consisting of a 180°F adjustable thermostat with upper and lower sensing bulbs. 2) Be equipped with intermittent electronic ignition, a manual reset gas shutoff device, a gas pressure regulator, factory-installed, CSA Certified and ASME Rated T&P relief valve and 2-3/4" x 3-3/4" tank inspection port. 3) Be design-certified by UL (Underwriters Laboratories) to current edition of ANSI Z.21.10.3 - CSA 4.3 standards governing storage-type water heaters. 4) Meets the thermal efficiency and standby loss requirements of the U. S. Department of Energy and Current Edition of ASHRAE/ IESNA 90.1. 5) Have a 3-year limited warranty against corrosion as outlined in the written warranty.

For technical information, call 800-527-1953. A. O. Smith Corporation reserves the right to make product changes or improvements without prior notice.



Item # \_\_\_\_\_

Job \_\_\_\_\_

## Metro C5 8 Series Controlled Temperature Holding Cabinet

- **Control:** The intuitive 8 Series solid state controller provides continuous closed loop monitoring of temperature providing accurate control over the internal environment of the cabinet, resulting in safe and hot food. Actual temperature is measured, displayed, and controlled.
- **Performance:** Rapid heat-up and recovery times are achieved with a digitally controlled ducted heating system. The intelligent controller assures food is held at the desired temperature. Low temperature alarm assures cabinet is performing within desired temperature range.
- **Passive Humidity:** An integral water pan system can be used to add humidity to the cabinet environment, improving food quality.
- **Configurations:**
  - Sizes: Full Height,  $\frac{3}{4}$  Height,  $\frac{1}{2}$  Height, and Under Counter.
  - Doors: Full Length Solid, Full Length Clear, Dutch Solid, Dutch Clear. All are lift off and field reversible.
  - Reach-In or Pass-Thru (not available on under counter and  $\frac{3}{4}$  height).
  - Materials: Stainless Steel and Aluminum.
- **Capacity:** Universal slides hold 18"x26" sheet pans or 12"x20" steam table pans on adjustable 1 $\frac{1}{2}$ " increments. Lip load slides hold 18"x26" sheet pans on 1 $\frac{1}{2}$ " increments. Optional Wire Shelf interfaces with universal slide system to accommodate small items and pans.
- **Reliability:** Reliability and durability are designed into C5 from the ground up. High-quality components and robust construction provide a long life of service and worry-free use.
- **Top-Mounted Controls:** Ergonomic user-friendly controls are mounted at the top of the cabinet for easier access, better readability, to prevent damage, and to simplify cleaning.
- **NAFEM Data Protocol:** The C5 controller is NDP capable.
- **ENERGY STAR:** Full Height,  $\frac{3}{4}$  Height, and  $\frac{1}{2}$  Height Stainless Steel reach-in models with solid doors are ENERGY STAR rated.



Full Height  
Dutch Solid  
Doors

Under Counter  
Full Clear Door $\frac{1}{2}$  Height  
Full Solid Door $\frac{3}{4}$  Height  
Full Clear DoorFull Height  
Dutch Clear Doors

### 8 Series Controller:

- **Temperature:** Measures & displays actual cabinet temperature
- **Intuitive:** Easy-to-use controls that anyone can understand
- **Low-Temp Alarm:** Assures cabinet is operating at desired temperature
- **Recall & Memory:** View settings at the touch of a button. Settings are saved when turned off.



Intuitive

Low-Temp Alarm



**InterMetro Industries Corporation**  
North Washington Street  
Wilkes-Barre, PA 18705  
www.metro.com



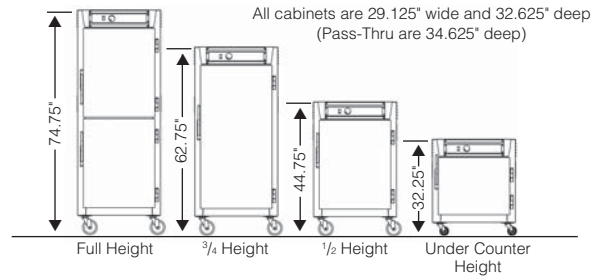
Metro C5 8 Series Controlled Temperature Holding Cabinet

13.98



## Metro C5 8 Series Controlled Temperature Holding Cabinet

### Specifications



- **Cabinet Material:** Type 304 stainless steel; 20-gauge polished exterior; 22-gauge interior, or .063" aluminum, brushed exterior, natural interior.
- **Insulation:** Full perimeter, 2.5" thick, high-density fiberglass. R Value=9.9.
- **Casters:** Four casters with 5" donut neoprene wheel, double ball bearing swivel, ball bearing axle, nickel plated, two with brake. 3" rubber casters on Under Counter models.
- **Doors:**
  - Solid doors are fully insulated, double-panel construction.
  - Clear doors are double-pane, tempered glass. Argon filled with Low-E coating.
- **Hinges:** Self-closing, lift-off, double hinged, with long-life nylon bearings.
- **Gaskets:** High temperature, cabinet mounted, Santoprene gaskets.
- **Latches:** Chrome plated, high-strength magnetic pull latch with lever-action release.
- **Handles:** Four built-in polymer handles.
- **Universal Slides:** Universal wire slides; 1/4" diameter nickel-chrome wire adjustable on 1/2" increments. Type 304, stainless steel vertical standards.
- **Lip Load Slides:** 1 1/2"x1/2"x.063" extruded aluminum channel slides on .063" Aluminum vertical standards.
- **Display and Controls:** Intelligent cabinet temperature control with digital display.
- **Heat Generation System:** Thermostatically controlled closed loop feedback with 1950 Watt heating element, ball bearing blower motor, and ducted air system. Low temperature alarm enable/disable.
- **Cord:** 7 1/2' cord with NEMA 5-20P plug. Cord mounted on top (Full, 3/4, Pass Thru) or back (1/2, Under Counter) can be field reversed.
- **Thermal Performance:** 200° F maximum temperature.
- **Recommended Clearances from Enclosures:** 1 1/2" clearance from cabinet walls on sides and back, 6" clearance on top. Minimum 1/2" clearance above under counter units is required.
- **Slide Capacities:**

Cabinet Size	Universal Wire Pan Capacity**			Lip Load Pan Capacity
	Slide Pairs Provided	Max.*	18"x26"	
Full Height	18	37	18	35
Full Height Dutch	18	35	17	34
3/4 Height	14	29	13	27
1/2 Height	8	17	8	17
Under Counter	5	10	5	10

\*Maximum number of slide pairs @ 1 1/2" spacing. Additional slide pairs ordered separately.  
\*\*Capacity based on standard number of slides provided.

All Metro Catalog Sheets are available on our website: [www.metro.com](http://www.metro.com)



### InterMetro Industries Corporation

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Information and specifications are subject to change without notice. Please confirm at time of order

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### Reach-In Model Number Description

Cabinet Height  
9 = Full Height  
7 = 3/4 Height  
5 = 1/2 Height  
3 = Under Counter \*\*

Door Style  
FS = Full Length Solid  
FC = Full Length Clear  
DS = Dutch Solid \*  
DC = Dutch Clear \*

Slide Type  
U = Universal Wire  
L = Lip Load Aluminum

**C589-SDS-U**

Cabinet Material  
S = Stainless  
N = Aluminum

NEMA 5-20P

For Standard Wattage Cabinets (120V, 16A, 60Hz, 2000W)

\*Please note: Dutch doors only available on full-size models.  
\*\*Please note: Under counter not available in 120V, 2000W.

### Pass-Thru Model Number Description

**C589-SDS-UPDS**

\*Please note: Pass-Thru is only available on Full and 1/2 Height Models.

### Low Watt Model Number Description

**C589L-SDS-U**

NEMA 5-15P

Add "L" for Lower Wattage Cabinets (120V, 12A, 60Hz, 1440W)

### Export Model Number Description

**C589X-SDS-U**

NEMA 6-15P

Add "X" for Export Cabinets (220-240V, 7.6-8.3A, 50/60Hz, 1681-2000W)

### Models with Accessories or Options

**C589-SDS-UA**

**C589-SDS-UPDSA**

An "A" suffix indicates that accessories need to be factory assembled to the cabinet. Order accessories separately.

### Options/Accessories:

- Small Item Shelf (C5-SHELF-S)
- Universal Slide Pair, chrome (C5-USLIDEPR-C)
- Universal Slide Pair, stainless (C5-USLIDEPR-S)
- Flush Door Latch (C5-LATCHFLUSH)\*
- Key Locking Door Latch (C5-LATCHLOCK)\*
- Twist Locking Door Latch (C5-LATCHTWST)\*
- Full Perimeter Bumper (C5-PERMBUMP)
- Control Panel Cover (C5-COVER)
- Bumper & Drip Trough (C5-BUMPDRIIP)
- Rear Push Handle (C5-HANDLE)
- 6" Stainless Steel Legs (C5-SSLEGS)
- 6" Casters (C5-6CASTER)
- 5" Rear Rigid Casters (C5-5RDGCSTR)
- Straight Plug, 20 Amp, 120V (C5-STRPLG-20)
- Straight Plug, 15 Amp, 120V (C5-STRPLG-15)
- Twist Lock Plug, 20 Amp, 120V (C5-RTWSTPLG)
- Twist Lock Plug, 15 Amp, 120V (C5-RTWSTPLG-15)
- Factory Left Hand Hinging (DD3768)
- Factory Same-Side Pass-thru Door Hinging (C5-SAMESIDE)
- Stainless Steel Universal Slide Upgrades
  - Full Height (C5-USLIDE-9S)
  - 3/4 Height (C5-USLIDE-7S)
  - 1/2 Height (C5-USLIDE-5S)
  - Under Counter (C5-USLIDE-3S)

\*Please note: (1) door latch must be ordered for each door (i.e. - dutch doors require (2) door latches; pass-thru dutch doors require (4) door latches)

Metro Heated cabinets are for hot food holding applications only.

L03-265  
Rev. 02/12  
Printed in U.S.A.



We put space to work.

Item # \_\_\_\_\_

Job \_\_\_\_\_

## MetroMax Q® Polymer / Wire Shelving

Quick-to-adjust, corrosion resistant shelving constructed of removable polymer open grid shelf mats, wire shelf frames, and corner releases. Shelf frames and steel posts have an epoxy coating over an electroplated substrate. Shelves and epoxy coated posts offer a 15 year warranty against rust and corrosion. Optional corrosion proof polymer posts are available. Microban® antimicrobial product protection is built into the shelf mats and posts. Shelf has a rigid four-sided frame with center truss(es). Robust corner provides complete 360° capture of the wedge and post for added stability. Stationary units have maximum capacity of 2,000 lbs. (907kg) evenly distributed. Mobile units (with stem casters) offer a maximum total unit load of 900 lbs. (408kg). Units assemble easily — shelves mount on four one-piece wedges along grooved, numbered posts and adjust on 1" (25mm) increments.

- **Forever Strong:** Proven corner connection and four-sided shelf frame with center truss(es) assures stability and strength in stationary, mobile, and high-density track shelving configurations.  
800 lbs. (363kg) per shelf for lengths of 24" to 48" (610 to 1219mm)  
600 lbs. (272kg) per shelf for lengths of 54" (1372mm) or longer  
Stationary unit: 2000lbs (907kg) evenly distributed.  
Mobile unit (with stem casters): Up to 900lbs. (408kg).  
Multiply the caster load rating by 3 to determine actual rating.
- **Rust & Corrosion Resistant:** Corrosion resistant shelves and posts offer a 15 year warranty against rust and corrosion.
- **Easy to Clean and Maintain:** Polymer mats can be easily removed and cleaned in a sink or commercial washer / dish machine.
- **Microban® Antimicrobial Product Protection** is built into the shelf mats and posts to inhibit the growth of bacteria, mold, mildew, and fungus that cause odors and product degradation. Microban product protection keeps the product "cleaner between cleanings".
- **Quick-to-Adjust:** Patented corner release allows shelves to be adjusted without tools. Simply flip each corner release, relocate the wedge connectors on the posts, and reposition the shelf. Quickly adjust shelves to reclaim wasted vertical space.
- **Efficient Use of Space:** Shelves adjust on 1" (25mm) increments along the post to maximize the use of available vertical space.
- **Fast, Easy Assembly:** Shelves are ready to use right out of the box. One-piece wedges securely attach to the posts — Raised beads on the back of each wedge snap into the grooves on the post. Window on wedge aligns with numbers on the post to locate the desired shelf position. Shelf mounts on four wedges, A unit can be assembled without tools in minutes.
- **Interchangeable:** Part of the MetroMax platform, MetroMax Q shelves are compatible on the same shelving units with MetroMax i and MetroMax 4 shelves.
- **Open Grid and Solid Mat Options:** MetroMax Q is available with open grid mats. Open grid shelves promote air circulation and light penetration. For 21" (530mm) deep MetroMax Q, solid mat overlays are available. For 18" and 24" (457 and 610mm) depths, MetroMax i or MetroMax 4 solid shelves may be added when solid shelves are required.
- **NSF Listed** for all environments.
- **Optional Accessories** are on spec sheet 9.25.

\*MICROBAN® and the MICROBAN® symbol are registered trademarks of the Microban® Products Company, Huntersville, NC. Microban® product protection does not by itself protect a user from food borne illness. Product must be routinely cleaned.

All Metro Catalog Sheets are available on our website: [www.metro.com](http://www.metro.com)



Supports good  
**HACCP**  
processes



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Product Information. U.S. and Canada: 1.800.992.1776  
Outside U.S. and Canada: [www.metro.com/contactus](http://www.metro.com/contactus)

L02-178  
Printed in U.S.A. 3/18

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**MetroMax Q®** Polymer / Wire Shelving

**9.21**

Job \_\_\_\_\_

# MetroMax Q<sup>®</sup> POLYMER / WIRE SHELVING



We put space to work.<sup>®</sup>

### Material Specifications:

- **Shelf Mats:** Injection-molded polypropylene with exclusive built-in Microban<sup>®</sup> antimicrobial product protection.
- **Shelf frames:** Steel with electroplated substrate and highly durable, abrasion-resistant epoxy finish.
- **Epoxy-coated posts:** Steel with electroplated substrate and highly durable, abrasion-resistant epoxy finish. Epoxy finish has built-in Microban antimicrobial product protection. The adjustable foot is reinforced nylon.
- **Shelf Wedge Connector:** Reinforced nylon.
- **Temperature range:** -20°F (-29°C) to 125°F (52°C) continuous use, with intermittent exposure to 200°F (93°C) for cleaning. Visit metro.com/service-support for cleaning guidelines.



**Replacement MetroMax Q Wedges**  
Cat. No. MQ9985  
Bag of 4  
(included with each shelf)

### Standard Interchangeable Shelves

- Part number includes shelf with removable mats and one bag of wedges

Shelf with Grid Mat Model No.	Nominal Size		Actual Size		Approx. Pkd. Wt.				
	Width (in.)	Length (mm)	Width (in.)	Length (mm)	(lbs.)	(kg)			
MQ1824G	18	457	24	610	18 <sup>3</sup> / <sub>8</sub>	23 <sup>13</sup> / <sub>16</sub>	605	6.2	2.8
MQ1830G	18	457	30	762	18 <sup>3</sup> / <sub>8</sub>	29 <sup>13</sup> / <sub>16</sub>	757	8.0	3.6
MQ1836G	18	457	36	914	18 <sup>3</sup> / <sub>8</sub>	35 <sup>13</sup> / <sub>16</sub>	910	9.7	4.4
MQ1842G	18	457	42	1067	18 <sup>3</sup> / <sub>8</sub>	41 <sup>13</sup> / <sub>16</sub>	1062	11.4	5.2
MQ1848G	18	457	48	1219	18 <sup>3</sup> / <sub>8</sub>	47 <sup>13</sup> / <sub>16</sub>	1215	13.2	6.0
MQ1854G	18	457	54	1372	18 <sup>3</sup> / <sub>8</sub>	53 <sup>13</sup> / <sub>16</sub>	1367	15.0	6.8
MQ1860G	18	457	60	1524	18 <sup>3</sup> / <sub>8</sub>	59 <sup>13</sup> / <sub>16</sub>	1519	16.7	7.6
MQ1872G	18	457	72	1829	18 <sup>3</sup> / <sub>8</sub>	71 <sup>13</sup> / <sub>16</sub>	1824	20.0	9.1
MQ2124G	21	530	24	610	21 <sup>3</sup> / <sub>8</sub>	23 <sup>13</sup> / <sub>16</sub>	605	8.0	3.6
MQ2130G	21	530	30	762	21 <sup>3</sup> / <sub>8</sub>	29 <sup>13</sup> / <sub>16</sub>	757	9.7	4.4
MQ2136G	21	530	36	914	21 <sup>3</sup> / <sub>8</sub>	35 <sup>13</sup> / <sub>16</sub>	910	11.4	5.2
MQ2142G	21	530	42	1067	21 <sup>3</sup> / <sub>8</sub>	41 <sup>13</sup> / <sub>16</sub>	1062	12.8	5.8
MQ2148G	21	530	48	1219	21 <sup>3</sup> / <sub>8</sub>	47 <sup>13</sup> / <sub>16</sub>	1215	14.5	6.6
MQ2154G	21	530	54	1372	21 <sup>3</sup> / <sub>8</sub>	53 <sup>13</sup> / <sub>16</sub>	1367	16.7	7.6
MQ2160G	21	530	60	1524	21 <sup>3</sup> / <sub>8</sub>	59 <sup>13</sup> / <sub>16</sub>	1519	18.5	8.4
MQ2172G	21	530	72	1829	21 <sup>3</sup> / <sub>8</sub>	71 <sup>13</sup> / <sub>16</sub>	1824	21.7	9.9
MQ2424G	24	610	24	610	24 <sup>3</sup> / <sub>8</sub>	23 <sup>13</sup> / <sub>16</sub>	605	9.7	4.4
MQ2430G	24	610	30	762	24 <sup>3</sup> / <sub>8</sub>	29 <sup>13</sup> / <sub>16</sub>	757	11.4	5.2
MQ2436G	24	610	36	914	24 <sup>3</sup> / <sub>8</sub>	35 <sup>13</sup> / <sub>16</sub>	910	13.1	6.0
MQ2442G	24	610	42	1067	24 <sup>3</sup> / <sub>8</sub>	41 <sup>13</sup> / <sub>16</sub>	1062	14.1	6.4
MQ2448G	24	610	48	1219	24 <sup>3</sup> / <sub>8</sub>	47 <sup>13</sup> / <sub>16</sub>	1215	15.8	7.1
MQ2454G	24	610	54	1372	24 <sup>3</sup> / <sub>8</sub>	53 <sup>13</sup> / <sub>16</sub>	1367	18.5	8.4
MQ2460G	24	610	60	1524	24 <sup>3</sup> / <sub>8</sub>	59 <sup>13</sup> / <sub>16</sub>	1519	20.3	9.2
MQ2472G	24	610	72	1829	24 <sup>3</sup> / <sub>8</sub>	71 <sup>13</sup> / <sub>16</sub>	1824	23.5	10.7

### Solid Shelf Options:

MetroMax i and MetroMax 4 solid shelves may be used with MetroMax Q shelves on the same unit. See spec sheets 9.20 & 9.22 for model numbers.

### Posts

- Corrosion resistant epoxy-coated steel option.
- Corrosion proof polymer option.

STATIONARY POST WITH LEVELING FOOT									
Epoxy-Coated Steel Model No.	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Polymer Model No.	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Nominal Height (in.) (mm)	Actual Height (in.) (mm)		
MQ13PE	1.0	0.5	MX13P	0.5	0.2	13	370	14 <sup>3</sup> / <sub>16</sub>	360
MQ27PE	2.0	0.9	MX27P	0.9	0.4	27	685	28 <sup>3</sup> / <sub>16</sub>	716
MQ33PE	2.5	1.1	MX33P	1.0	0.5	33	875	34 <sup>3</sup> / <sub>16</sub>	868
MQ54PE	4.0	1.8	MX54P	1.6	0.7	54	1370	54 <sup>3</sup> / <sub>16</sub>	1376
MQ63PE	4.5	2.0	MX63P	1.8	0.8	63	1585	62 <sup>3</sup> / <sub>16</sub>	1580
MQ74PE	5.5	2.5	MX74P	2.3	1.0	74	1690	74 <sup>3</sup> / <sub>16</sub>	1884
MQ86PE	6.5	2.9	MX86P	2.5	1.4	86	2195	86 <sup>3</sup> / <sub>16</sub>	2189

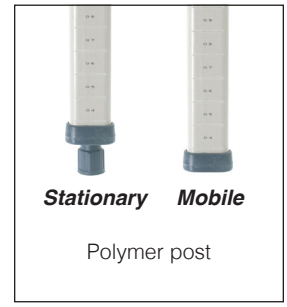
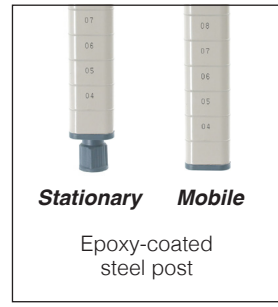
MOBILE POST FOR STEM CASTER									
Epoxy-Coated Steel Model No.	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Polymer Model No.	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)	Nominal Height (in.) (mm)	Actual Height (in.) (mm)		
MQ13UPE	1.0	0.5	MX13UP	0.5	0.2	13	370	13 <sup>3</sup> / <sub>16</sub>	335
MQ27UPE	2.0	0.9	MX27UP	0.9	0.4	27	685	27 <sup>3</sup> / <sub>16</sub>	691
MQ33UPE	2.5	1.1	MX33UP	1.0	0.5	33	875	33 <sup>3</sup> / <sub>16</sub>	843
MQ54UPE	4.0	1.8	MX54UP	1.6	0.7	54	1370	53 <sup>3</sup> / <sub>16</sub>	1351
MQ63UPE	4.5	2.0	MX63UP	1.8	0.8	63	1585	61 <sup>3</sup> / <sub>16</sub>	1554
MQ74UPE	5.5	2.5	MX74UP	2.3	1.0	74	1690	73 <sup>3</sup> / <sub>16</sub>	1859
MQ86UPE	6.5	2.9	MX86UP	3.0	1.4	86	2195	85 <sup>3</sup> / <sub>16</sub>	2164

\*Stationary posts include an adjustable leveling foot to compensate for uneven floors. Leveling foot can be adjusted 1" (25mm). Special height cut posts are available. Consult your Metro representative.

### Heavy-Duty Dunnage Shelves

- Weight capacity per shelf evenly distributed: 1,200 lbs. (544kg) on shelves up to and including 48" (1219mm) long; 900 lbs. (408kg) for shelves 60" (1524mm) long.
- Dunnage shelves are recommended for use on units with four posts, not on an add-on unit with two posts.

Grid Mat Model No.	Nominal		Approx. Pkd. Wt.			
	Width (in.)	Length (mm)	(lbs.)	(kg)		
MHP2436G	24	610	36	914	21	9.5
MHP2448G	24	610	48	1220	27	12.2
MHP2460G	24	610	60	1524	33	15.0



MetroMax Q<sup>®</sup> Polymer / Wire Shelving

an Ali Group Company



The Spirit of Excellence



Item # \_\_\_\_\_

Job \_\_\_\_\_

## TOP-TRACK™ HIGH-DENSITY STORAGE SYSTEMS

for Super Erecta® and Super Adjustable Super Erecta® Systems

- *Reduce Inventory Costs*
- *Increase Revenues*
- *Maximize Storage Capacity*
- *Increase Productivity*
- *Simplify Operations*
- *Cleaner Between Cleanings*



- **Maximizes Storage Capacity:** Top-Track can increase the storage capacity of a given area by 30% to 40%. Mobile units are used between stationary units. Only one aisle, which can be opened between any two units as needed, is required. The Top-Track Storage system utilizes far less aisle space and maximizes the usable storage area.
- **Cost-Saving Performance:** This efficient utilization of space addresses the storage needs of new or growing operations. In a new facility, less square footage would have to be dedicated to storage. In growing operations, Top-Track can eliminate the need to expand the facility to handle increasing storage requirements, greatly reducing the costs associated with a growing business's needs.
- **Improved Organization and Inventory Control:** Top-Track allows better organization of stored goods and permits improved inventory control with one-stop delivery and pick-up.
- **Increased Productivity:** With reduced square footage dedicated to storage, Top-Track maximizes the amount of productive "front of the house" space available, increasing daily revenues.
- **Accessible:** The overhead track system guides the mobile units and opens an access aisle between any two units, whenever it is needed. The open access promotes cleanliness and easy access for walking or for utility carts, simplifying the material handling task.
- **Super Erecta/Super Erecta Super Adjustable:** Super Erecta and Super Adjustable shelves are available in a variety of widths and lengths. Each system features ease of assembly, promotes air circulation, promotes light penetration and shelf level adjustability. Super Adjustable features shelf corners with a quick release lever. Shelves can be rapidly adjusted, without the use of tools, to meet changing storage needs. Shelves are available in Brite™, chrome, Metroseal 3 with \*Microban® built-in product protection and stainless steel.

\*MICROBAN® and the MICROBAN® symbol are registered trademarks of the Microban Products Company, Huntersville, NC.



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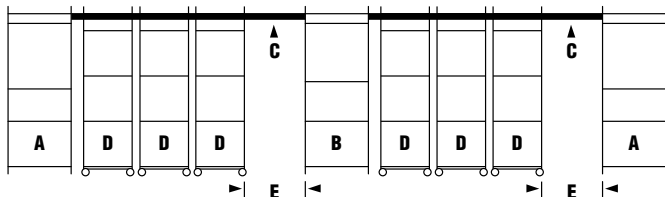
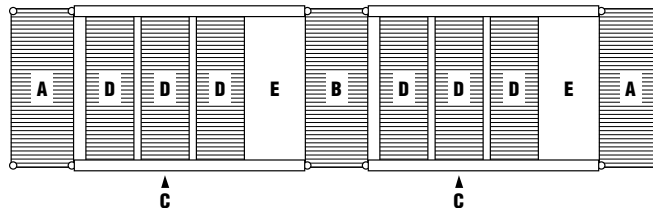


**Top-Track™ High-Density Storage Systems**

**11.12**



# TOP-TRACK™ HIGH-DENSITY STORAGE SYSTEMS

**FRONT VIEW**

**OVERHEAD VIEW**


## System Components

- A** = Stationary End Units
- B** = Stationary Intermediate Unit (Optional)
- C** = Track Set
- D** = Mobile Units
- E** = Open Aisle

## Dimensions

### Stationary End Unit Kits

	Cat. No. Chrome-Plated	Cat. No. Metroseal 3	Cat. No. Stainless Steel	Shelf Width (in.) (mm)	
Includes hardware necessary for connecting stationary end units to track. <b>ONE KIT IS REQUIRED PER SINGLE SYSTEM. SHELVES SOLD SEPARATELY.</b> 86" (2185mm) posts included. Just add shelves.	TTE18C	TTE18K3	TTE18S	18	457
	TTE21C	TTE21K3	TTE21S	21	530
	TTE24C	TTE24K3	TTE24S	24	610

### Stationary Intermediate Unit Kits

	Cat. No. Chrome-Plated	Cat. No. Metroseal 3	Cat. No. Stainless Steel	Shelf Width (in.) (mm)	
Includes hardware necessary for connecting intermediate unit to track on both sides. <b>ONE KIT IS REQUIRED PER SINGLE SYSTEM. SHELVES SOLD SEPARATELY.</b> 86" (2185mm) posts included. Just add shelves.	TTA18C	TTA18K3	TTA18S	18	457
	TTA21C	TTA21K3	TTA21S	21	530
	TTA24C	TTA24K3	TTA24S	24	610

### Track Sets

	6' (1830mm)	7' (2135mm)	8' (2440mm)	9' (2745mm)	10' (3050mm)	11' (3355mm)	12' (3660mm)	13' (3965mm)
Includes necessary sections of track for assembling track runs of 6'-21' (1830mm-6405mm).	TTS6NA	TTS7NA	TTS8NA	TTS9NA	TTS10NA	TTS11NA	TTS12NA	TTS13NA
	TTS14NA	TTS15NA	TTS16NA	TTS17NA	TTS18NA	TTS19NA	TTS20NA	TTS21NA

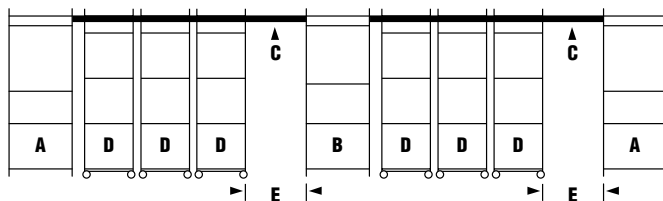
### Mobile Unit Kits

	Cat. No. Chrome-Plated	Cat. No. Metroseal 3	Cat. No. Stainless Steel	Shelf Width (in.) (mm)	
One kit required per mobile unit. Kit includes posts, casters/caster channels, donut bumpers, roller bearing assemblies, hardware, and split sleeves. <b>SHELVES SOLD SEPARATELY.</b> Just add shelves.	TTM18C	TTM18K3	TTM18S	18	457
	TTM21C	TTM21K3	TTM21S	21	530
	TTM24C	TTM24K3	TTM24S	24	610

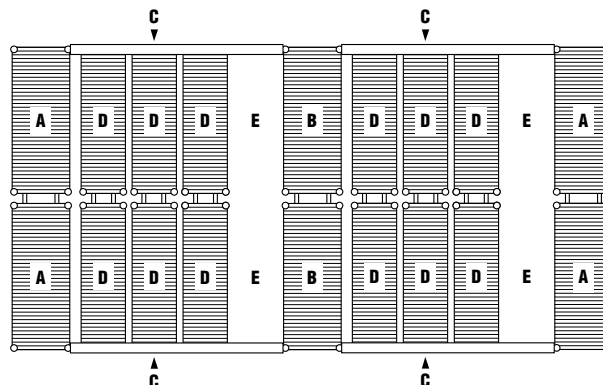
**NOTES:**

- The stationary end and intermediate units **must** have a minimum of four shelves.
- The standard Top-Track™ system requires the use of 86" (2185mm) posts (i.e., 86PK3 or 86PS) on the stationary end and intermediate units. **Shelves for the stationary end and intermediate units are sold separately.**
- The mobile unit kits includes special 74" (1880mm) posts with casters. **Shelves for mobile units are sold separately.**
- Recommended maximum load rating for a mobile unit is 900 lbs. (400kg). Floor should be level, smooth, and free from large cracks and raised obstacles.
- Under normal conditions, an aisle width of 30"-36" (762-914mm) is recommended. The storage of very large objects within the system, however, may require an aisle width larger than 36" (914mm).
- A stationary intermediate unit is required when track length exceeds 21 feet (6401mm). A stationary intermediate unit may be used at the discretion of the user when track lengths are less than 21 feet (6401mm).

## FRONT VIEW

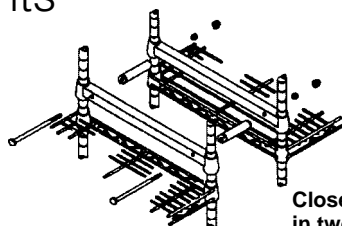


## OVERHEAD VIEW



## System Components

- A = Stationary End Units  
 B = Stationary Intermediate Unit (Optional)  
 C = Track Set  
 D = Mobile Units  
 E = Open Aisle



Close-up showing shelving units connected end-to-end in two Top-Track™ systems

## Dimensions

## Stationary End Unit Kits

Includes hardware necessary for connecting stationary end units in Double Deep systems and connecting to an overhead track set. **ONE KIT IS REQUIRED FOR ENTIRE DOUBLE DEEP CONFIGURATION. SHELVES SOLD SEPARATELY.** 86" (2185mm) posts included. Just add shelves.

Cat. No. Chrome-Plated	Shelf Width (in.) (mm)	
LTTE18C	18	457
LTTE21C	21	530
LTTE24C	24	610

## Stationary Intermediate Unit Kits

Includes hardware necessary for connecting intermediate stationary end units in Double Deep systems and connecting to an overhead track set on each side. **ONE KIT IS REQUIRED FOR ENTIRE DOUBLE DEEP CONFIGURATION. SHELVES SOLD SEPARATELY.** 86" (2185mm) posts included. Just add shelves.

Cat. No. Chrome-Plated	Shelf Width (in.) (mm)	
LTTA18C	18	457
LTTA21C	21	530
LTTA24C	24	610

## Track Sets

Includes necessary sections of track for assembling track runs of 6' to 21' (763-6405mm). **ONLY ONE TRACK SET IS REQUIRED BETWEEN STATIONARY UNITS.**

	6' (1830mm)	7' (2135mm)	8' (2440mm)	9' (2745mm)	10' (3050mm)	11' (3355mm)	12' (3660mm)	13' (3965mm)
TTS6NA	TTS7NA	TTS8NA	TTS9NA	TTS10NA	TTS11NA	TTS12NA	TTS13NA	
	14' (4270mm)	15' (4575mm)	16' (4880mm)	17' (5185mm)	18' (5490mm)	19' (5795mm)	20' (6100mm)	21' (6405mm)
TTS14NA	TTS15NA	TTS16NA	TTS17NA	TTS18NA	TTS19NA	TTS20NA	TTS21NA	

## Mobile Unit Kits

Includes the necessary posts, casters, caster channels, donut bumpers, roller bearing assemblies, and tie-together hardware to connect two mobile units together (i.e., one in each system). **SHELVES SOLD SEPARATELY.** Just add shelves.

Cat. No. Chrome-Plated	Shelf Width (in.) (mm)	
LTTM18C	18	457
LTTM21C	21	530
LTTM24C	24	610

## NOTES:

- The stationary end and intermediate units **must** have a minimum of four shelves. **For all Super Adjustable applications, the top and bottom shelves are to be non "quick adjust" Super Erecta shelves.**
- The standard Double Deep Top-Track™ system requires the use of 86" (2185mm) posts (i.e., 86P) on the stationary end and intermediate units. **Shelves for the stationary end and intermediate units are sold separately.**
- The mobile unit kit includes special 74" (1880mm) posts with casters. **Shelves for mobile units are sold separately.** For all Super Adjustable applications, the top and bottom shelves are to be non "quick adjust" Super Erecta shelves.
- Under normal conditions, an aisle width of 30"-36" (762mm-914mm) is recommended. The storage of very large objects within the system, however, may require an aisle width larger than 36" (914mm).
- Two intermediate shelving units connected end-to-end are required when the track length exceeds 21 feet (6401mm). Stationary intermediate shelving units may be used at the discretion of the user when track lengths are less than 21 feet (6401mm).
- The maximum Double Deep system configuration is 10'7" (3202mm) (e.g., two systems, each having 60" (1525mm) for long shelves plus 6" (152mm) for Top-Track components.)
- Ease of rollability for the mobile unit is an important consideration in evaluating Top-Track as a possible storage alternative. The floor should be level, smooth, and free from large cracks and raised obstacles. Two mobile shelving units connected end-to-end and loaded with between 800 to 1,200 lbs. (365-550kg) will require a human effort range (in lbs. of human force) of between 18-24 lbs. (8-11kg) to move the unit from a complete stop. An average person will perceive this as acceptable effort levels.
- Mobile units should have the top shelf positioned as close as possible to the track.



Job \_\_\_\_\_



# TOP-TRACK™ HIGH-DENSITY STORAGE SYSTEMS

## Specifications

- **Track:** Aluminum extrusion 6063-T6.
- **Joining Channel:** 16 gauge galvanized steel.
- **Roller Assembly:** Zinc-plated steel hardware with nylon roller.
- **Casters:**
  - **For applications where Brite™ or chrome finishes are acceptable:** 5" (127mm) wheel with offset rigid horn, ball bearings in axle, nickel-plated, pre-lubricated.
  - **For applications where Metroseal 3 and stainless steel are acceptable:** 5" (127mm) wheel with offset stainless steel rigid horn, stainless steel ball bearings in axle, pre-lubricated.

### Workable Configurations of Mobile Units Base on Various Track Lengths and Desired Aisle Sizes

Length of Track	Nominal Aisle Size = 30" (760mm)			Nominal Aisle Size = 33" (838mm)			Nominal Aisle Size = 36" (914mm)					
	No. Mobile Units (Note 1) 18" (457mm)	21" (530mm)	24" (610mm)	Actual Aisle Size (in.) (mm)	No. Mobile Units (Note 1) 18" (457mm)	21" (530mm)	24" (610mm)	Actual Aisle Size (in.) (mm)	No. Mobile Units (Note 1) 18" (457mm)	21" (530mm)	24" (610mm)	Actual Aisle Size (in.) (mm)
6	2			31½ 800	2			31½ 800				
7			2	31½ 800			2	31½ 800			2	37½ 952
8	1	2		29¼ 749	2	1		32¼ 819	3			35¼ 895
9			3	29¼ 749		1	2	32¼ 819	1		2	35¼ 895
10	2	1	1	30 762	3		1	33 838	3	1		36 914
11		1	3	30 762		2	2	33 838		3	1	36 914
12	1	4		30¾ 781	2	3		34¾ 857	3	2		36¼ 933
13		2	3	30¾ 781		3	2	34¾ 857		4	1	36¼ 933
14	4	3		31½ 800	2	4		32¼ 819	6	1		35¼ 895
15	4	3		29¼ 749	5	2		32¼ 819	6	1		35¼ 895
16	8			30 762	1	6		32¼ 819	2	5		35¼ 895
17	4	4		30 762	5	3		33 838	7		1	36 914
18		8		30 762	1	7		33 838	2	6		36 914
19	2		6	30 762	2	1	5	33 838	3		5	36 914
20			8	30 762		1	7	33 838		2	6	36 914
21					5	5		34½ 876	6	4		37½ 952

**NOTE 1:** Actual overall width of nominal 18" (457mm), 21" (530mm), and 24" (610mm) wide mobile units is 20¼" (667mm). The number of mobile units here applies to individual units in a single system, and sets of units (two mobile units tied back-to-back) in a double deep system.

**NOTE 2:** In confined spaces, usable space for the Top-Track installation should be determined by deducting 4" (102mm) from the overall measured space. This allows for variables such as building tolerances.

## Example

**Selection Criteria:** Actual track length required: 17'3" (5228mm). Aisle width must be in 30"-36" (762-914mm) range.

Selection of Mobile Units	Nominal 30" (762mm) Aisle			Nominal 33" (838mm) Aisle		
	18" (457mm)	21" (530mm)	24" (610mm)	18" (457mm)	21" (530mm)	24" (610mm)
17' (5185mm)	4	4		5	3	

Other selections would produce a movable aisle outside the 30"-36" (762-914mm) range.

### Beyond the standard configurations mentioned above, custom Top-Track capabilities include:

- Attaching one end of the track to a wall in a single or double deep installation.
- Tying together a cluster of two mobile units (i.e., side-to-side) in a single system, or four mobile units in a double deep system.
- A taller installation up to a maximum height of 8' (2438mm) (i.e., 86" (2185mm) high posts in the stationary end units).
- Metroseal 3 and stainless steel Top-Track components for the double deep application.
- Track assemblies 6.5', 7.5' (1956, 2261mm) in length.

Contact factory for details.

All Metro Catalog Sheets are available on our Web Site: [www.metro.com](http://www.metro.com)



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Item # \_\_\_\_\_

Job \_\_\_\_\_

## SUPER ERECTA SHELF® CONVENIENCE PAK SHELVING

### Shelving Sales Made Easy

Metro's Convenience Pak Super Erecta Shelf® Shelving provides a complete shelving unit in a single box. Convenience Pak shelving is easier to promote, select, and order as compared to separate shelving components. Convenience Pak will increase your overall sales volume, improve operating efficiencies and reduce your handling and inventory costs.

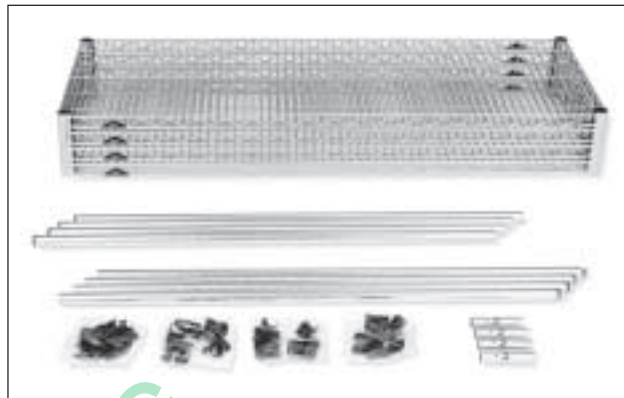
- **Single Package Design:** Convenience Pak Super Erecta Shelving is packaged in one box. Each post comes in 2 modules with a heavy-duty connector provided to connect post halves. Post modules, connectors, shelves, and split sleeve connector are all included in 1 box.
- **Simplified Sales and Ordering:** Each given size Convenience Pak unit has its own catalog number and list price, making Convenience Pak the easiest shelving product to select, price, and order. With ease and efficiency your sales people can respond to your customers' basic shelving needs, increasing their sales volume per sales call.
- **Easy to Inventory:** The single package Convenience Pak makes it easy for you to inventory much of your shelving requirements, reducing the inventory space for posts and shelves.
- **Simplified Shipping and Handling:** Basic shelving orders can be handled with one trip to the warehouse, requiring only one box be handled rather than separate shelves, posts, and split sleeves. Common mistakes made in consolidating components for a given job will be dramatically reduced resulting in an overall improvement in your operating efficiencies. Simplified ordering and invoicing will reduce the work load on your in-house personnel, reducing your overall costs.
- **As Strong and Durable as Standard Super Erecta Shelf Shelving:** Post modules and heavy-duty connector provide a shelving unit equal to the superior load bearing and durability recognized in our traditional Super Erecta Shelving design. Whether the application is stationary or mobile, the Convenience Pak unit meets the tough performance guidelines established by Super Erecta Shelving.
- **Three Finishes:** Convenience Pak units are available in Super Erecta Brite,™ Chrome, and Metroseal 3™ finishes, to handle any shelving applications your customers may have.

U.S. and Foreign Patents Pending



**InterMetro Industries Corporation**  
North Washington Street  
Wilkes-Barre, PA 18705  
www.metro.com

- Increase sales productivity
- Improve operating efficiency
- Reduce costs



**EMERSON**  
Storage Solutions

**METRO**  
SUPER ERECTA SHELF®  
Convenience Pak Shelving

**10.03**

Job \_\_\_\_\_



## SUPER ERECTA SHELF® CONVENIENCE PAK SHELVING

### Three Finishes Available:

- **Super Erecta Brite™:** Applicable to dry storage applications, where moisture and humidity are not a concern.
- **Chrome:** Designed for dry storage applications where added durability, cleanability, or a more aesthetic appearance might be required.
- **Metroseal 3** is manufactured using the latest state-of-the-art plating and coating processes. It incorporates a durable electro-plated metal base layer. This substrate, when coated with Metro's new proprietary epoxy coating will provide years of corrosion free service. For more information on Metroseal 3, refer to sheet #10.10a.



Cat. No.	Width		Length		Height		Approx. Pkd. Wt.	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(lbs.)	(kg)
<b>Four (4) Super Erecta Brite™ Shelves per Unit</b>								
EZ1836BR-4	18	455	36	910	74.5	1890	51	23
EZ1848BR-4	18	455	48	1220	74.5	1890	63	28
EZ1860BR-4	18	455	60	1525	74.5	1890	82	37
EZ2436BR-4	24	610	36	910	74.5	1890	66	30
EZ2448BR-4	24	610	48	1220	74.5	1890	76	34
EZ2460BR-4	24	610	60	1525	74.5	1890	102	46
<b>Four (4) Chrome Shelves per Unit</b>								
EZ1836NC-4	18	455	36	910	74.5	1890	51	23
EZ1848NC-4	18	455	48	1220	74.5	1890	63	28
EZ1860NC-4	18	455	60	1525	74.5	1890	82	37
EZ2436NC-4	24	610	36	910	74.5	1890	66	30
EZ2448NC-4	24	610	48	1220	74.5	1890	76	34
EZ2460NC-4	24	610	60	1525	74.5	1890	102	46
<b>Four (4) Metroseal 3™ Shelves per Unit</b>								
EZ1836NK3-4	18	455	36	910	74.5	1890	51	23
EZ1848NK3-4	18	455	48	1220	74.5	1890	63	28
EZ1860NK3-4	18	455	60	1525	74.5	1890	82	37
EZ2436NK3-4	24	610	36	910	74.5	1890	66	30
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All Metro Catalog Sheets are available on our Web Site: [www.metro.com](http://www.metro.com)



**InterMetro Industries Corporation**  
North Washington Street, Wilkes-Barre, PA 18705  
Phone: 570-825-2741 • Fax: 570-825-2852  
For Product Information Call: 1-800-433-2232

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Item # \_\_\_\_\_

Job \_\_\_\_\_

## SUPER ERECTA SHELF® CONVENIENCE PAK SHELVING

### Shelving Sales Made Easy

Metro's Convenience Pak Super Erecta Shelf® Shelving provides a complete shelving unit in a single box. Convenience Pak shelving is easier to promote, select, and order as compared to separate shelving components. Convenience Pak will increase your overall sales volume, improve operating efficiencies and reduce your handling and inventory costs.

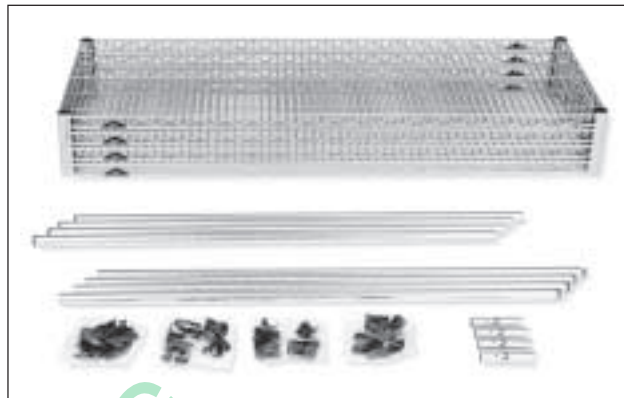
- **Single Package Design:** Convenience Pak Super Erecta Shelving is packaged in one box. Each post comes in 2 modules with a heavy-duty connector provided to connect post halves. Post modules, connectors, shelves, and split sleeve connector are all included in 1 box.
- **Simplified Sales and Ordering:** Each given size Convenience Pak unit has its own catalog number and list price, making Convenience Pak the easiest shelving product to select, price, and order. With ease and efficiency your sales people can respond to your customers' basic shelving needs, increasing their sales volume per sales call.
- **Easy to Inventory:** The single package Convenience Pak makes it easy for you to inventory much of your shelving requirements, reducing the inventory space for posts and shelves.
- **Simplified Shipping and Handling:** Basic shelving orders can be handled with one trip to the warehouse, requiring only one box be handled rather than separate shelves, posts, and split sleeves. Common mistakes made in consolidating components for a given job will be dramatically reduced resulting in an overall improvement in your operating efficiencies. Simplified ordering and invoicing will reduce the work load on your in-house personnel, reducing your overall costs.
- **As Strong and Durable as Standard Super Erecta Shelf Shelving:** Post modules and heavy-duty connector provide a shelving unit equal to the superior load bearing and durability recognized in our traditional Super Erecta Shelving design. Whether the application is stationary or mobile, the Convenience Pak unit meets the tough performance guidelines established by Super Erecta Shelving.
- **Three Finishes:** Convenience Pak units are available in Super Erecta Brite,™ Chrome, and Metroseal 3™ finishes, to handle any shelving applications your customers may have.

U.S. and Foreign Patents Pending



**InterMetro Industries Corporation**  
North Washington Street  
Wilkes-Barre, PA 18705  
www.metro.com

- Increase sales productivity
- Improve operating efficiency
- Reduce costs



**EMERSON**  
Storage Solutions

**METRO**  
SUPER ERECTA SHELF®  
**Convenience Pak Shelving**

**10.03**

Job \_\_\_\_\_



## SUPER ERECTA SHELF® CONVENIENCE PAK SHELVING

### Three Finishes Available:

- **Super Erecta Brite™:** Applicable to dry storage applications, where moisture and humidity are not a concern.
- **Chrome:** Designed for dry storage applications where added durability, cleanability, or a more aesthetic appearance might be required.
- **Metroseal 3** is manufactured using the latest state-of-the-art plating and coating processes. It incorporates a durable electro-plated metal base layer. This substrate, when coated with Metro's new proprietary epoxy coating will provide years of corrosion free service. For more information on Metroseal 3, refer to sheet #10.10a.



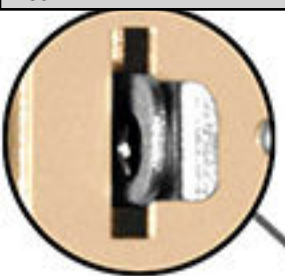
Cat. No.	Width		Length		Height		Approx. Pkd. Wt.	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(lbs.)	(kg)
<b>Four (4) Super Erecta Brite™ Shelves per Unit</b>								
EZ1836BR-4	18	455	36	910	74.5	1890	51	23
EZ1848BR-4	18	455	48	1220	74.5	1890	63	28
EZ1860BR-4	18	455	60	1525	74.5	1890	82	37
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**Steel hasp  
assembly  
(accepts built-in  
lock or padlock)**



**Louvers for  
ventilation**



**Name/number  
plate (optional  
engraving available  
upon request)**



Construction Documents

SECTION 115213 - PROJECTION SCREENS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Manually operated, front-projection screens.

B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for metal support framing for front-projection screens.

1.3 DEFINITIONS

- A. Gain: Ratio of light reflected from screen material to that reflected perpendicularly from a magnesium carbonate surface as determined per SMPTE RP 94.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show layouts and types of front-projection screens. Include the following:

- 1. Drop lengths.
- 2. Location of seams in viewing surfaces.
- 3. Anchorage details, including connection to supporting structure for suspended units.
- 4. Details of juncture of exposed surfaces with adjacent finishes.
- 5. Accessories.

C. Samples for Initial Selection: For finishes of surface-mounted screen cases.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For front-projection screens to include in maintenance manuals.

Construction Documents

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Environmental Limitations: Do not deliver or install front-projection screens until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.7 COORDINATION

- A. Coordinate layout and installation of front-projection screens with adjacent construction, including ceiling suspension systems, light fixtures, HVAC equipment, fire-suppression system, and partitions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Projection Screens: Obtain front-projection screens from single manufacturer. Obtain accessories, including necessary mounting hardware, from screen manufacturer.

2.2 MANUALLY OPERATED, FRONT-PROJECTION SCREENS

- A. General: Manufacturer's standard spring-roller-operated units, consisting of case, screen, mounting accessories, and other components necessary for a complete installation.
  - 1. Screen Mounting: Top edge securely anchored to a 3-inch-diameter, rigid steel roller; bottom edge formed into a pocket holding a tubular metal slat, with ends of slat protected by plastic caps, and with a saddle and pull attached to slat by screws.
  - 2. Tab Tensioning: Provide units that have a durable low-stretch cord, such as braided polyester, on each side of screen that is connected to edge of screen by tabs to pull screen flat horizontally. In lieu of tab tensioning, screens may be constructed from vinyl-coated screen cloth that contains horizontal stiffening monofilaments to resist edge curling.
- B. Surface-Mounted, Metal-Encased, Manually Operated Screens with Tab Tensioning: Units designed and fabricated for surface mounting on wall or ceiling, fabricated from formed-steel sheet not less than 0.027 inch thick or from aluminum extrusions; with flat back design and vinyl covering or baked-enamel finish. Provide units with matching end caps and concealed mounting.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Draper Inc; Premier/Series C or Silhouette/Series C.
    - b. Stewart Filmscreen Corporation; Luxus Communicator.



Construction Documents

2.3 FRONT-PROJECTION SCREEN MATERIAL

- A. Matte-White Viewing Surface: Peak gain of not less than 0.9, and gain of not less than 0.8 at an angle of 50 degrees from the axis of the screen surface.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BEI Audio-Visual Products; Matte White.
    - b. Bretford, Inc.; Matte White.
    - c. Da-Lite Screen Company; Audio Vision, Da-Mat, HD Progressive 0.9, HD Progressive 1.1, High Contrast Matte White, or Matte White.
    - d. Draper Inc; ClearSound Perf XT950E, ClearSound White Weave XT900E, Matt White XT1000E, Matt White XT1000V, TecVision XT1000X White, TecVision XT1300X White.
    - e. Stewart Filmscreen Corporation; Snomatte 100.
- B. Material: Vinyl-coated, glass-fiber fabric or vinyl sheet.
- C. Mildew-Resistance Rating: Zero or 1 when tested according to ASTM G 21.
- D. Flame Resistance: Passes NFPA 701.
- E. Seamless Construction: Provide screens, in sizes indicated, without seams.
- F. Edge Treatment: Without black masking borders.
- G. Size of Viewing Surface: As selected by the Architect.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install front-projection screens at locations indicated to comply with screen manufacturer's written instructions.
- B. Install front-projection screens with screen cases in position and in relation to adjoining construction indicated. Securely anchor to supporting substrate in a manner that produces a smoothly operating screen with vertical edges plumb and viewing surface flat when screen is lowered.
  - 1. Test manually operated units to verify that screen-operating components are in optimum functioning condition.

END OF SECTION 115213



Construction Documents

SECTION 122113 – HORIZONTAL LOUVER BLINDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Horizontal louver blinds with aluminum slats.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For horizontal louver blinds, include fabrication and installation details.
- C. Samples: For each exposed product and for each color and texture specified, 12 inches long.
- D. Product Schedule: For horizontal louver blinds. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For horizontal louver blinds with polymer slats that have been tested for compliance with NFPA 701, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For horizontal louver blinds to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Horizontal Louver Blinds: Full-size units equal to 5 percent of quantity installed for each size, color, texture, pattern, and gloss indicated, but no fewer than two units.

Construction Documents

1.7 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
  - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver horizontal louver blinds in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install horizontal louver blinds until construction and wet-work and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where horizontal louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain horizontal louver blinds from single source from single manufacturer.

2.2 HORIZONTAL LOUVER BLINDS, ALUMINUM SLATS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. CACO, Inc., Window Fashions.
  - 2. Hunter Douglas Contract.

Construction Documents

3. Levolor Contract; a Newell Rubbermaid company.
  4. Springs Window Fashions; SWFcontract.
- B. Slats: Aluminum; alloy and temper recommended by producer for type of use and finish indicated; with crowned profile and radius corners.
1. Width: 1 inch.
  2. Thickness: Manufacturer's standard.
  3. Spacing: Manufacturer's standard.
  4. Finish: Ionized antistatic, dust-repellent, baked polyester finish.
  5. Features:
    - a. Lift-Cord Rout Holes: Minimum size required for lift cord and located near back (outside) edge of slat to maximize slat overlap and minimize light gaps between slats.
- C. Headrail: Formed steel or extruded aluminum; long edges returned or rolled. Headrails fully enclose operating mechanisms on three sides.
1. Capacity: One blind(s) per headrail unless otherwise indicated.
  2. Ends: Manufacturer's standard.
  3. Manual Lift Mechanism:
    - a. Lift-Cord Lock: Variable; stops lift cord at user-selected position within blind full operating range.
    - b. Operator: Extension of lift cord(s) through lift-cord lock mechanism to form cord pull.
  4. Manual Tilt Mechanism: Enclosed worm-gear mechanism and linkage rod that adjusts ladders.
    - a. Tilt: Full.
    - b. Operator: Clear-plastic wand.
    - c. Over-Rotation Protection: Manufacturer's detachable operator or slip clutch to prevent over rotation of gear.
  5. Manual Lift-Operator and Tilt-Operator Lengths: Length required to extend to 48 inches above floor level when blind is fully closed.
  6. Manual Lift-Operator and Tilt-Operator Locations: Manufacturer's standard unless otherwise indicated.
- D. Bottom Rail: Formed-steel or extruded-aluminum tube that secures and protects ends of ladders and lift cords and has plastic- or metal-capped ends.
1. Type: Manufacturer's standard.
- E. Lift Cords: Manufacturer's standard braided cord.

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Construction Documents

- F. Ladders: Evenly spaced across headrail at spacing that prevents long-term slat sag.
  - 1. Type: Braided cord.
- G. Valance: Manufacturer's standard.
- H. Mounting Brackets: With spacers and shims required for blind placement and alignment indicated.
  - 1. Type: End.
  - 2. Intermediate Support: Provide intermediate support brackets to produce support spacing recommended by blind manufacturer for weight and size of blind.
- I. Hold-Down Brackets and Hooks or Pins: Manufacturer's standard.
- J. Side Channels and Perimeter Light Gap Seals: Manufacturer's standard.
- K. Colors, Textures, Patterns, and Gloss:
  - 1. Slats: As selected by Architect from manufacturer's full range.
  - 2. Components: Provide rails, cords, ladders, and materials exposed to view matching or coordinating with slat color unless otherwise indicated.

2.3 HORIZONTAL LOUVER BLIND FABRICATION

- A. Product Safety Standard: Fabricate horizontal louver blinds to comply with WCMA A 100.1 including requirements for corded, flexible, looped devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
  - 1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which blind is installed less 1/4 inch per side or 1/2 inch total, plus or minus 1/8 inch. Length equal to head-to-sill dimension of opening in which blind is installed less 1/4 inch, plus or minus 1/8 inch.
- C. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.
  - 1. Lift-and-Tilt Mechanisms: With permanently lubricated moving parts.
- D. Mounting and Intermediate Brackets: Designed for removal and reinstallation of blind without damaging blind and adjacent surfaces, for supporting blind components, and for bracket positions and blind placement indicated.
- E. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to brackets and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.

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Construction Documents

F. Color-Coated Finish:

1. Metal: For components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 INSTALLATION**

- A. Install horizontal louver blinds level and plumb, aligned and centered on openings, and aligned with adjacent units according to manufacturer's written instructions.
  1. Locate so exterior slat edges are not closer than 1 inch from interior faces of glass and not closer than 1/2 inch from interior faces of glazing frames through full operating ranges of blinds.
  2. Install mounting and intermediate brackets to prevent deflection of headrails.
  3. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.

**3.3 ADJUSTING**

- A. Adjust horizontal louver blinds to operate free of binding or malfunction through full operating ranges.

**3.4 CLEANING AND PROTECTION**

- A. Clean horizontal louver blind surfaces after installation according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensures that horizontal louver blinds are without damage or deterioration at time of Substantial Completion.

Construction Documents

- C. Replace damaged horizontal louver blinds that cannot be repaired in a manner approved by Architect before time of Substantial Completion.

END OF SECTION 122113



Construction Documents

SECTION 122413 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Manually operated roller shades with single rollers.

B. Related Requirements:

- 1. Section 061053 "Miscellaneous Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.

- 1. Motor-Operated Shades: Include details of installation and diagrams for power, signal, and control wiring.

C. Samples: For each exposed product and for each color and texture specified, 10 inches long.

D. Product Schedule: For roller shades.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of shadeband material.

Construction Documents

- C. Product Test Reports: For each type of shadeband material, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than two units.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
  - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

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Construction Documents

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products by MechoShade Systems, Inc., or a comparable product by one of the following:
  - 1. Draper Inc.
  - 2. Hunter Douglas Contract.
  - 3. Lutron Electronics Co., Inc.
- B. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
  - 1. Bead Chains: Stainless steel.
    - a. Loop Length: Full length of roller shade.
    - b. Limit Stops: Provide upper and lower ball stops.
    - c. Chain-Retainer Type: Chain tensioner, jamb mounted.
  - 2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller shade weight and for lifting heavy roller shades.
    - a. Provide for shadebands that weigh more than 10 lb or for shades as recommended by manufacturer, whichever criterion is more stringent.
- C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
  - 1. Roller Drive-End Location: As selected by the Architect.
  - 2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
  - 3. Shadeband-to-Roller Attachment: Manufacturer's standard method.
- D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- E. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.

Construction Documents

F. Shadebands:

1. Shadeband Material: Light-filtering fabric.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
  - a. Type: Enclosed in sealed pocket of shadeband material.

G. Installation Accessories:

1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
  - a. Shape: As selected by the Architect.
  - b. Height: Manufacturer's standard height required to conceal roller and shadeband assembly when shade is fully open, but not less than 4 inches.
2. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure.
  - a. Height: Manufacturer's standard height required to enclose roller and shadeband assembly when shade is fully open, but not less than 4 inches.
3. Endcap Covers: To cover exposed endcaps.
4. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.3 SHADEBAND MATERIALS

- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.
  1. Source: Roller shade manufacturer.
  2. Type: As selected by the Architect.
  3. Weave: Mesh.
  4. Thickness: As selected by the Architect.
  5. Weight: As selected by the Architect.
  6. Roll Width: As selected by the Architect.
  7. Orientation on Shadeband: Up the bolt.
  8. Openness Factor: As selected by the Architect.
  9. Color: As selected by Architect from manufacturer's full range.

2.4 ROLLER SHADE FABRICATION

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

Construction Documents

- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
  - 1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch. Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch, plus or minus 1/8 inch.
- C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible, except as follows:
  - 1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
  - 1. Opaque Shadebands: Located so shadeband is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.
- B. Electrical Connections: Connect motor-operated roller shades to building electrical system.
- C. Roller Shade Locations: At exterior windows as directed by the Architect.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

Construction Documents

3.4 CLEANING AND PROTECTION

- A. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 122413

Construction Documents

SECTION 123623.13 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes plastic-laminate countertops.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product, including panel products, high-pressure decorative laminate, and adhesive for bonding plastic laminate.
  - 1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
  - 1. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, electrical switches and outlets, and other items installed in plastic-laminate countertops.
- C. Samples for Initial Selection:
  - 1. Plastic laminates.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator.
- B. Product Certificates: For the following:
  - 1. Composite wood and agrifiber products.
  - 2. High-pressure decorative laminate.
  - 3. Adhesives.
- C. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

Construction Documents

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program.
- B. Installer Qualifications: Fabricator of products or certified participant in AWI's Quality Certification Program.
- C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver countertops until painting and similar operations that could damage countertops have been completed in installation areas. If countertops must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install countertops until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE COUNTERTOPS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades indicated for construction, installation, and other requirements.
- B. Grade: Premium.



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Construction Documents

- C. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGS.
  - 1. Basis-of-Design: Subject to compliance with requirements, provide product indicated on the Finish Schedule, or a comparable product as approved by the Architect.
    - a. Colors, Patterns, and Finishes: As indicated on the Finish Schedule.
- D. Edge Treatment: Same as laminate cladding on horizontal surfaces.
- E. Core Material at Sinks: Exterior-grade plywood.
- F. Core Thickness: 3/4 inch.
  - 1. Build up countertop thickness to 1-1/2 inches at front, back, and ends with additional layers of core material laminated to top.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.
  - 1. Wood Moisture Content: 8 to 13 percent.
- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
  - 1. Medium-Density Fiberboard: ANSI A208.2, Grade 130 .
  - 2. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
  - 3. Softwood Plywood: DOC PS 1.

2.3 MISCELLANEOUS MATERIALS

- A. Adhesive for Bonding Plastic Laminate: Contact cement, unless otherwise recommended by fabricator.
  - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.4 FABRICATION

- A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.
- B. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch over base cabinets. Ease edges to radius indicated for the following:

Construction Documents

- C. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.
- B. Before installing countertops, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

- A. Grade: Install countertops to comply with same grade as item to be installed.
- B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.
  - 1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items.
  - 2. Seal edges of cutouts by saturating with varnish.
- C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.
  - 1. Secure field joints in plastic-laminate countertops with concealed clamping devices located within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.
- D. Install countertops level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
- E. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- F. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
  - 1. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
  - 2. Secure backsplashes to walls with adhesive.

Construction Documents

3. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean countertops on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 123623.13



Construction Documents

SECTION 123661.19 - QUARTZ AGGLOMERATE COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Quartz agglomerate countertops.
  - 2. Quartz agglomerate backsplashes.
  - 3. Quartz agglomerate end splashes.

1.3 ACTION SUBMITTALS

- A. Product Data: For countertop materials.
- B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
  - 1. Show locations and details of joints.
  - 2. Show direction of directional pattern, if any.
- C. Samples for Initial Selection: For each type of material exposed to view.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For quartz agglomerate countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

Construction Documents

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of countertops.
- C. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for fabrication and execution.
  - 1. Build mockup of typical countertop.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.8 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 QUARTZ AGGLOMERATE COUNTERTOP MATERIALS

- A. Quartz Agglomerate: Solid sheets consisting of quartz aggregates bound together with a matrix of filled plastic resin and complying with ICPA SS-1, except for composition.
  - 1. Basis-of-Design: Subject to compliance with requirements, provide product indicated on the Finish Schedule, or a comparable product as approved by the Architect:
    - a. Colors and Patterns: As indicated on the Finish Schedule.
- B. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

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Construction Documents

2.2 COUNTERTOP FABRICATION

- A. Fabricate countertops according to quartz agglomerate manufacturer's written instructions and the AWI/AWMAC/WI's "Architectural Woodwork Standards."
  - 1. Grade: Premium.
- B. Configuration:
  - 1. Front: Straight, slightly eased at top.
  - 2. Backsplash: Straight, slightly eased at corner.
  - 3. End Splash: Matching backsplash.
- C. Countertops:
  - 1. Unless otherwise indicated, provide 1/2-inch- thick, quartz agglomerate with front edge built up with same material.
  - 2. Where indicated, provide 3/4-inch-thick, quartz agglomerate with front edge built up with same material.
- D. Backsplashes: 1/2-inch- thick, quartz agglomerate.
- E. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with quartz agglomerate manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
  - 1. Fabricate with loose backsplashes for field assembly.
- F. Joints: Fabricate countertops without joints.
- G. Cutouts and Holes:
  - 1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
    - a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.
  - 2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
  - 3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

2.3 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by quartz agglomerate manufacturer.

Construction Documents

- B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to receive quartz agglomerate countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.
- B. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- C. Secure countertops to subtops with adhesive according to quartz agglomerate manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with quartz agglomerate manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- D. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- E. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
  - 1. Seal edges of cutouts in particleboard subtops by saturating with varnish.
- F. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123661.19



Construction Documents

SECTION 124813 - ENTRANCE FLOOR MATS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Roll-up rail mats.
  - 2. Recessed frames.

1.3 COORDINATION

- A. Coordinate size and location of recesses in concrete to receive floor mats and frames.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for floor mats and frames.
- B. Shop Drawings:
  - 1. Items penetrating floor mats and frames, including door control devices.
  - 2. Divisions between mat sections.
  - 3. Perimeter floor frames.
- C. Samples: For the following products, in manufacturer's standard sizes:
  - 1. Tread Rail: Sample of each type and color.
  - 2. Frame Members: Sample of each type and color.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For floor mats to include in maintenance manuals.

Construction Documents

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Resilient-Tile Entrance Mats: Full-size tile units equal to 2 percent of amount installed, but no fewer than 10 units.

PART 2 - PRODUCTS

2.1 ENTRANCE FLOOR MATS AND FRAMES, GENERAL

- A. Structural Performance: Provide roll-up rail mats and frames capable of withstanding the following loads and stresses within limits and under conditions indicated:
  - 1. Uniform floor load of 300 lbf/sq. ft.
  - 2. Wheel load of 350 lb per wheel.
- B. Accessibility Standard: Comply with applicable provisions in the DOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.2 ROLL-UP RAIL MATS

- A. Basis-of-Design: Subject to compliance with requirements, provide product indicated on the Finish Schedule, or a comparable product as approved by the Architect.
- B. Roll-up, Aluminum-Rail Hinged Mats: Extruded-aluminum tread rails 2 inches wide by 3/8 inch thick, sitting on continuous vinyl cushions.
  - 1. Tread Inserts: As indicated on the Finish Schedule.
  - 2. Colors, Textures, and Patterns of Inserts: As indicated on the Finish Schedule.
  - 3. Rail Color: Clear anodic, unless otherwise selected by the Architect.
  - 4. Hinges: Aluminum.
  - 5. Mat Size: As indicated.

2.3 FRAMES

- A. Recessed Frames: Manufacturer's standard extrusion.
  - 1. Extruded Aluminum: ASTM B 221, Alloy 6061-T6 or Alloy 6063-T5, T6, or T52.
    - a. Color: Clear anodic, unless otherwise selected by the Architect.

Construction Documents

2.4 CONCRETE FILL AND GROUT MATERIALS

- A. Provide concrete fill and grout equivalent in strength to cast-in-place concrete slabs for recessed mats and frames. Use aggregate no larger than one-third fill thickness.

2.5 FABRICATION

- A. Floor Mats: Shop fabricate units to greatest extent possible in sizes indicated. Unless otherwise indicated, provide single unit for each mat installation; do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in mats are necessary, space symmetrically and away from normal traffic lanes. Miter corner joints in framing elements with hairline joints or provide prefabricated corner units without joints.
- B. Recessed Frames: As indicated, for permanent recessed installation, complete with corner pins or reinforcement and anchorage devices.
  - 1. Fabricate edge-frame members in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible, with hairline joints equally spaced and pieces spliced together by straight connecting pins.
- C. Coat concealed surfaces of aluminum frames that contact cementitious material with manufacturer's standard protective coating.

2.6 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and floor conditions for compliance with requirements for location, sizes, minimum recess depth, and other conditions affecting installation of floor mats and frames.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install recessed mat frames and mats to comply with manufacturer's written instructions so that tops of mats will be flush with adjoining finished flooring. Set mats with tops at height recommended by manufacturer for most effective cleaning action; coordinate tops of mat surfaces with bottoms of doors that swing across mats to provide clearance between door and mat.

Construction Documents

1. For installation in terrazzo flooring areas, allow for grinding and polishing of terrazzo without grinding surface of recessed frames. Coordinate with other trades as required.
2. Install necessary shims, spacers, and anchorages for proper location, and secure attachment of frames.
3. Install grout and fill around frames and, if required to set mat tops at proper elevations, in recesses under mats. Finish grout and fill smooth and level.
4. Delay setting mats until construction traffic has ended.

3.3 PROTECTION

- A. After completing frame installation and concrete work, provide temporary filler of plywood or fiberboard in recesses and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near Substantial Completion.

END OF SECTION 124813

Construction Documents

SECTION 131200 - FOUNTAINS

PART 1 - GENERAL

1.1 SUMMARY

1. Work included - Provide and install fountain equipment mechanical and electrical package in accordance with the Contract Documents. Furnish all labor, materials, apparatus, tools, equipment, transportation, temporary construction, and special or occasional services as required to make a complete working fountain installation, as shown on the drawings or described in these specifications. The work of this Section shall include, but not be limited to the following:
  - a) Fountain Display System including pumps, valves, and specialties (nozzles, pool fittings, etc.) as hereinafter described, listed and shown on the drawings.
  - b) Fountain Electrical Control System including control panel, water level and PLC controller, time switches, relays, motor starters, grounding system, PLC if required, and other circuits and accessories as required, U.L. 508 Listed.
  - c) Fountain Submersible Lighting System accessories and controls.
  - d) Filtration and Water Treatment System, media, accessories, and controls.
  - e) Drain, water makeup and overflow equipment, and controls.
  - f) All special tools for proper operation and maintenance of equipment provided under this section.

1.2 REFERENCE STANDARDS

1. This installation shall comply with all applicable and the most stringent provisions of the latest edition of the following codes.
  - a) BOCA - National Building Code
  - b) UPC - Uniform Plumbing Code
  - c) NE C- National Electrical Code
2. Materials furnished hereunder shall, where applicable, comply with the latest edition of applicable standard specifications published by the following organizations:
  - a) ASTM - American Society for Testing and Material
  - b) ANSI - American National Standards Institute
  - c) IEEE - Institute of Electrical & Electrical Eng.
  - d) IPCEA - Insulated Power Cable Engineers Assoc.
  - e) NEMA - National Electrical Manufacturers Assoc.
  - f) ASME - American Society of Mechanical Engineer
  - g) UL - Underwriters Laboratories, Inc.
  - h) ETL – Intertek Listed (Certified To World Recognized UL Standards)

Construction Documents

- i) NSF - National Sanitation Foundation
- j) ASSE - American Society of Sanitary Engineers
- k) AWWA - American Water Works Association
- l) CS - Commercial Standards

1.3 QUALITY ASSURANCE

1. All workmanship and materials shall conform and comply with the requirements of building ordinances, codes, rules and regulations of all departments of Federal, State, county, and city having lawful jurisdiction over the work in this section.
2. When these specifications and/or drawings call for or describe materials, workmanship, or construction of a better quality, higher standard, or larger size than is required by the above mentioned rules and regulations, the provisions of these specifications and/or drawings shall take precedence over the requirements of said rules and regulations.
3. The Contractor shall furnish, without extra charge, any additional material and/or labor required for compliance with these rules and regulations although not mentioned in these specifications or indicated on the drawings.
4. All materials shall be new and shall conform with applicable standards in every case where such standards have been established for the particular material in question.
5. All work shall be executed by workmen skilled in the craft to which they are assigned.
6. Adequate supervision shall be provided to maintain high quality workmanship.
7. The Roman Fountains name and catalog numbers are used to establish a high standard of quality and utility for the specified items and to provide a dimensional reference for installation plans that are drawn to scale.
  - a) Roman Fountains Corporation
  - b) 9875 Medlock Bridge Pkwy, Suite 250
  - c) Johns Creek, Georgia 30022 U.S.A.
  - d) Phone: (770) 300-0041 FAX: (770) 300-0074
  - e) Contact: Tom Hanson
  - f) E-mail: tomh@romanfountains.com
  - g) www.romanfountains.com
8. Any proposal for substitution of materials or equipment shall be submitted 10 calendar days prior to the final bid date; otherwise, no substitutions will be permitted. Submittal for equivalent items shall, where applicable, include the following data which are not necessarily required for specified items:
9. Performance Characteristics and hydraulic and electrical load data.
10. Materials of construction, fabrication, and manufacture.
11. Certification of Conformance with specific codes, standards, and specifications.
12. Submittal of substituted equipment may be rejected if the component alters the design in a manner that affects other trades or if it impairs accessibility or critical clearances.

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13. No substitutions shall be made unless authorized in writing by the Architect/Engineer. Should a substitution be accepted, and should the substitute material prove defective or otherwise unsatisfactory for the service intended within the guarantee period, the Contractor shall replace this material or equipment with material or equipment specified, at its own expense, and to the satisfaction of the Architect/Engineer/Owner.
14. Contractors submitting bids on substitute materials and equipment must also submit a bid on the "as specified" materials and equipment.
15. Contractors submitting bids on substitute materials and equipment must also provide a written performance guarantee certifying that the substitute materials and equipment will produce the specified water effects.

1.4 MATERIAL SUPPLIER'S RESPONSIBILITY

1. Design Responsibility: The Equipment Supplier shall accept complete design responsibility for the hydraulic and electrical system, provided that all equipment required for the fountain installation is procured from the specified equipment Manufacturer as itemized in its proposals and materials list on the final, approved installation drawings.
2. The Contractor shall be responsible for installation of all equipment required for the fountain installation in accordance with fountain supplier's drawings and instructions.
3. Performance Guarantee: The Equipment Supplier shall guarantee the fountain to perform to the designed water heights and spray patterns, provided that installation of the equipment is in strict accordance with the supplier's recommendations, instructions, details, and approved drawings.
4. Warranty: All materials and component parts, excluding lamps, supplied by the Manufacturer, shall be guaranteed to be free from defects of materials and/or workmanship for a period of one year from date of substantial completion or 18 months from shipment, whichever comes first. (Complete warranty form available from material supplier on request.)

1.5 SUBMITTALS AND DRAWINGS

1. The Contractor shall submit complete shop drawings to the Architect for approval, in quantities required for proper distribution and in accordance with the requirements of the General Conditions.
2. Shop drawings shall include or incorporate those final drawings furnished by the Equipment Supplier, as specified herein, together with all additional information and drawings required to show the proper installation of fountain equipment. "Preliminary" or "schematic" drawings provided by the Equipment Supplier shall not be used for installation purposes.
3. The Contractor shall deliver drawings for approval, after the signing of the contract, so as not to delay the construction required under other sections.
4. Submittals shall include the following:
5. Materials list for all materials and equipment furnished.
6. Shop drawings and product data for all materials and equipment furnished.
7. Shop drawing of the equipment space layout showing all mechanical and electrical equipment in addition to all piping and conduit. Include pipe elevations and dimensions between pipe centerlines where relevant. Provide layout drawings of all pipe runs and pool fitting locations.

Construction Documents

8. Shop drawings shall include outline dimensions, operating and maintenance clearances required, and sufficient technical data to indicate compliance with the Specification.
9. Shop drawings may not include details reproduced from the Contract Documents except when submitting "as specified" materials and equipment.
10. Submittals may be rejected if they are difficult to read due to insufficient scale, poor image quality, or poor drafting quality; or if the required information is not included.
11. Work shall not proceed until submittals have been approved by the Architect.
12. The Contractor shall provide labeled equipment certifying approval, as hereinafter specified, by Underwriters Laboratories (UL) whenever available.

1.6 COORDINATION

1. The Contractor shall coordinate the work with all trades and appropriate sections of the construction specifications as necessary to ensure proper provisions for the work of this section.
2. The Contractor shall be responsible for the protection of the Owner's property from injury or loss due to its work. All damage to existing property (building, utilities, pavement, etc.) or planting (trees, shrubs, lawn or ground cover) caused by the Contractor during its operation or as a result of malfunction of installed work during the guarantee period shall be repaired at the Contractors expense.
3. The Contractor shall fully inform itself regarding any available space limitations and unusual requirements, for the installation of all materials and work furnished under this section. Although the location of equipment may be shown on the drawings in certain positions, the Contractor shall also be guided by the Architectural details and conditions at the job, correlating its work with that of the other sections and other trades, with discrepancies and interferences being brought to the attention of the Architect for resolution prior to proceeding with the work.

1.7 PERMITS AND FEES

1. Permits: The Contractor shall secure and pay for all permits, inspections, and certificates of inspection of any governmental and inspection body having jurisdiction over all or any part of the work included under this section and/or such inspections etc., required by these specifications.
2. Fees: The Contractor shall secure and pay for all fees and assessments in connection with the work under this contract and shall include this cost in its bid and contract price.

1.8 CONTRACTOR GUARANTEE AND EQUIPMENT WARRANTY

1. In entering into a contract covering this work, the Contractor accepts the specifications and drawings and guarantees that the work will be performed in accordance with the requirements of the specifications and drawings, as may be made in the contract documents.
2. The Contractor further guarantees that the workmanship and material will be of the best quality procurable and that only experienced workers, familiar with each particular class of work, will be employed.
3. The Contractor further agrees to hold itself responsible for any defects which may develop in any part of the entire system, including equipment as provided for under this specification, due to faulty workmanship, design or material and to replace and make good, without cost to the Owner, any such faulty parts or construction which may develop at any time within one (1) year from the



Construction Documents

date of the final acceptance. Any repairs or replacements required because of defects, as outlined in this clause, are to be made promptly and approved in writing by the Architect.

4. Contractor shall warrant all material found defective within one (1) year of final acceptance and shall be replaced at no cost to the Owner including labor to remove and re-install any defective materials.
5. The warranty shall not extend to damage incurred through incorrect or improper operation and maintenance by the Owner. The Owner shall assume full responsibility for proper operation and maintenance upon final acceptance of installation from Contractor.
6. In the case of Manufacturer's guarantees being limited, or expiring within the specified guarantee period, the Contractor shall be responsible for purchasing and providing service contracts and additional warranty coverages to extend through the warranty period as may be required by Owner.

1.9 MAINTENANCE MANUAL

1. The Equipment Supplier shall deliver to the Owner three (3) copies of the Operations and Maintenance Manual, together with any additional information or manuals which would assist in the proper operation and maintenance of equipment.
2. The Contractor shall, at its expense, arrange and provide for the technical instruction of the Owner's maintenance personnel, by the Equipment Supplier's personnel, for such time as is reasonably required to acquaint them with the operation and maintenance of all equipment furnished and installed under this section.

PART 2 – PRODUCTS

2.1 GENERAL

1. Prime Contractor shall be responsible for purchasing all specialized fountain mechanical and electrical materials and tools for the fountain and shall then furnish electrical fountain components to the electrical contractor for installation and connection.
2. Materials not listed within these specifications or on drawings as furnished by the Equipment Supplier, but required for the complete installation of the fountain mechanical and/or electrical systems, shall be furnished by the Contractor.
3. Materials shown on the drawings, but not specified herein, shall be provided in accordance with information shown on the drawings and the general provisions of this part of the specification.
4. Substitutions in the list of equipment included in this section may be made by the Equipment Supplier only if the equipment is of better quality and more effective than that listed, improves system design and performance or delivery times, and only if the changes are thoroughly documented and approved in writing by the Architect.

2.2 SPECIALIZED FOUNTAIN MATERIAL MANUFACTURER/SUPPLIER

1. Approved Manufacturer - Subject to compliance with requirements, the following is the approved Manufacturer/Supplier for specialized fountain system equipment listed in this specification.

Construction Documents

Roman Fountains Corporation, Johns Creek, GA, USA  
 Ph. (770) 300-0041 Fax # (770) 300-0074  
 www.romanfountains.com

2. All fountain equipment specified and supplied to the Contractor shall be supplied by a single fountain Equipment Supplier/Manufacturer.
3. The Equipment Supplier must currently be in the business of supplying fountain equipment for a minimum of twenty (20) years and shall have previously supplied fountain system design, drawing and equipment, similar in size and complexity to the specified project.
4. The specified supplier shall have minimum assets of \$750,000. and be able to furnish "CPA" verification of asset strength at the request of the Project Architect.

2.3 MATERIAL MANUFACTURER/SUPPLIER'S RESPONSIBILITY

1. Warranty: All materials and component parts, excluding lamps supplied by the Equipment Supplier, shall be guaranteed to be free from defects of materials and/or workmanship for a period of one (1) year from date of official start-up or 18 months, whichever is sooner.
2. Design Responsibility: The Equipment Supplier shall accept complete design responsibility for the hydraulic and electrical system, provided that all equipment is supplied by it as indicated. This does not include responsibility for the actual installation of the equipment except where the equipment is installed by the Equipment Supplier.
3. Performance Guarantee: The Equipment Supplier shall provide a written performance guarantee certifying that the fountain system will perform to the designed water heights and patterns and will create the designed water heights and patterns, and will create the designed lighting effects, providing the equipment is supplied by a single Equipment Supplier and the installation is in accordance with the Supplier's recommendations and drawings.

2.4 FOUNTAIN COMPONENTS

Item #	Qty.	Component #	Description
1	11	RCN-125	Cascade Nozzle; cast bronze construction with 1-1/4" (F) N.P.T. connection.
2	11	RWS-150-S	Slab Penetration, cast bronze with integral waterstop flange, brass bonding lug and 1-1/2" (F) N.P.T. connections.
3	11	RBB-125-T	Threaded Brass Ball Valve; Cast bronze machined body, brass full port ball, silicone bronze stem, Teflon seat, stainless steel handle nut, vinyl covered stainless steel handle, 400 PSI maximum operating pressure at 150 degrees Fahrenheit, and 1-1/4" (F) N.P.T. threaded end connections.
4	2	RAVS-1600	16" Square Anti-Vortex Plate & Sump Assembly; Heavy duty FRP sump with integral waterstop flange, 4" side, and 3" bottom, and 2" 'vacuum break' (socket) connections (the 3" interior connection shall be provided with a 3" threaded male plug). Solid brass 3/16" thick anti-vortex plate with brass spacers and "TORX" type stainless steel vandal resistant safety fasteners and wrench.

Construction Documents

5	1	RFD-300	Floor Drain Fitting, cast bronze with integral waterstop flange, bonding screw, threaded closure plug with recessed head and 3" (F) N.P.T. outlet connection.
6	1	ROVS-200-W	Sidewall Overflow Drain, bronze drain body, integral waterstop flange with bonding screw, removable bronze grate, S.S. fasteners, and 2" (F) N.P.T. connection.
7	1	RCOM-WND	Wall-Mounted Combination Overflow/Water Make-up/Low Water Cutoff Sensor, molded thermoplastic sensor/overflow housing with brass cover plate, stainless steel fasteners, sensor compression fitting, 3/4" (F) N.P.T. conduit entry, 2" adjustable socket overflow, 1-3/4" adjustability range, and 100 ft. of pre-attached 4-conductor, color-coded sensor cable.
8	4	RPS-150-FA	Front Access Surface Skimmer; body of injection molded black cyclocac body with removable floating weir/basket assembly; diverter adjustment plate; natural finish brass faceplate; stainless steel fasteners and 1-1/2" SLIP connection.
9	4	REF-150-WS	Adjustable 'Eyeball' Inlet Fitting; consisting of a machined brass body with integral water-stop flange, bonding lug, machined brass 'eyeball' with 3/4" orifice, retaining ring and 1-1/2" (F) N.P.T. connection, standard natural brass finish.
10	11	RFL-DH-LED-White	'Donut Hole' LED Submersible Light Fixture, ETL Listed, 12VDC, low profile with stainless steel adapter for 1-1/2" nozzle riser mounting, high output white LED diodes, stainless steel housing and fasteners, tempered glass lens, silicone lens gasket, chromed brass cord entrance fitting and 19 feet of 18 AWG SJOW cable. Fixture also available in RGB.
11	11	RDHN-ADAP	Threaded Adapter for RFL-DH-LED 'Donut Hole' LED Submersible Light Fixture, threaded adapter fitting machined from type 303 stainless steel with 1-1/2" (F) N.P.T. bottom connection and 1-1/4" (F) N.P.T. top connection.
12	2	RJB-5-100-C	Conduit-Mounted Submersible Junction Box; cast bronze construction with neoprene gasket, stainless steel fasteners, one 1" (F) N.P.T. bottom power conduit connection, and five (5) 3/4" N.P.T. side connections with brass cord seal fittings (shipped loose, installed in field). Junction box shall have a minimum volume of 60.0 cubic inches and shall include an internal grounding lug.
13	1	RJB-6-100-C	Conduit-Mounted Submersible Junction Box; cast bronze construction with neoprene gasket, stainless steel fasteners, one 1" (F) N.P.T. bottom power conduit connection, and six (6) 3/4" N.P.T. side connections with brass cord seal fittings (shipped loose, installed in field). Junction box shall have a minimum volume of 60.0 cubic inches and shall include an internal grounding lug.
14	2	RWS-100-L	Slab Penetration, Schedule 40 red brass pipe body to square brass waterstop flange, brass bonding lug and 1" (M) N.P.T. connections.

Construction Documents

15	2	RPC-2114-D	<p>Potting Compound, re-enterable, electrical insulating compound, designed for use in RJB-Series junction boxes (required by NEC 680). 21.2 oz. size.</p>
16	1	RDP-2-500-RBU RSX	<p>Series 2 Direct Burial Pump Vault, consisting of a 4'-4" x 4'-10" x 3'-2" deep heavy duty FRP vault with white gel-coat interior and brown gel-coat exterior, furnished with fiberglass reinforced plastic lid with stainless steel piano hinge attachment, lock hardware (<i>lock by installer</i>). The vault contains a RSPP-500, 5 HP self-priming display pump with integral suction strainer; RCCF-075, 75 sq. ft. cartridge filter unit; RBU-Series chemical feeder; 4" vent connections with 250 CFM vent fan; RMS-075-NS 3/4" fill manifold assembly; 1/3HP RSX-033 Sump pump assembly with check valve; 2" floor drain; RPCP/RLCP U.L. 508 listed control panel in a NEMA 4 enclosure, containing; main disconnect; pump starter with circuit breaker, contactor &amp; adjustable, solid-state overload, single channel programmable time switch for pump and lights, H.O.A. switches, LED Power Supply, plus lighting contactor, G.F.C.I. breakers, and water level/low level cutoff control circuit (when applicable). Unit is pre-wired, pre-plumbed (Schedule 80 PVC) and factory tested, prior to shipment.</p> <p>Power requirement: 120/208 VAC, 3-phase, 4-wire feeder + GND</p>
17	2	RPVC-400	<p>PVC Vent Cap for 4" vent pipe, Schedule 40 PVC construction with 1/4" stainless steel fasteners. Low profile, corrosion resistant, brown color.</p>

PART 3 - EXECUTION

3.1 GENERAL

1. Install and connect all equipment in accordance with Manufacturers' instructions and recommendations. Provide all piping, valves, and connections recommended by the Manufacturer for proper operation.
2. Protect all pipes, equipment, and other parts of the work against injury by exposure to the weather during construction while stored or installed in place.
3. Make all adjustments required for the proper operation of the mechanical system. Use Manufacturer's factory technicians where adjustments cannot be accomplished by the Contractor's personnel at Contractors' expense.

3.2 ALIGNMENT AND LUBRICATION OF ROTATING EQUIPMENT

1. After installation, align all pumps connected to motors by means of flexible couplings, if necessary, to within the tolerance limits recommended by the equipment and coupling manufacturers.
2. Before any rotating equipment is put in operation for testing purposes, properly lubricate with lubricants recommended by the Manufacturer. Further lubricate before final acceptance. Provide

Construction Documents

a complete schedule of lubrication of all rotating equipment within the equipment literature binder.

3.3 VALVE INSTALLATION

1. Supply all piping systems with valves arranged to provide necessary isolation and give regulating control throughout the system.
2. Butterfly valves used to isolate equipment or accessories shall be lug-type installed in a manner to allow servicing without draining the system.
3. Check valves shall close against pressure.
4. Do not install valve stems below horizontal line.

3.4 PIPE INSTALLATION

1. General:

- a) Provide flanges or unions as indicated and as necessary, to allow removal and reinstallation of any item, or equipment, or accessory without cutting, welding, or soldering.
- b) Provide discharge piping of proper size for all air vent, solenoid and relief valves. Extend to nearest drain.
- c) Provide a readily accessible 1-1/2" hose angle valve with hose connection and hose, at all low points in the system and immediately downstream of check valves as necessary to allow the system to be completely drained.
- d) Cut pipe to measurements established at the site. Work into place without springing or forcing.
- e) Protect all openings in piping during construction to prevent entrance of foreign matter.
- f) Cut pipe and tubing ends square. Remove rough edges and burrs so that a smooth and unobstructed flow will be obtained.
- g) Close or short nipples should be used only where shown on the Drawings, or absolutely necessary to satisfy dimensional constraints.
- h) Make changes in pipe size using reduced fittings. Use bushings only if shown on the drawings.
- i) Unless otherwise noted, connections to equipment or accessories shall be threaded for sizes 3" and smaller, flanged for sizes 4" and larger.
- j) Arrange exposed piping straight, parallel and perpendicular to the walls of the structure unless otherwise shown on the drawings.
- k) Wherever two or more pipes are installed in parallel, allow sufficient space for required gluing, welding, soldering, painting, and/or the application of insulation.

2. Pipe Joints:

- a) Grooved Pipe:

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Construction Documents

- 1) Grooves for mechanical coupling shall be cut using tools, methods, and dimensional criteria specified by the manufacturer of the coupling.
3. Welded Pipe:
  - b) Perform all welding in accordance with the requirements of ASME Boiler Pressure Piping Code or ANSI B31.1.
4. Threaded Pipe:
  - a) Cut all threads accurately, axis of thread coinciding with axis of pipe.
  - b) No more than two threads shall show beyond fitting.
  - c) Make up joints with Teflon tape.
  - d) Remake leaky joints with new materials.
  - e) Copper Tubing
5. Soldered Joints:
  - a) Use drawn temper tubing.
  - b) Surfaces to be joined must be cleaned of all oil, grease, rust, and oxides. After cleaning, and before assembly or heating, apply an appropriate flux to each joint surface and spread evenly. Apply heat with an oxyacetylene torch.
  - c) Apply an appropriate flux to each joint surface and spread evenly. Apply heat with an oxyacetylene torch.
  - d) Make up all joints using non-corrosive flux and 95-5 solder, ATSM B32 Grade A.
  - e) Provide each valve with unions for removal of valve without cutting or torching.
  - f) Provide dielectric unions at points of connection to ferrous piping.
  - g) Where threaded connections are used in copper systems, all nipples shall be standard weight red brass.
6. Flared Joints:
  - a) Use annealed tubing.
  - b) Cut end using tubing cutter. Ream and clean.
  - c) Slide fitting over end. Flare tubing using standard flaring tool.
7. PVC Pipe:
  - a) Bevel all pipe ends with a coarse file or beveling tool.
  - b) Clean surfaces to be joined of all loose dirt and moisture from the I.D. and O.D. of the pipe end and the I.D. of the fitting socket.
  - c) Apply a coating of purple primer to the entire I.D. surface of the fitting socket and to an equivalent area on the O.D. of the pipe end.
  - d) Apply heavy body gray solvent cement using an appropriate natural bristle brush as follows: Apply a liberal coating of cement around the entire perimeter of the pipe end to a width slightly more than the equivalent socket depth of the fitting. Apply a light but

Construction Documents

complete coating once around the entire depth of the socket surface, avoiding excessive cement application. Apply a second liberal coating onto the pipe end.

- e) Immediately after cementing, insert the pipe into the fitting to the full socket depth while rotating the pipe or fitting one-quarter turn. Hold joint for at least 15 seconds after joining to make sure pipe does not back out of the socket.
  - f) Do not disturb or move the joint for at least one hour after joining.
  - g) Do not solvent weld pipe if ambient air temperature is below 40 degrees F. or above 90 degrees F., or if it is raining.
  - h) Discard cement when an appreciable change in viscosity takes place or if cement is lumpy or stringy. Do not thin. Cement must be used before expiration date shown on the container.
8. Pipe Protection:
- a) Copper or brass piping, encased in concrete: Exterior shall be wrapped with one layer of pipe wrap at half lap.
  - b) Copper or brass piping, underground: Exterior shall be coated with two coats of coal tar mastic to a total thickness of 8 to 10 mils. Allow 12 hours drying time between applications. Clean and prepare pipe exterior in accordance with manufacturer's recommendations.
  - c) Welded steel piping assemblies: Galvanize after fabrication.
  - d) Galvanized steel piping, underground, submerged, or encased in concrete: Exterior shall be coated with two coats of coal tar mastic to a total thickness of 8 to 10 mil. Allow 12 hours drying time between applications. Clean and prepare pipe exterior in accordance with manufacturer's recommendations.
9. Penetrations:
- a) Core drilling for pipe penetrations shall be accomplished only at locations and in a manner approved by the Architect.
  - b) Provide a metal or approved plastic sleeve or core-drilled hole for every pipe passing through a concrete wall or floor.
  - c) Provide a water stop or membrane clamp for every pipe or sleeve penetrating an exterior concrete wall or floor or the fountain wall or floor, whichever is appropriate to the waterproofing method and/or as shown on the Drawings.
  - d) Seal sleeves passing through interior walls with foam sealant, unless otherwise indicated on the Drawings.
  - e) Seal sleeves passing through exterior walls with resilient seal and foam sealant, unless otherwise indicated on the Drawings.
10. Piping Tests:
- a) Provide all temporary piping, pumps, and gauges necessary to conduct the specified tests.
  - b) Conduct all tests before concealment of work and before any coating, wrap, or insulation is applied.
  - c) Replace or repair any part that leaks. Repeat test until criteria are met.

Construction Documents

- d) Do not subject any item to a test pressure greater than the pressure rating of the item.
- e) Vent air from all piping being tested.
- f) Underground piping shall be tested as follows:
- g) In accordance with pipe manufacturers' recommendations and procedures, pressurize all underground piping (except for drain system) to 75 psi prior to backfilling (spot backfilling to anchor piping may be done prior to pressurizing). Piping shall remain pressurized until all backfilling, grading, planting, and concrete work in the area of the piping is completed.
- h) In accordance with pipe manufacturers' recommendations and procedures, pressurize all underground drain piping beneath the equipment space to 15 psi until all backfilling and concrete work in the area is completed.
- i) The completed piping system shall be tested as follows:
- j) Conduct each test for a minimum continuous duration of eight hours.
- k) Hydrostatically pressure test all storm and sanitary drain piping at 15 psi.
- l) Hydrostatically pressure test all other piping and equipment at 75 psi.
- m) Strike all solder joints with a soft-face hammer while under pressure.
- n) Log pressure readings for all tests required above at the beginning and end of each test and on every working day between. Note the location and cause of any failures and method of repair on the daily log. Submit copy of the log to the Architect weekly.
- o) Testing of the completed system, as specified above, shall be witnessed by the Architect.

11. Flushing:

- a) Before the fountain system is placed in operation, flush all fountain system piping with water to remove foreign matter and debris in piping.
- b) Completely drain all piping and equipment. Re-flush as necessary until water runs clean.
- c) Fill the system to the required capacity with clean water.
- d) Circulate the water throughout the system for one hour, using the display pump. Install start-up screens as necessary to prevent equipment clogging and damage.
- e) Drain, fill, and circulate (repeat previous three steps above) until the water remains clear.

3.5 HOUSEKEEPING PADS

- 1. All floor-mounted equipment shall be erected on reinforced concrete housekeeping pads. Pads shall be 4" high with chamfered edges except where otherwise indicated or required on Architects' drawings.

3.6 SUPPORTING DEVICES

- 1. Furnish and install all required fasteners, rods, hangers, supports, bolts, nuts, washers, and steel plates and shapes.
- 2. Furnish and arrange for the installation of all required inserts and anchor bolts. Provide templates where appropriate.



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Construction Documents

3. Provide additional hangers or supports at all valves, strainers, and elsewhere where required to properly support any additional pipe loadings.
4. Where several pipes occur at the same elevation, trapeze type hangers
5. Provide copper plated hangers where hangers are in direct contact with copper piping.
6. Strap hangers are not permitted in any piping work.
7. Equipment may not support any of the pipe loading, nor may equipment, except valves and strainers, be supported by any of the piping.
8. Basket strainers larger than 3" shall be independently supported.
9. Piping shall not be supported by another pipe or duct.

3.7 EQUIPMENT IDENTIFICATION

1. Provide a securely attached permanently engraved metal nameplate for each piece of equipment containing all data required to properly identify the equipment (i.e. manufacturer, type, size, capacity, horsepower, etc.).
2. Provide a valve tag for each valve to provide information to correlate the valve with the outlet or fitting served.
3. Provide a half-size copy of the "As-built" Schematic Diagram, permanently encased in plastic, to provide the Owner's operating personnel ready correlation of each valve identified with each outlet or fitting served.
4. Install nameplates for gauge/control device panels as shown on the Drawings. Attach using stainless steel machine screws.
5. Provide flow direction arrow pipe bands on all system piping. (Seton or equal)

3.8 ADJUSTMENTS

1. Make temporary and final adjustments for each system and equipment apparatus installed, using factory-trained technicians when appropriate. Refer to the Drawings and operation and maintenance manuals for system start-up and adjustment details. Contact Manufacturer/Supplier for additional assistance as necessary.

3.9 PAINTING AND CLEANING

1. Clean all exposed equipment and piping to remove rust, scale, concrete, etc. before painting.
2. Mask off all bright metal parts and nameplates.
3. Paint all exposed equipment and piping (including galvanized) within the equipment space as follows:
  - i. Pretreatment, bare ferrous parts: Sand blast or treat with oil penetrant.
  - ii. Primer: Previously painted or retreated equipment and piping shall receive one coat of rust inhibiting primer.
  - iii. Finish: Apply two coats of white epoxy enamel.

Construction Documents

4. Thoroughly clean and wipe down all equipment and piping, sweep floor and remove all debris and remaining tools and equipment from pump room, and any other loose or abandoned items which may create an operation or maintenance hazard.

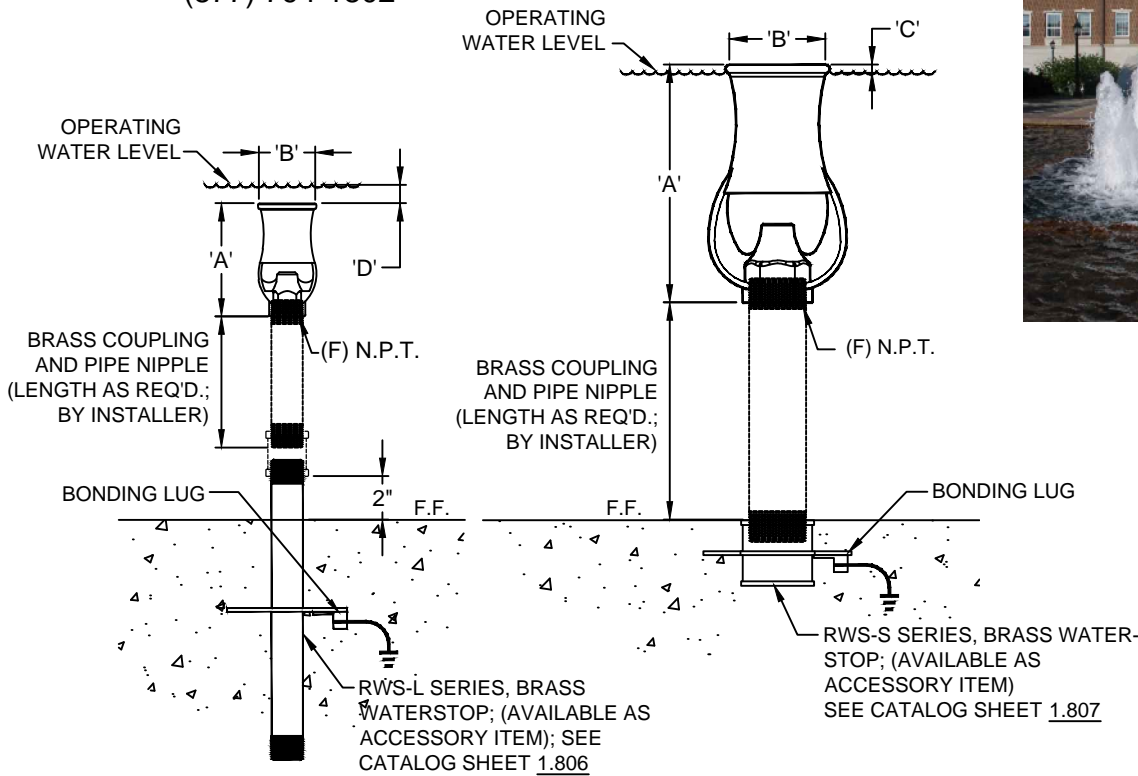
3.10 OPERATING INSTRUCTIONS

1. At the time of completion, a period of not less than eight hours shall be allotted by the Contractor for instruction of operating and maintenance personnel in the use of all systems. All personnel shall be instructed at one time, the Contractor making at its expense, all necessary arrangements with Manufacturer's technicians to provide instruction, product literature, and application guides for the user's reference.

3.11 THIRTY-DAY OPERATION PERIOD

- f) Prior to acceptance of the installation by the Owner, demonstrate a thirty day, fully automated, uninterrupted daily operation of not less than eight hours, nor more than sixteen hours, for all systems provided under this Section.
- g) Supervise the operation of the equipment and be responsible for the proper operation thereof and make no claim against the Owner for any damage to the equipment during such operation. Make such changes, adjustments, or replacement of equipment as may be required to ensure installation complies with the Specifications, and replace any defective or non-conforming parts or materials.
- h) The costs of labor, electricity, water, and operational tools, equipment and supplies during the thirty day operation period shall be paid by the Contractor.
- i) Coordinate the thirty-day operation period with all trades related to the fountain work.

END OF SECTION 131200



ELEVATION



3D IMAGE

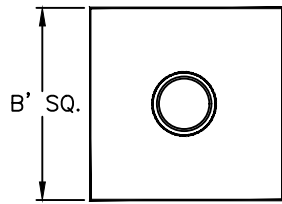
**SPECIFICATION DATA:** Cascade Nozzle; one-piece cast bronze construction, female threaded connection. (Optional alignment swivel available as accessory item; see catalog sheet 1.802.)

**DESIGN/APPLICATION DATA:** RCN-Series cascade nozzle produces a highly aerated, conical water column.

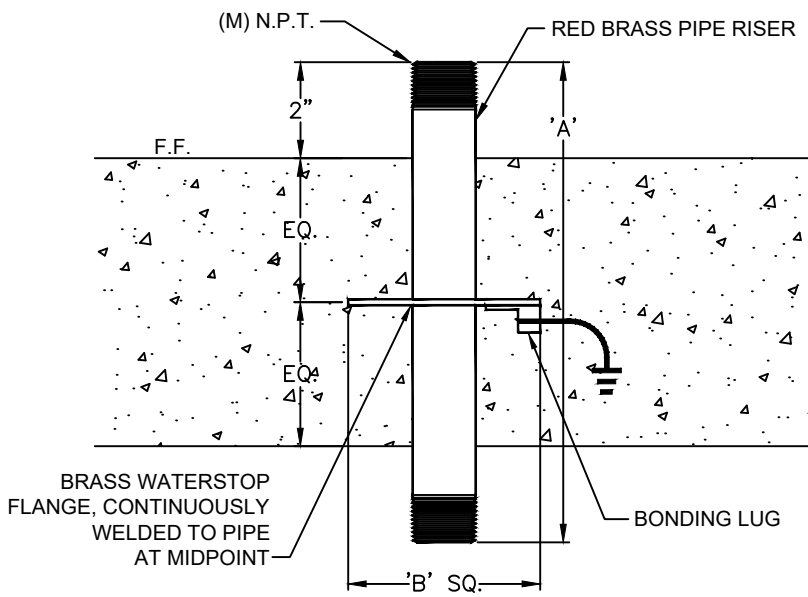
- NOTES:**
1. This is a water level dependent nozzle.
  2. Boxed area indicates optimum performance.
  3. Cascade nozzles may generate wave turbulence in small, confined pools, requiring a dampening device available as accessory item; see catalog sheet 1.810; consult factory.
  4. Due to continuing product improvement program, Roman Fountains reserves the right to change the specifications without notice.

TECHNICAL AND HYDRAULIC DATA																			
DIMENSIONS						SPRAY HEIGHT													
MODEL NO.	(F)N.P.T.	A	B	C	D		2'	3'	4'	5'	6'	8'	10'	12'	15'	20'	25'	30'	
RCN-050	1/2"	4"	2"	-	1-1/4"	GPM	7	9	10	11									
						HEAD	16'	25'	35'	39'									
RCN-075	3/4"	5-1/2"	2-1/2"	-	1"	GPM	12	15	16	18	20	23							
						HEAD	21'	23'	32'	44'	51'	69'							
RCN-125	1-1/4"	8"	3-1/2"	1/2"	-	GPM	16	21	23	26	29	34	38	40					
						HEAD	12'	18'	23'	28'	37'	50'	58'	65'					
RCN-150	1-1/2"	9"	3-3/4"	1/2"	-	GPM	23	29	32	36	42	45	49	53	58				
						HEAD	11'	14'	18'	23'	32'	37'	46'	50'	62'				
RCN-200	2"	10-3/4"	4-1/2"	1/2"	-	GPM			42	47	50	61	67	71	75	92			
						HEAD			14'	19'	24'	33'	40'	43'	49'	71'			
RCN-300	3"	14-1/4"	6-1/2"	3/4"	-	GPM				88	90	93	112	116	144	166	187	205	
						HEAD				24'	26'	35'	42'	49'	63'	79'	104'	116'	

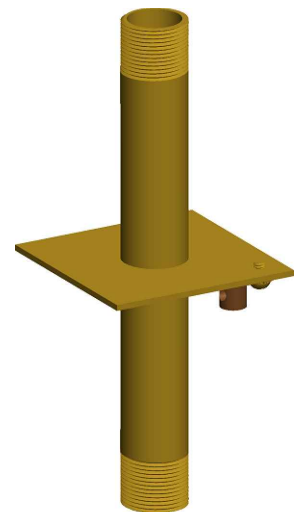
DRAWING NO.  
**1.101**



PLAN VIEW



ELEVATION



3D IMAGE

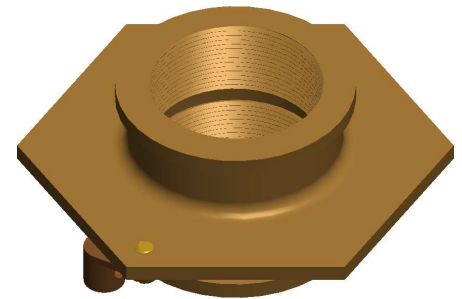
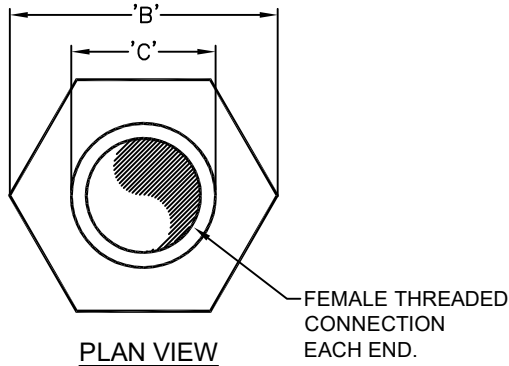
**SPECIFICATION DATA:** Slab Penetration Fitting (Long Style); Sch. 40 Red Brass pipe body to square brass waterstop flange/concrete key, continuous welded to pipe at the midpoint, brass bonding lug, (M) N.P.T. (male) threads at each end.

**DESIGN/APPLICATION DATA:** Roman Fountains RWS-L Series, slab penetration fittings are designed and fabricated for casting into concrete pool slabs as a waterstop device and a concrete key fitting. The fitting provides a rigid, threaded stub-out connection for display nozzles and other pool fittings.

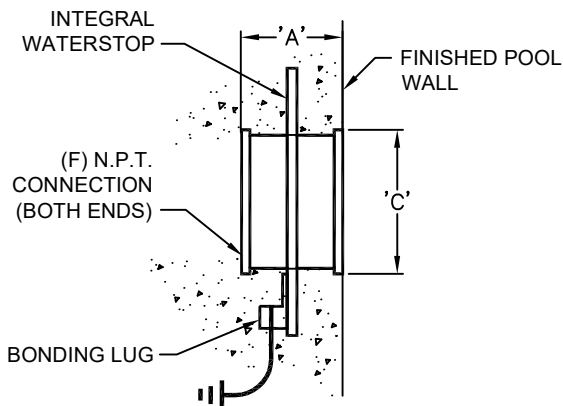
**NOTES:** 1. Custom lengths with custom waterstop flange positions available; consult factory.  
2. Due to continuing product improvement program, Roman Fountains reserves the right to change the specifications without notice.

TECHNICAL DATA			
MODEL NO.	N.P.T.	LENGTH 'A'	FLANGE SIZE 'B'
RWS-050-L	1/2"	10"	4" Sq.
RWS-075-L	3/4"	10"	4" Sq.
RWS-100-L	1"	10"	4" Sq.
RWS-125-L	1 1/4"	12"	4" Sq.
RWS-150-L	1 1/2"	12"	4" Sq.
RWS-200-L	2"	18"	6" Sq.
RWS-300-L	3"	24"	6" Sq.

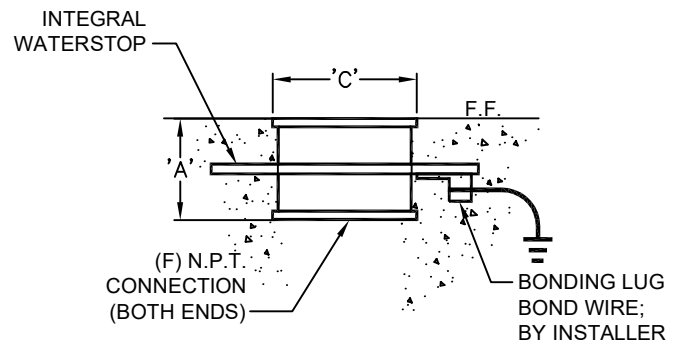
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**1.806**



3D IMAGE



WALL APPLICATION ELEVATION



FLOOR APPLICATION ELEVATION

**SPECIFICATION DATA:** Slab Penetration Fitting (Short Style); machined cast brass, one-piece construction, with integral waterstop flange, bonding lug, and (F) N.P.T. connection; both ends.

**DESIGN/APPLICATION DATA:** Roman Fountains RWS-S Series slab penetration fittings are designed and fabricated for casting into concrete pool walls and slabs as a waterstop device and a concrete key fitting. The fitting provides a rigid, threaded connection for display nozzles and other pool fittings.

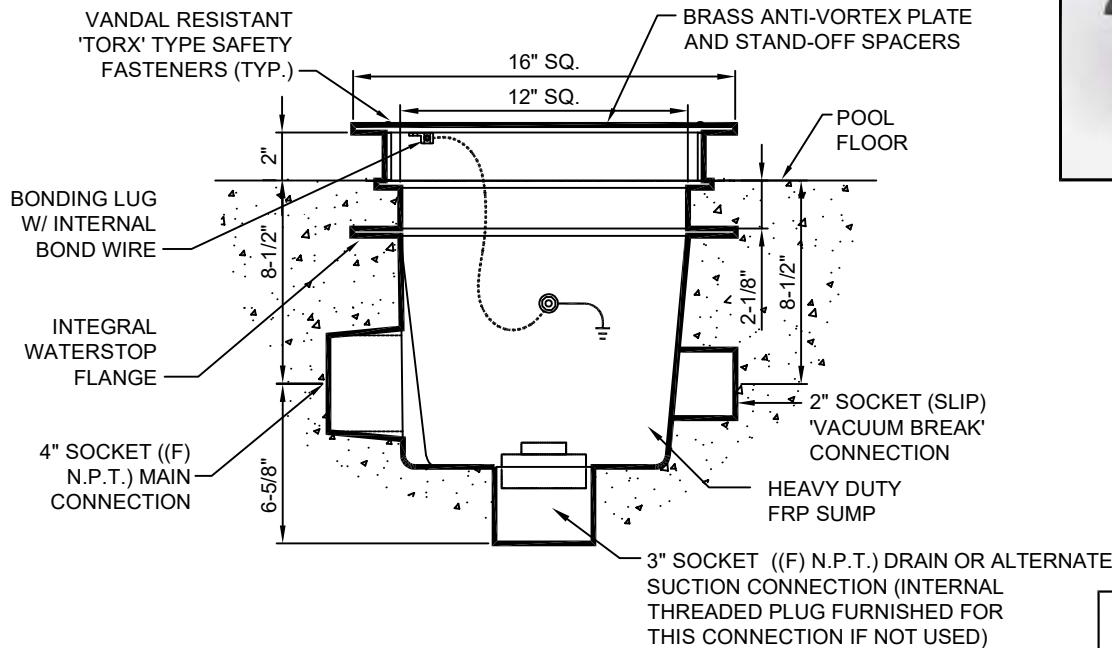
**NOTE:** Due to continuing product improvement program, Roman Fountains reserves the right to change the specifications without notice.

### TECHNICAL DATA

MODEL	N.P.T.	LENGTH 'A'	FLANGE SIZE 'B'	EXPOSED 'C'
RWS-150-S	1 1/2"	2 1/4"	5"	2 7/16"
RWS-200-S	2"	2 3/8"	5 1/2"	3"
RWS-300-S	3"	3"	6 1/2"	4 5/16"

DRAWING NO.  
**1.807**

## RAVS-1600, 16" SQ. ANTI-VORTEX PLATE AND SUMP ASSEMBLY



### SAFETY NOTICE

THE ANTI-VORTEX PLATE MUST BE FIRMLY IN PLACE AND SECURELY FASTENED TO SUMP BODY AT ALL TIMES TO GUARD AGAINST THE POSSIBILITY OF SUCTION ENTRAPMENT. NEVER REMOVE PLATE UNLESS FOUNTAIN IS SHUT OFF AND COMPLETELY DRAINED.

**SPECIFICATION DATA:** 16" Square Anti-Vortex Plate & Sump Assembly; Heavy Duty FRP sump with integral waterstop flange, 4" side, 3" bottom and 2" 'vacuum break' (socket) connections. (The 3" interior connection shall be provided with a 3" threaded male plug.) Solid brass 3/16" thick anti-vortex plate with brass spacers "TORX" type S.S. vandal resistant safety fasteners and wrench.

**DESIGN/APPLICATION DATA:** Roman Fountains RAVS-1600, anti-vortex plates and sumps are designed for use in fountain and reflecting pools using remote pumping systems. Available in a range of capacities and sizes, they provide a pre-fabricated mechanism for returning water from pool to pump, eliminating vortexing (drawing air into the pump) and promoting efficient re-circulation.

- NOTES:**
1. If this is the primary suction source for the recirculation system, use two (2) units minimum, to lessen the risk of suction entrapment.
  2. 128 SQ. inch open area = .638 FPS suction velocity @ 200 GPM.
  3. Recommended maximum flow rate: 200 GPM @ 16" water depth.
  4. Due to continuing product improvement program, Roman Fountains reserves the right to change the specifications without notice.

DRAWING NO.  
**3.314**

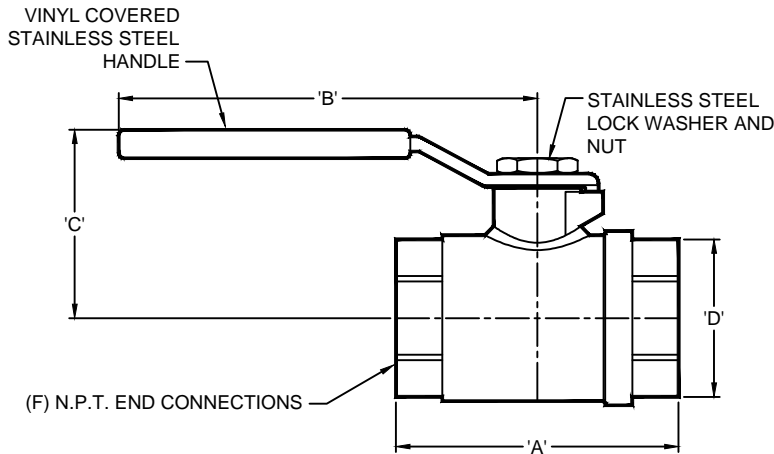


(877) 794-1802

## RBB-T SERIES, THREADED BRASS BALL VALVE



Appearance may vary according to size and supply available.



For submersible applications, remove handle and store in safe place after adjustment.

TECHNICAL DATA					
MODEL NO.	SIZE	A	B	C	D
RBB-050-T	1/2"	2 5/16"	3 15/16"	1 11/16"	1"
RBB-075-T	3/4"	2 1/2"	4 23/32"	2"	1 7/32"
RBB-100-T	1"	3 3/16"	4 23/32"	2 5/32"	1 19/32"
RBB-125-T	1 1/4"	3 11/16"	6 7/32"	3"	1 15/16"
RBB-150-T	1 1/2"	4"	6 7/32"	3 1/4"	2 1/8"
RBB-200-T	2"	4 3/4"	6 7/32"	3 1/2"	2 23/32"
RBB-250-T	2 1/2"	6 1/8"	10 1/32"	5 7/32"	3 11/32"
RBB-300-T	3"	6 31/32"	10 1/32"	5 1/2"	3 29/32"

**SPECIFICATION DATA:** Threaded Brass Ball Valve; Cast bronze machined body, brass full port ball, silicone bronze stem, Teflon seat, stainless steel handle nut, vinyl covered stainless steel handle, 400 PSI maximum operating pressure at 150°, and (F) N.P.T. threaded end connections.

**DESIGN/APPLICATION DATA:** RBB-T Series, ball valves are designed for use in fountain systems where flow regulation of nozzles and smaller diameter piping systems is required. The compact, streamlined design allows for ease of handing, installation and operation.

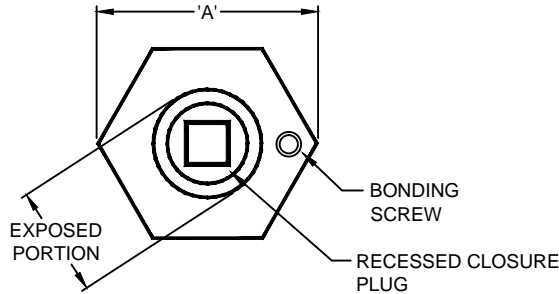
- NOTES:**
1. For submersible applications remove valve handle once adjusted.
  2. Due to continuing product improvement program, Roman Fountains reserves the right to change the specifications without notice.

DRAWING NO.  
**3.706**

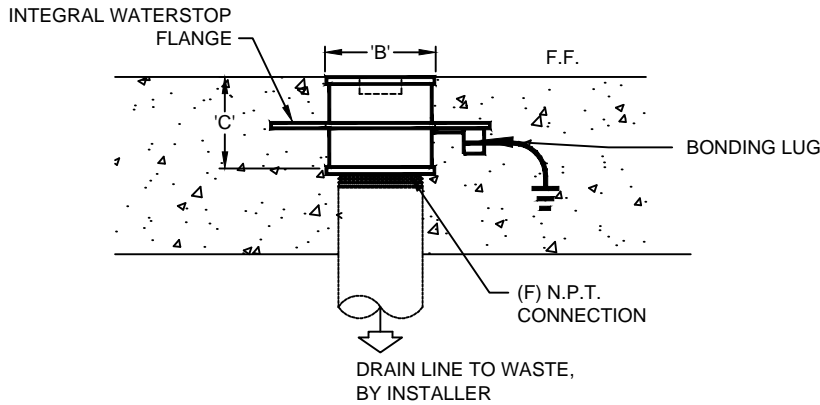


(877) 794-1802

# RFD SERIES, CAST BRONZE FLOOR DRAIN



TOP VIEW



ELEVATION

TECHNICAL DATA					
Model No.	Connection Size	Dimension 'A'	Dimension 'B'	Dimension 'C'	Slab Thickness
RFD-150	1-1/2"	4-7/8"	2-1/2"	2-3/16"	4" Min.
RFD-200	2"	5-5/8"	3"	2-5/16"	6" Min.
RFD-300	3"	6-1/2"	4-3/8"	3-1/8"	6" Min.
RFD-400	4"	8-1/8"	5-1/2"	3-3/4"	6" Min.

**SPECIFICATION DATA:** Cast Bronze Floor Drain Fitting; with integral waterstop flange; bonding screw, threaded closure plug with recessed head and (F) N.P.T. outlet connection.

**DESIGN/APPLICATION DATA:** Roman Fountains RFD Series pool drains are designed for use in fountains and reflecting pools to drain water from the pool. They are also designed for use in multi-level pools as pool-to-pool drains.

- NOTES:**
1. Installer must consult local codes for termination of drain lines.
  2. A 'P'-TRAP may be required per code; by installer.
  3. Due to continuing product improvement program, Roman Fountains reserves the right to change the specifications without notice.

DRAWING NO.  
**4.101**



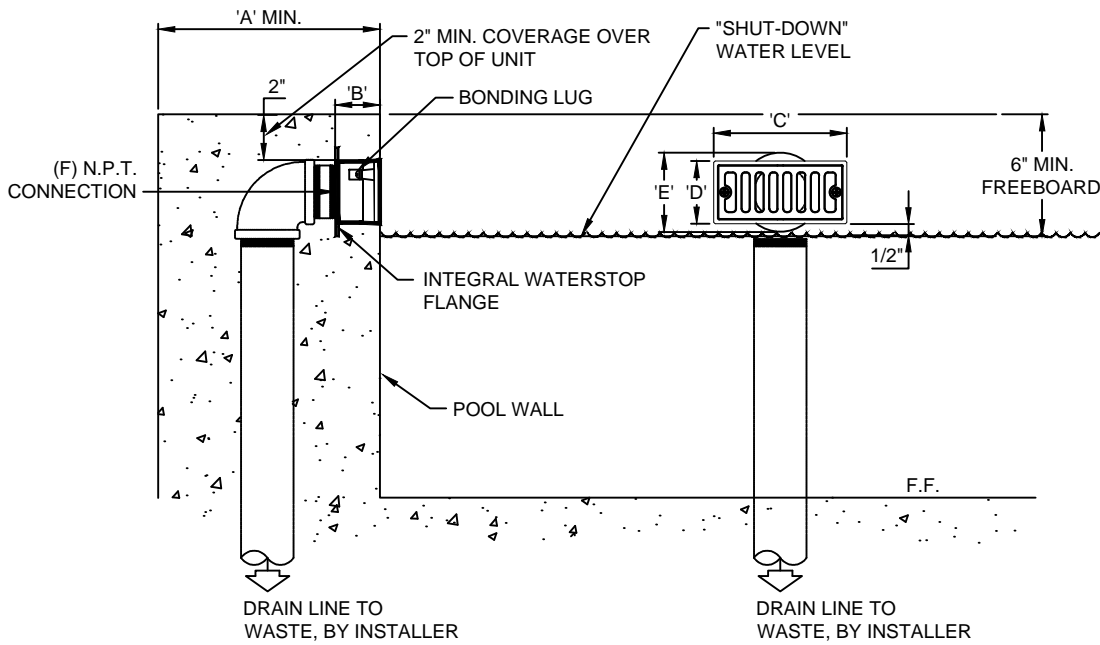


(877) 794-1802

# ROVS-200-W, SIDEWALL OVERFLOW DRAIN



FRONT ELEVATION



SIDE ELEVATION

FRONT ELEVATION

TECHNICAL DATA								
Model No.	Connection Size	Dimension 'A'	Dimension 'B'	Dimension 'C'	Dimension 'D'	Dimension 'E'	Open Area	Max. Drain Rate
ROVS-200-W	2"	10"	1-1/2"	6"	2-7/8"	3.5" dia..	6.5 Sq. In.	20 GPM

**SPECIFICATION DATA:** Sidewall Overflow Drain; bronze drain body, integral waterstop flange with bonding screw; removable bronze grate; stainless steel fasteners and (F) N.P.T. connection.

**DESIGN/APPLICATION DATA:** ROVS-W Series, sidewall overflow drains are designed for use in fountain and reflection pool walls to maintain a specified water level and siphon off excess water. They may be used in conjunction with RFD Series floor drains.

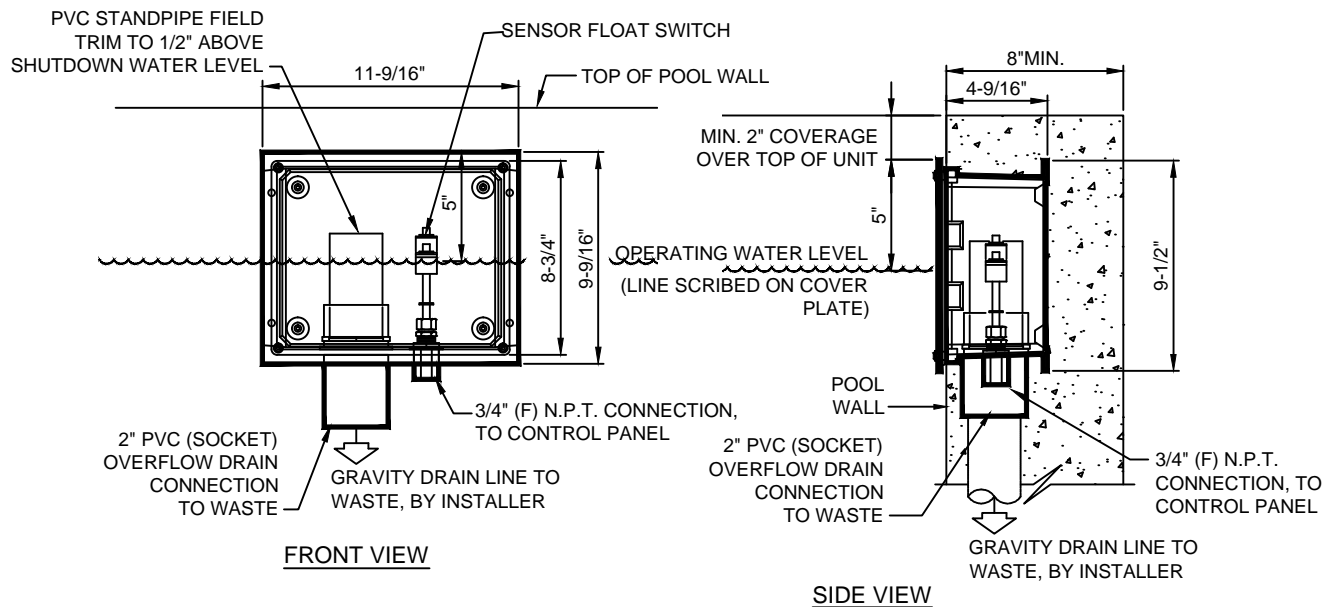
- NOTES:**
1. Installer must consult local codes for termination of drain lines.
  2. In multi-level fountains, the lowest pool may experience a rise in water level on system shut-down. Install overflow unit at 'static' (shut-down) water level.
  3. Due to continuing product improvement program, Roman Fountains reserves the right to change the specifications without notice.

DRAWING NO.  
**4.103**



(877) 794-1802

# RCOM-WND, WALL-MOUNTED COMBO OVERFLOW/MAKE-UP/CUTOFF HOUSING

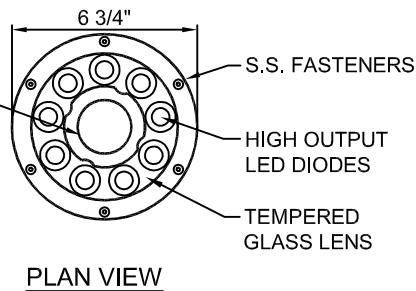
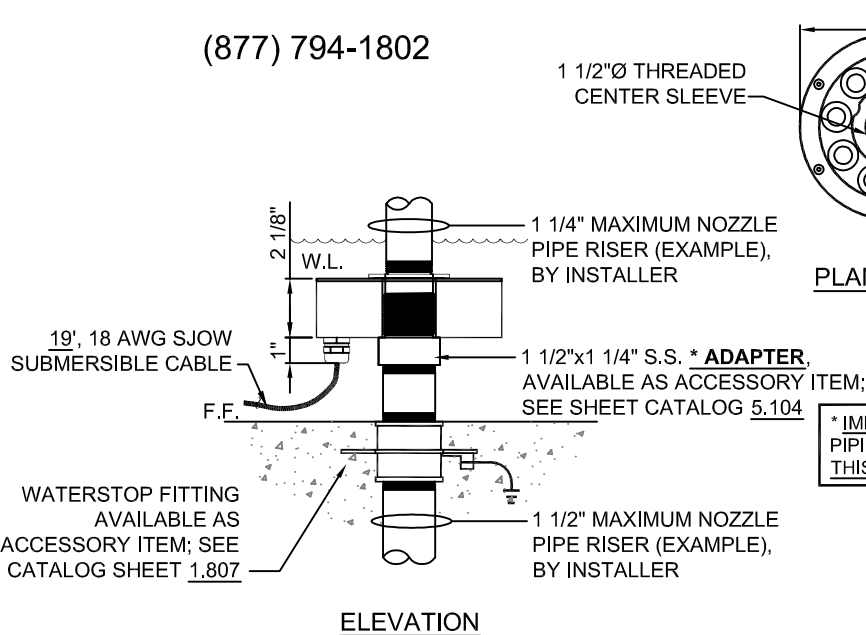


**SPECIFICATION DATA:** Wall-Mounted Combination Overflow/Water Make-up/Low Level Cutoff. Consists of a thermoplastic housing sensor/overflow with brass coverplate; stainless steel fasteners; sensor compression fitting; 3/4" (F) N.P.T. conduit entry and 2" adjustable overflow. Unit features a multi-level float-type sensor of brass and Buna-N construction with a 1-3/4" adjustability range and includes 100 ft. of pre-attached, 4-conductor, color-coded sensor cable. When purchasing as a component system, package must include a RCOM-PNL Series, dual function solid-state water level control panel; see catalog cut sheet 4.210 RCOM-PNL3 for panel rated for 120 VAC with internally transformed 24 volt sensor output circuit.

- NOTES:**
1. A normally closed, electrically actuated, 120VAC solenoid valve is required to operate water makeup function; specify RSV Series valve. (Ref. Cat. sheet 4.403)
  2. A lighting and/or motor contactor is required to operate the low level cutoff function; consult factory.
  3. The PVC overflow standpipe is removable and is furnished full height, to provide a 1/2" margin above the sensor 'high limits' position; trim as required, and reinsert.
  4. This unit is to be used in applications where shut-down gain is 2-1/2" or less.
  5. Do not run sensor wire in conduit with any other conductors.
  6. Do not over tighten brass cover plate screws into niche!
  7. NEMA rated enclosure available for outdoor use on special order; consult factory.
  8. Installer must consult local codes for termination of drain lines
  9. Due to continuing product improvement program, Roman Fountains reserves the right to change the specifications without notice.

DRAWING NO.  
**4.206**  
R1\_03-16-19

(877) 794-1802



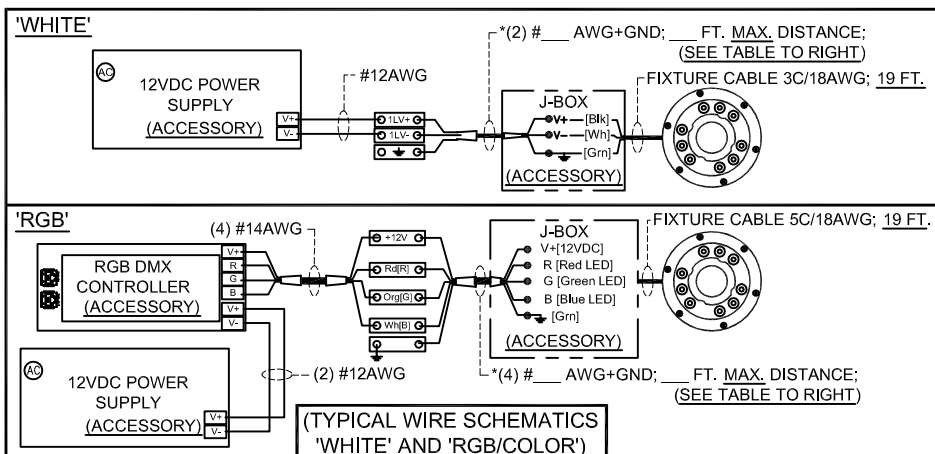
**\* IMPORTANT: THROUGH- FIXTURE PIPING *ONLY* ACCOMPLISHED WITH THIS ADAPTER!**



# LED

# 12VDC

NOTE: THIS PRODUCT HAS BEEN CERTIFIED BY ETL TO MEET THE U.L. 676 STANDARD FOR UNDERWATER LIGHTING FIXTURES.



*MAXIMUM CABLE LENGTH FOR A SINGLE RUN						
LOAD AT 12VDC	AMPS	MAXIMUM CABLE LENGTH TO THE LAST FIXTURE IN A CABLE RUN BY WIRE SIZE				
WATTS		#14	#12	#10	#8	#6
25-30	2.0-2.5	35FT.	60FT.	100FT.	150FT.	
31-36	2.5-3.0	30FT.	50FT.	80FT.	125FT.	175FT.
37-42	3.0-3.5		45FT.	70FT.	100FT.	175FT.
43-55	3.5-4.6		35FT.	55FT.	80FT.	135FT.
56-75	4.7-6.3		25FT.	40FT.	60FT.	100FT.
76-100	6.4-8.3		20FT.	30FT.	50FT.	75FT.
101-112	8.4-9.3		15FT.	25FT.	40FT.	65FT.

TECHNICAL DATA							
MODEL NO.	LIGHT SOURCE	LIGHT COLOR	BEAM ANGLE	INPUT VOLTAGE	WATTS	CABLE TYPE	IP RATING
RFL-CG-DH-LED-W-AS	9X3W WHITE DIODES	COOL 'WHITE'	30 DEG.	12VDC	*27.0	18-3 AWG SJOW	68
RFL-CG-DH-LED-WW-AS	9X3W WHITE DIODES	WARM 'WHITE'	30 DEG.	12VDC	*27.0	18-3 AWG SJOW	68
RFL-CG-DH-LED-RGB-AS	9X3W RGB DIODES	'RGB'	30 DEG.	12VDC	*27.0	18-5 AWG SJOW	68

\*NOTE: THIS FIGURE REPRESENTS THE MAXIMUM POSSIBLE LOAD FOR THIS FIXTURE.

**SPECIFICATION DATA:** Small diameter, low profile LED submersible light fixture with center sleeve feature for nozzle riser mounting (up to 1 1/2"Ø) \* (See important Adapter Note above!); high output LED diodes, stainless steel housing and fasteners, tempered glass lens, silicone lens gasket, chromed brass cord entrance fitting; 19 ft. of 18 AWG SJOW cable (not available with additional cord length).

**DESIGN/APPLICATION DATA:** Any fountain application where 360° illumination of a spray nozzle is required with a high output LED submersible light fixture.

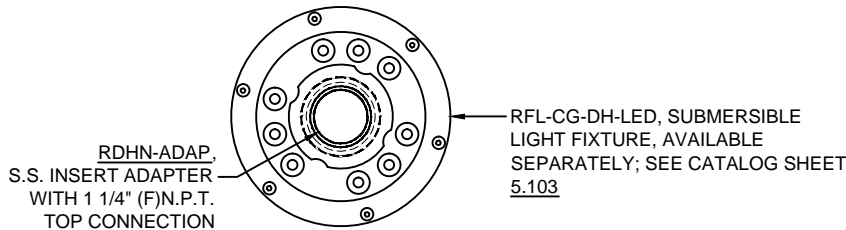
- NOTES:**
- 12VDC Power supply required to operate fixtures. Contact factory for requirements.
  - 'DMX' Controller required to operate 'RGBW' fixtures in programmable mode. Contact factory for requirements.
  - Due to our continuing product improvement, Roman Fountains reserves the right to change the specifications without notice.

**DRAWING NO.**  
**5.103**

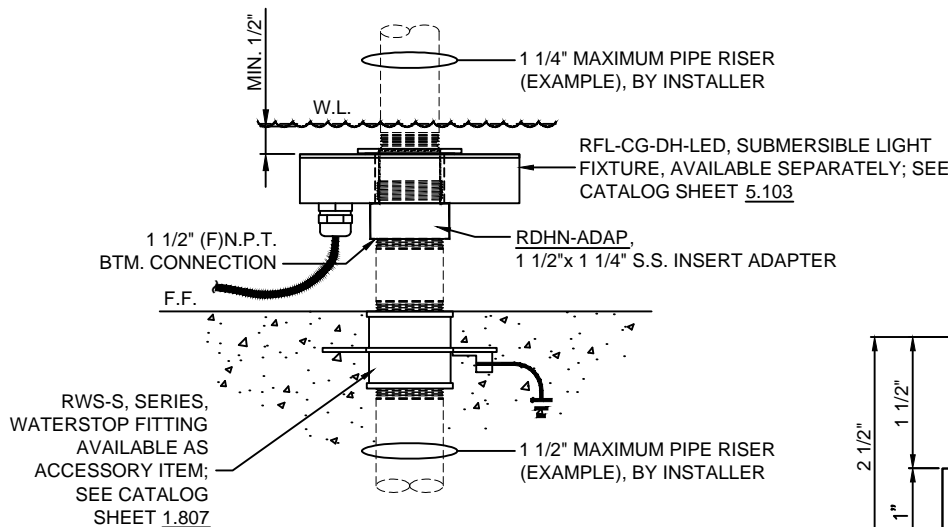


**RDHN-ADAP, THREADED ADAPTER  
FOR RFL-DH-LED 'DONUT HOLE'  
SUBMERSIBLE LED LIGHT FIXTURE**

(877) 794-1802

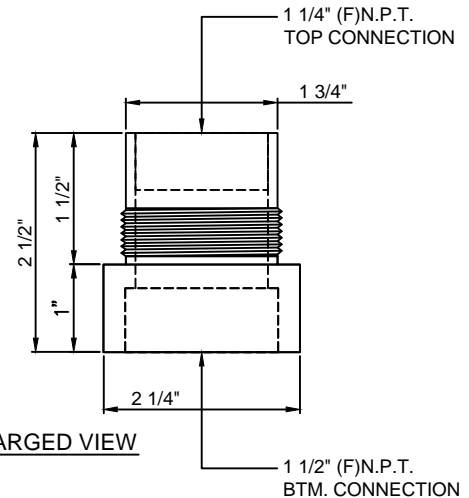


**PLAN VIEW**



**ELEVATION**

**APPLICATION**



**ENLARGED VIEW**

**SPECIFICATION DATA:** Threaded adapter fitting machined from type 303 stainless steel with 1 1/2" (F)N.P.T. bottom connection and 1 1/4" (F)N.P.T. top connection.

**DESIGN/APPLICATION DATA:** This adapter is used for applications where riser mounting of the RFL-DH-LED, 'Donut Hole' LED light fixture is required. Adapter threads into the straight (non-tapered) threads at fixture bottom, to provide a pipe (N.P.T.) thread and basically acts as a reducer coupling for through piping to a spray nozzle; brass or stainless steel reducer bushings (provided By Installer) may be used at either end of adapter when a smaller pipe riser size is required.

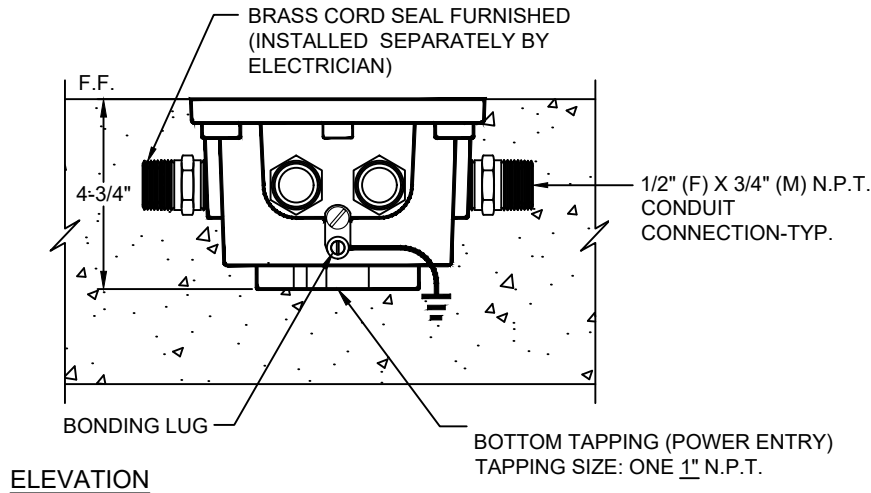
**NOTE:** Due to our continuing product improvement, Roman Fountains reserves the right to change the specifications without notice.

**DRAWING NO.  
5.105**

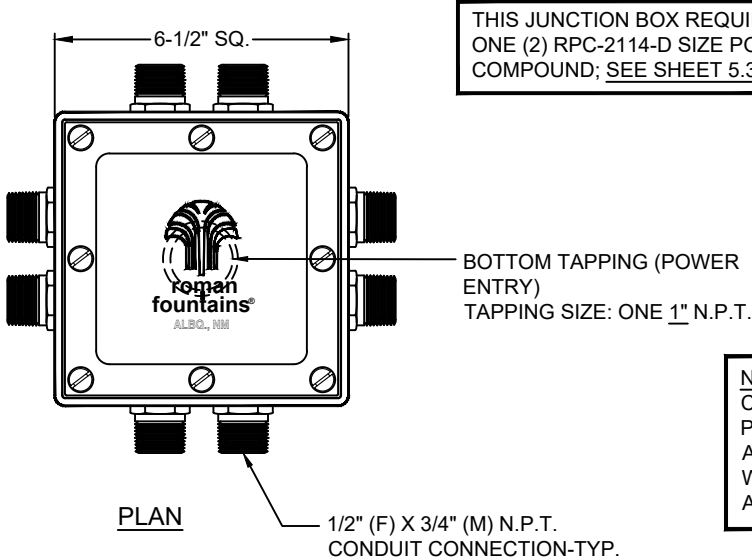


# RJB-8-100-F, FLUSH-MOUNTED SUBMERSIBLE JUNCTION BOX

(877) 794-1802



**NOTE:**  
CORD COMPRESSION SEALS FURNISHED BY ROMAN FOUNTAINS, INSTALLED INTO BOX BY ELECTRICIAN.



THIS JUNCTION BOX REQUIRES ONE (2) RPC-2114-D SIZE POTTING COMPOUND; SEE SHEET 5.327

BOTTOM TAPPING (POWER ENTRY):  
ONE 1" (F) N.P.T.

3/4" (F) N.P.T. CORD SEAL SIDE TAPPINGS - (5) THRU (8)  
QUANTITY: ( )

**NOTE: NOT TO BE USED IN SWIMMING POOL OR SPA APPLICATIONS.**

**NOTE:** ONCE WIRING IS COMPLETED, FLASH LIGHTING CIRCUITS MOMENTARILY (10 SECONDS) TO VERIFY PROPER OPERATION. THEN WITH PUTTY PROVIDED, SEAL ALL CONDUIT ENTRIES INTO J-BOX PRIOR TO POTTING WITH (2) #RPC-2114-D, POTTING COMPOUND (AVAILABLE AS ACCESSORY ITEM).

**SPECIFICATION DATA:** Flush-Mounted Submersible Junction Box, cast bronze construction, with neoprene gasket, stainless steel fasteners, one 1" (F) N.P.T. bottom power conduit connection, and ( ) 3/4" N.P.T. side connection with brass cord seal fittings (shipped loose and installed in field). Junction box shall have a minimum volume of 60.0 cubic inches and shall include an internal grounding lug.

**NOTE:** Due to our continuing product improvement, Roman Fountains reserves the right to change the specifications without notice.

**INSTALLATION:** Roman Fountains recommends the following procedures be followed when installing underwater junction boxes.

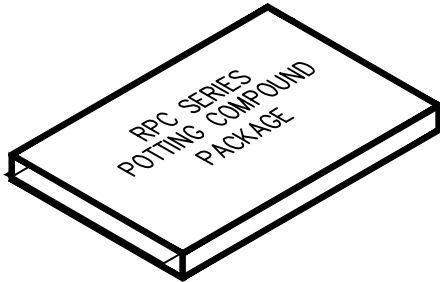
1. Check local electrical code before installing. Must comply with NEC article 680.
2. Use only 'Everdur' or brass pipe for conduit where exposed to pool water.
3. After making and verifying all connections, use putty provided to seal all conduit entries into j-box.
4. Once conduits are sealed, pot junction box with (2) #RPC-2114-D potting compound (available as accessory).
5. Use good quality thread sealant on junction boxes.
6. Test conduit system to eliminate all leaks.

DRAWING NO.  
**5.316**



(877) 794-1802

RPC-2114 SERIES,  
POTTING COMPOUND



RPC-2114-C, 12.3-oz. size

ONE PACK EQUALS  
22.19 CU. IN.

RPC-2114-D, 21.2-oz. size

ONE PACK EQUALS  
38.24 CU. IN.

**NOTE:** ARTICLE 680-52(b) OF THE NATIONAL ELECTRICAL CODE (N.E.C.) REQUIRES THAT ALL UNDERWATER JUNCTION BOXES AND ALL UNDERWATER ENCLOSURES BE FILLED WITH AN APPROVED POTTING COMPOUND TO PREVENT THE ENTRY OF MOISTURE.

**SPECIFICATION DATA:** Potting Compound, re-enterable, electrical insulating and potting compound, designed for use in RJB-Series junction boxes (required by NEC 680).

**NOTE:** Due to our continuing product improvement, Roman Fountains reserves the right to change the specifications without notice.

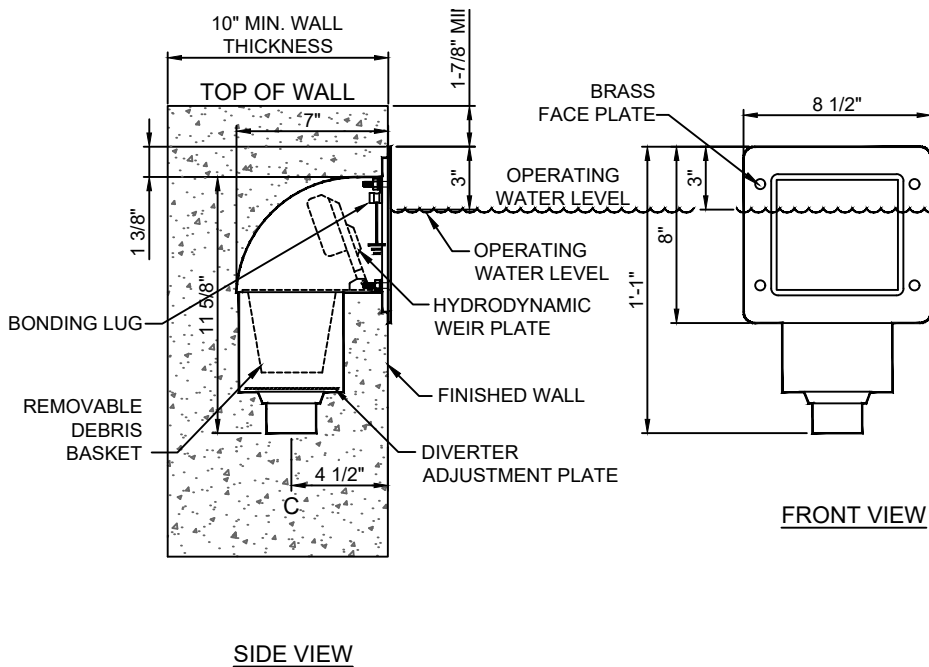
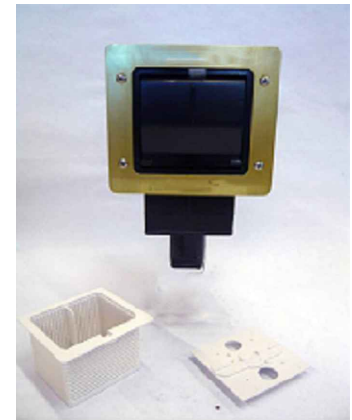
**DESIGN/APPLICATION DATA:** Roman Fountains RPC-2114 Series re-enterable electrical insulating and potting compound is designed for use in RJB Series junction boxes, as required by NEC 680. Its tacky urethane formulation adheres well and pulls away cleanly for fast splice re-entry. Moisture resistant, it is non-corrosive to copper and brass.

DRAWING NO.  
**5.327**



(877) 794-1802

**RPS-150-FA**  
**FRONT ACCESS SKIMMER**



TECHNICAL AND HYDRAULIC DATA		
MODEL	CONNECTION SIZE	MAXIMUM FLOW RATE
RPS-150-FA	1-1/2" SLIP	30 GPM

**SPECIFICATION DATA :** Front Access Surface Skimmer, body of injection molded black cyclac with removable floating weir/basket assembly; diverter adjustment plate; natural finish brass faceplate; stainless steel fasteners and 1-1/2" SLIP connection.

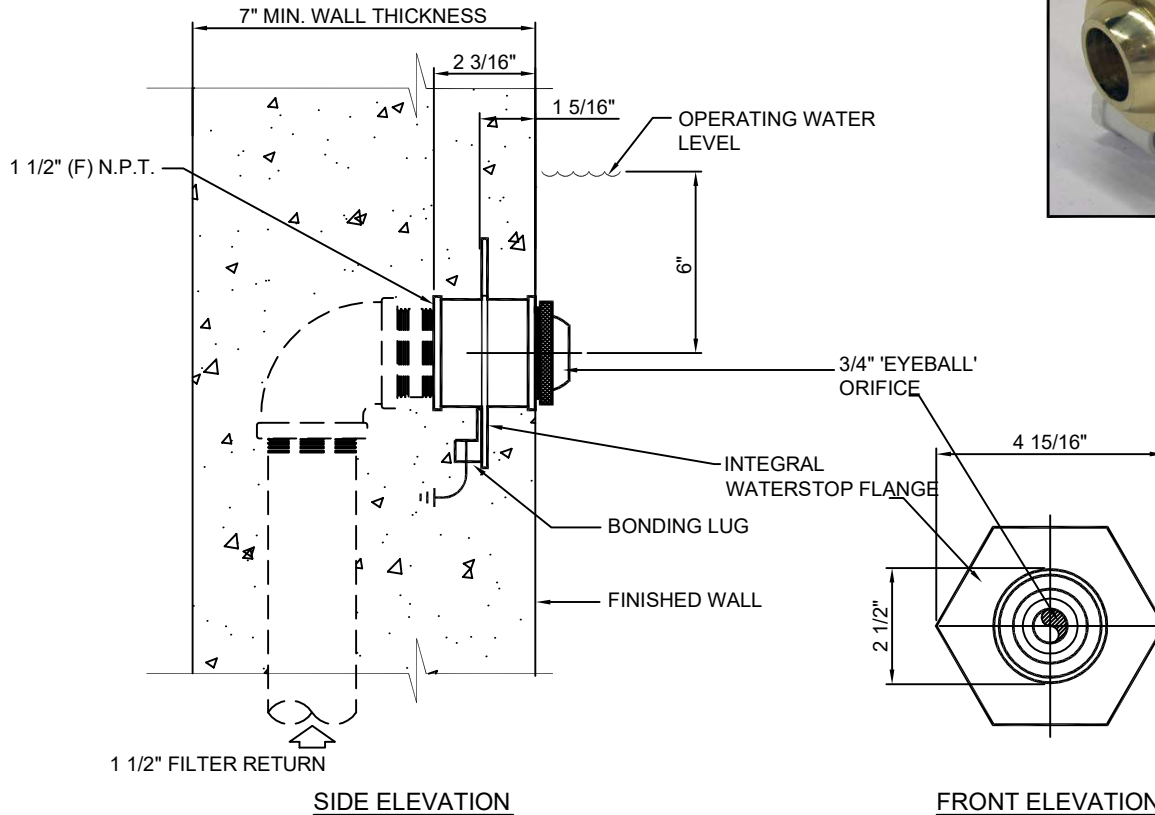
**NOTE:** Due to our continuing product improvement, Roman Fountains reserves the right to change the specifications without notice.

**INSTALLATION:** Install front access skimmer into the pool wall in the direction and location shown on installation drawings. Run specified type and size piping (as shown on piping schematics) from filter suction system and connect to bottom of skimmer using proper pipe fittings. Place skimmer basket into skimmer body and insure that weir plate moves freely with no resistance in either direction. Do not remove weir plate, or skimmer will not function properly.

**MAINTENANCE:** Periodically check skimmer basket for debris buildup and remove and clean as necessary. Periodically check skimmer weir plate for obstructions to insure it is floating freely. Do not operate filter system without skimmer basket in place or pump damage may result. **SHUT OFF FILTER PUMP BEFORE CLEANING SKIMMER, TO PREVENT INJURY.**

**DESIGN/APPLICATION DATA:** Roman Fountains RPS-150-FA, front access skimmer is designed for use in fountains and reflecting pools as a secondary filter system return point and strainer device to skim debris from the pool surface before settling occurs. Its "front access" design allows for discrete installation and removal of the skimmer basket.

(877) 794-1802



**NOTE: INSTALL WATERSTOP FLANGE  
FACE FLUSH TO FINISHED WALL.**

TECHNICAL AND HYDRAULIC DATA		
MODEL NO.	CONNECTION SIZE	MAXIMUM FLOW RATE
REF-150-WS	1-1/2"	30 GPM

**SPECIFICATION DATA:** Adjustable 'Eyeball' Inlet Fitting; consisting of a machined brass body with integral waterstop flange, bonding lug, machined brass 'eyeball' with 3/4" orifice, retaining ring and 1-1/2" (F) N.P.T. connection, standard natural brass finish.

**NOTE:** Due to our continuing product improvement, Roman Fountains reserves the right to change the specifications without notice.

**DESIGN/APPLICATION DATA:** Roman Fountains REF-150-WS, adjustable eyeball inlet fitting is designed for use in fountains and reflecting pools as a discharge point for filtered water, or an inlet point for makeup water.

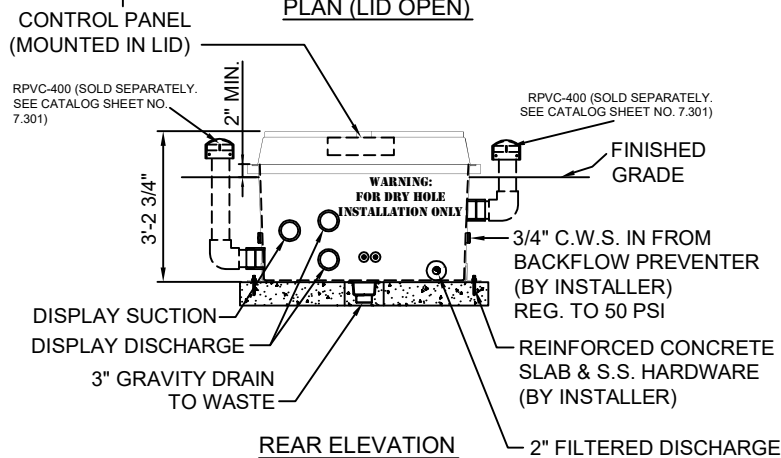
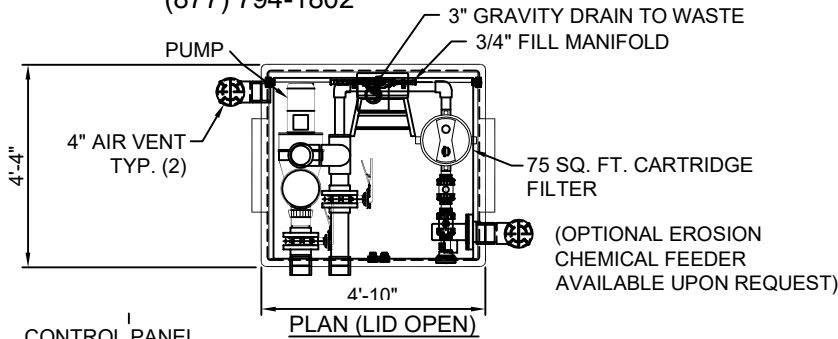
DRAWING NO.  
**6.504**



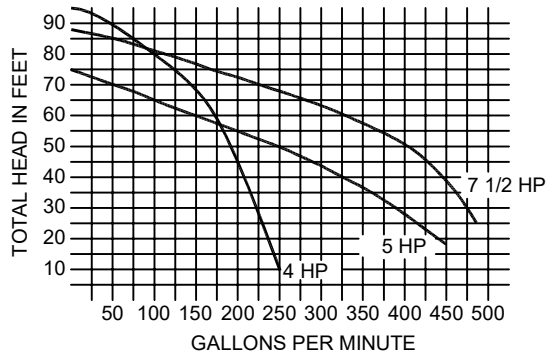


# RDP-2 SERIES, DIRECT-BURIAL FIBERGLASS PUMP VAULT

(877) 794-1802



**WARNING: FOR 'DRY HOLE' INSTALLATION ONLY!**



TECHNICAL DATA			
MODEL #	PUMP HP	SUCT./DISCH. (F) SOCKET	AVAILABLE SYSTEM POWER OPTIONS
RDP-2-400	4	4"x4"	115/208-230V, 1Ø or 208-230/460, 3Ø
RDP-2-500	5	*4"/ 4"	115/208-230V, 1Ø or 208-230/460, 3Ø
RDP-2-750	7.5	*4"/4"	115/208-230V, 1Ø or 208-230/460, 3Ø

\*MUST BE INCREASED TO 6" IMMEDIATELY OUTSIDE VAULT.

**SPECIFICATION DATA:** Series 2 Direct Burial Pump Vault, consisting of a 4'-10" x 4'-4" x 3'-2 3/4" deep heavy duty FRP vault with white gel-coat interior and brown gel-coat exterior, furnished with fiberglass reinforced plastic lid with stainless steel piano hinge attachment and locking device, containing a RSPD self-priming display pump with integral suction strainer, RCCF-075, 75 sq. ft. cartridge filter unit, 4" vent connections with 230 CFM vent fan, RMS-075-NS, 3/4" fill manifold assembly, 3" floor drain, U.L. 508 listed control panel in a NEMA 4 enclosure, containing; main disconnect; pump starter with circuit breaker, contactor & adjustable, solid-state overload, single-channel programmable time switch(es), for pump and lights, H.O.A. switch(es), plus lighting contactor(s), G.F.C.I. breaker(s), and water level/low level cutoff control (when applicable). Unit is pre-wired, pre-plumbed (Schedule 80 PVC) and factory tested, prior to shipment.

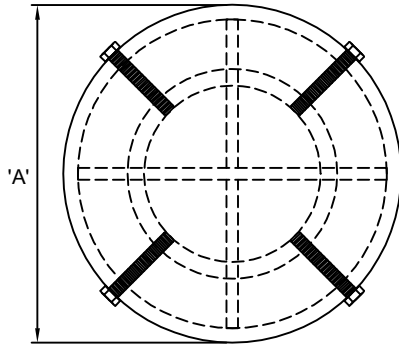
**OPTIONS:**

- Erosion type chemical feeder is available.
- 4'-0" x 4'-6" 'BILCO' locking aluminum Diamond Plate Hatchway with lock-open arm. Add RBH-DP to Model Number.

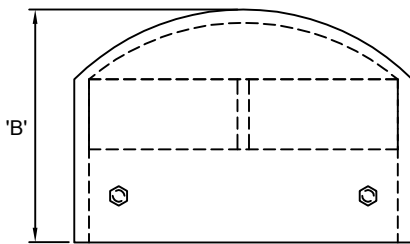
**NOTES:**

- Hatch opening must be located in flood-safe area.
- Slope finished grade away from pump module.
- Protect pump module gravity drain from back flow and sewer gas.
- Top of pump module must be at, or below lowest pool water level.
- Due to our continuing product improvement program, Roman Fountains reserves the right to change specifications w/o notice.

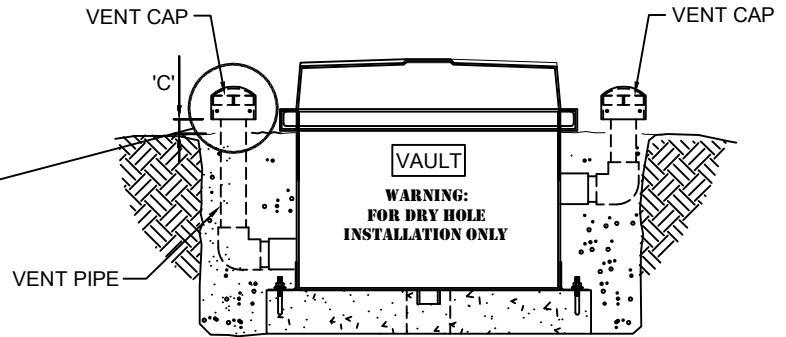
DRAWING NO.  
**7.203**



PLAN VIEW



ELEVATION VIEW



TYPICALLY ATTACHED TO THE ENDS OF THE TWO VAULT VENTILATION PIPES AS SHOWN IN THIS ELEVATION VIEW

DIMENSIONAL INFORMATION					
MODEL	VENT PIPE SIZE	OVERALL DIAMETER 'A'	CAP HEIGHT 'B'	MIN. CLEARANCE ABOVE GRADE 'C'	APPLICATION
RPVC-300	3"	7-1/4"	5"	3"	RDP-1 & STORAGE TANKS
RPVC-400	4"	7-1/4"	5"	3"	RDP-2
RPVC-600	6"	9-5/16"	6-3/8"	3"	RDP-250 & RDP-300
RPVC-800	8"	11-13/16"	5-1/4"	3"	RDP-4 & RDP-5

**SPECIFICATION DATA :** PVC Vent Cap, constructed of Schedule 40 PVC, and 1/4" stainless steel fasteners. Corrosion resistant design, brown.

**DESIGN/APPLICATION DATA:** The RPVC-Series vent cap is used for terminating ventilation piping above ground level. Low profile design allows air movement and reduces the possibility of debris being placed in the vent openings, thus causing stoppage of the ventilation system.

**NOTE:** Due to our continuing product improvement program, Roman Fountains reserved the right to change the specifications without notice.