X3 CONT

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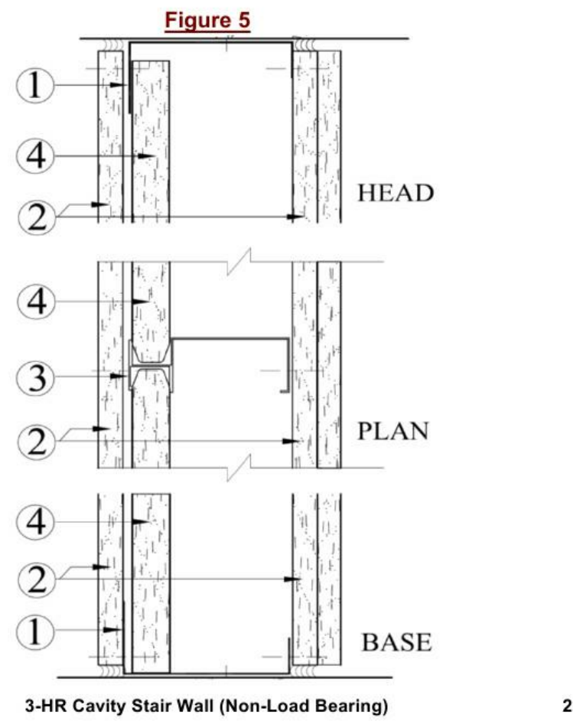
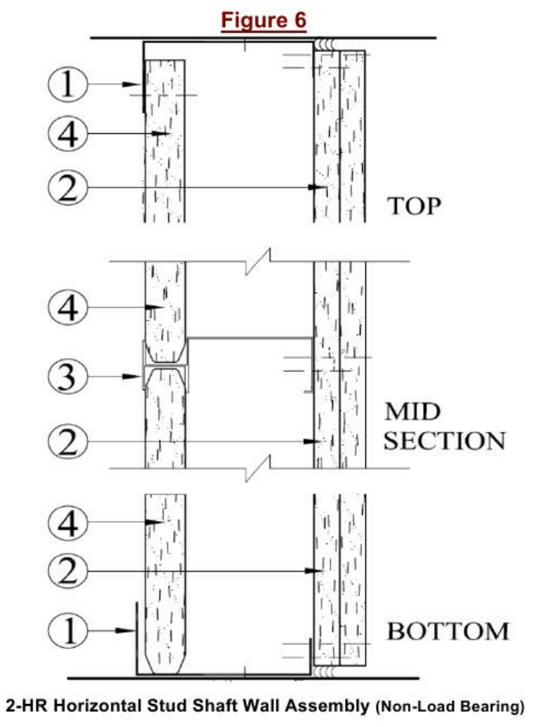
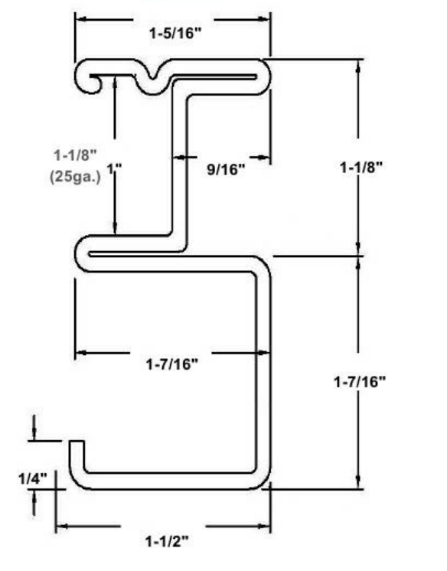


3-HR Cavity Stair Wall (Non-Load Bearing)



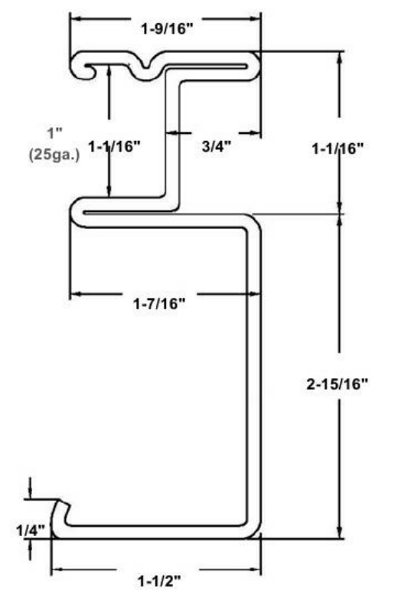
2-HR Horizontal Stud Shaft Wall Assembly (Non-Load Bearing)

Detail A



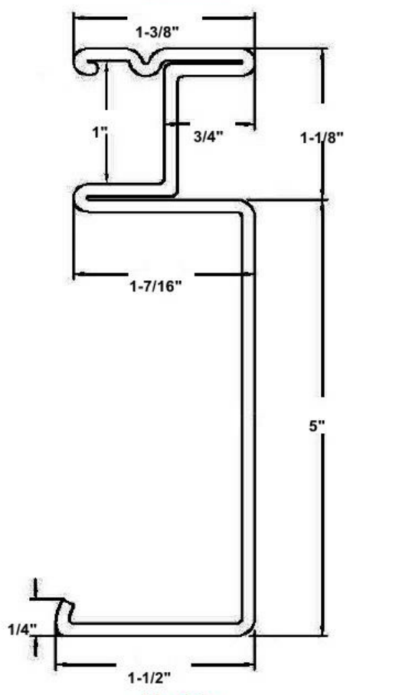
2-1/2" x 20ga.

Detail B



4" x 20ga.

Detail C



6" x 20ga.

AER-09038

Table 1. Limiting Heights Vertical Shaft Walls, Applicable to Fig. 1

		1-hr Shaft Wall / Stair Wall							
Stud Description	Allowable Deflection	5psf design (ft - in)		7.5psf design (ft - in)		10psf design (ft - in)		15psf design (ft - in)	
212CH25-18	L/120	11	5	10	0	9	1	7	11
	L/240	10	7	9	3	8	4	7	4
	L/360	9	4	8	2	7	5	6	6
212CH20-34	L/120	13	5	11	8	10	8	9	3
	L/240	12	3	10	9	9	9	8	6
	L/360	10	10	9	6	8	7	7	6
400CH25-18	L/120	15	2	12	5	10	9	8	9
	L/240	14	5	12	5	10	9	8	9
	L/360	12	9	11	2	10	1	8	9
400CH20-34	L/120	20	5	17	10	16	2	13	4
	L/240	17	6	15	3	13	10	12	1
	L/360	15	3	13	4	12	1	10	7
600CH20-34	L/120	26	3	21	5	18	7	15	2
	L/240	24	0	20	12	18	7	15	2
	L/360	21	1	18	5	16	9	14	8

Table 2. Limiting Heights - Vertical & Horizontal Shaft Walls, Applicable to Fig. 2, 3 & 6

		2-hr Stair Wall								2-hr Shaft Wall							
Stud Description	Allowable Deflection	5psf design (ft - in)		7.5psf design (ft - in)		10psf design (ft - in)		15psf design (ft - in)		5psf design (ft - in)		7.5psf design (ft - in)		10psf design (ft - in)		15psf design (ft - in)	
212CH25-18	L/120	12	2	10	8	9	8	8	5	12	4	10	10	9	10	8	7
	L/240	11	2	9	9	8	10	7	9	11	4	9	11	8	12	7	10
	L/360	9	10	8	7	7	10	6	10	10	4	9	1	8	3	7	2
212CH20-34	L/120	14	2	12	5	11	3	9	10	14	3	12	5	11	4	9	11
	L/240	13	0	11	5	10	4	9	1	12	10	11	3	10	2	8	11
	L/360	11	6	10	0	9	1	7	12	11	7	10	1	9	2	8	0
400CH25-18	L/120	16	4	14	3	12	11	10	7	17	9	14	6	12	7	10	3
	L/240	15	2	13	3	12	0	10	6	15	7	13	8	12	5	10	3
	L/360	13	4	11	8	10	7	9	3	13	11	12	2	11	1	9	8
400CH20-34	L/120	19	6	17	1	15	6	13	7	19	11	17	4	15	9	13	10
	L/240	17	11	15	8	14	3	12	5	18	1	15	9	14	4	12	6
	L/360	15	10	13	10	12	7	10	12	16	2	14	1	12	10	11	3
600CH20-34	L/120	28	0	25	1	21	9	17	9	25	4	22	2	19	8	16	1
	L/240	24	10	21	9	19	9	17	3	21	9	19	0	17	4	15	1
	L/360	21	11	19	2	17	5	15	2	20	0	17	6	15	11	13	11

Note: In Horizontal stud applications (Fig. 6) the horizontal wall width is limited to the length of the Liner Panel.

Table 3. Limiting Heights Vertical Shaft Walls, Applicable to Fig. 4 & 5

		3-hr Stair Wall								3-hr Shaft Wall							
Stud Description	Allowable Deflection	5psf design (ft - in)		7.5psf design (ft - in)		10psf design (ft -in)		15psf design (ft - in)		5psf design (ft - in)		7.5psf design (ft - in)		10psf design (ft - in)		15psf design (ft - in)	
212CH25-18	L/120	12	2	10	8	9	8	8	5	12	4	10	10	9	10	8	7
	L/240	11	2	9	9	8	10	7	9	11	4	9	11	8	12	7	10
	L/360	9	10	8	7	7	10	6	10	10	4	9	1	8	3	7	2
212CH20-34	L/120	14	2	12	5	11	3	9	10	14	3	12	5	11	4	9	11
	L/240	13	0	11	5	10	4	9	1	12	10	11	3	10	2	8	11
	L/360	11	6	10	0	9	1	7	12	11	7	10	1	9	2	8	0
400CH25-18	L/120	16	4	14	3	12	11	10	7	17	9	14	6	12	7	10	3
	L/240	15	2	13	3	12	0	10	6	15	7	13	8	12	5	10	3
	L/360	13	4	11	8	10	7	9	3	13	11	12	2	11	1	9	8
400CH20-34	L/120	19	6	17	1	15	6	13	7	19	11	17	4	15	9	13	10
	L/240	17	11	15	8	14	3	12	5	18	1	15	9	14	4	12	6
	L/360	15	10	13	10	12	7	10	12	16	2	14	1	12	10	11	3
600CH20-34	L/120	28	0	25	1	21	9	17	9	25	4	22	2	19	8	16	1
	L/240	24	10	21	9	19	9	17	3	21	9	19	0	17	4	15	1
	L/360	21	11	19	2	17	5	15	2	20	0	17	6	15	11	13	11

AER-09038

~ Ceiling Systems ~

One Hour Corridor Ceiling or Underside Stair Applications, See Figure 7

1. A minimum 2-1/2" deep 24 gauge J-runner attached horizontally to perimeter or boundary walls with a power actuated fasteners.

2. Gypsum Wall Board:

   a. For a one (1) hour assembly: Attach one (1) layer of 5/8" thick SHEETROCK® Brand FIRECODE® Core Gypsum Panel (Type X), to the underside of the "Corridor Ceiling" of the C-H stud and the perimeter J-runners. Use 1" long Type S screws that are spaced 12" o.c. in the field and at the edges.

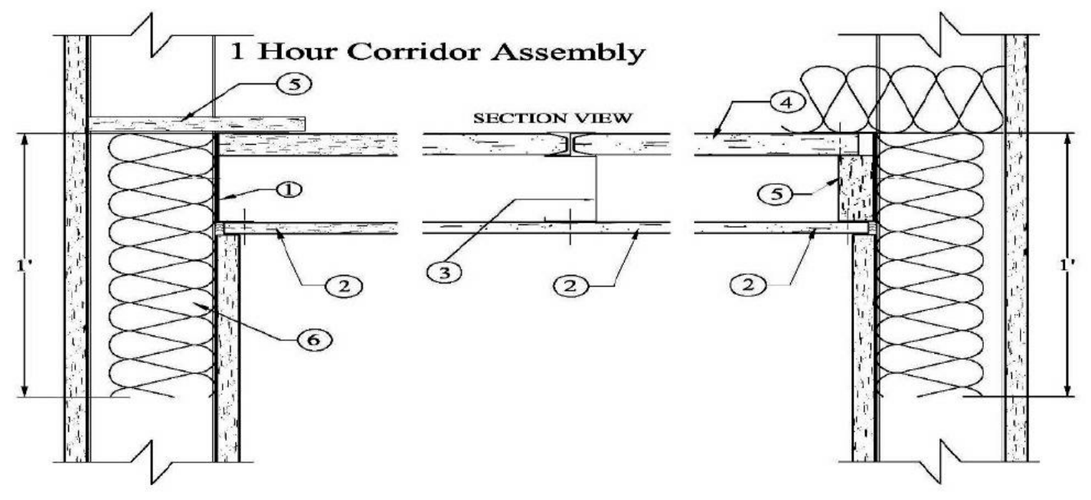
3. Install the C-H studs perpendicular to the J-runner spaced 24" o.c. with the C-section of the C-H stud facing downward towards the corridor side of the assembly with two (2) screws a minimum 1/2" long Type S-12 screws, one on each side.

4. 1" thick SHEETROCK® Brand Gypsum Liner Panel - Friction-fitted in "H" portion of C-H studs.

5. Ripper Board:

   a. Where the liner panel (item 4) is cut short to be installed, gaps must be filled by using a strip of 1" thick SHEETROCK® Brand Gypsum Liner Panel.
   b. As an alternative you can use mineral fiber insulation to prevent exposure to the top leg of the J-runner that forms the ceiling.
   c. Where the wall section extends above the corridor ceiling, above corridor height a rip of board must be used to cap the opening between studs and a strip of mineral fiber insulation as described in item 6 must be used.

6. In order to prevent the passage of heat and gases, a 12" long strip of mineral fiber insulation must be used to fill in the stud cavity of the walls.



1-Hour Exit Corridor Ceiling and Stair Soffits[a]	
Single-layer 5/8" gypsum panels	Maximum Span
212CH25-18[b]	8' - 6"
212CH20-34[c]	10' - 4"
400CH25-18[b]	9' - 3"
400CH20-34[c]	14' - 11"
600CH20-34[c]	20' - 10"

Notes:
a) Based on L/240 allowable deflection with studs at 24" o.c. and JR24 runner.

b) J-Runner connection to wall/building must meet or exceed 189-lbs capacity @ every stud location (24" o.c.).
c) J-Runner connection to wall/building must meet or exceed 386-lbs capacity @ every stud location (24" o.c.).

Figure 7 - One Hour Corridor Ceiling or Underside Stair Assembly and Limiting Spans

AER-09038

Two Hour Corridor Ceiling or Underside Stair Applications, See Figure 8

1. A minimum 2-1/2" deep 24 gauge J-runner attached horizontally to perimeter or boundary walls with a power actuated fasteners.

2. Gypsum Wall Board:

   a. For a two (2) hour assembly: Attached two (2) layers of minimum 1/2" thick SHEETROCK® Brand FIRECODE® C Core Gypsum Panels (Type C) to the underside of the "Corridor Ceiling" of the C-H stud and the perimeter J-For the BASE layer, use a 1" long Type S screw that is spaced 24" o.c. along the perimeter and the edges. The FACE layer should be applied with a 1-5/8" long Type S screw that is spaced 12" o.c. in the field and perimeter. All joints must be staggered a minimum of 24" o.c. from the adjacent layer.

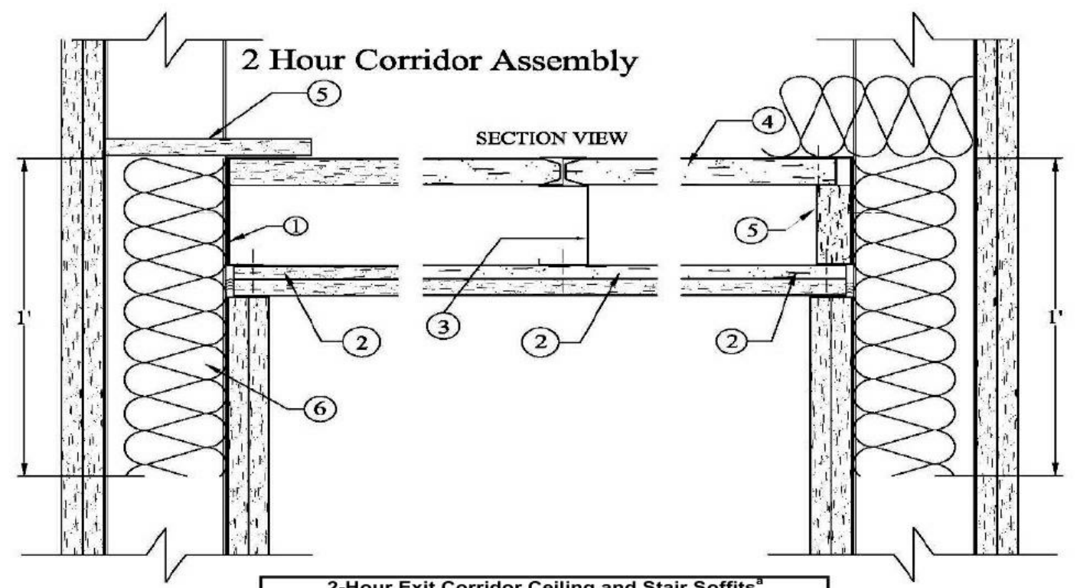
3. Install the C-H studs perpendicular to the J-runner spaced 24" o.c. with the C-section of the C-H stud facing downward towards the corridor side of the assembly with two (2) screws a minimum 1/2" long Type S-12 screws, one on each side.

4. 1" thick SHEETROCK® Brand Gypsum Liner Panel - Friction-fitted in "H" portion of C-H studs.

5. Ripper Board:

   a. Where the liner panel (item 4) is cut short to be installed, gaps must be filled by using a strip of 1" thick SHEETROCK® Brand Gypsum Liner Panel.
   b. As an alternative you can use mineral fiber insulation to prevent exposure to the top leg of the J-runner that forms the ceiling.
   c. Where the wall section extends above the corridor ceiling, above corridor height a rip of board must be used to cap the opening between studs and a strip of mineral fiber insulation as described in item 6 must be used.

6. In order to prevent the passage of heat and gases, a 12" long strip of mineral fiber insulation must be used to fill in the stud cavity of the walls.



2-Hour Exit Corridor Ceiling and Stair Soffits[a]	
Double-layer 1/2" gypsum panels	Maximum Span
212CH25-18[b]	7' - 10"
212CH20-34[c]	9' - 8"
400CH25-18[b]	7' - 7"
400CH20-34[c]	14' - 0"
600CH20-34[c]	19' - 7"

Notes:
a) Based on L/240 allowable deflection with studs at 24" o.c. and JR24 runner.

b) J-Runner connection to wall/building must meet or exceed 189-lbs capacity @ every stud location (24" o.c.).
c) J-Runner connection to wall/building must meet or exceed 386-lbs capacity @ every stud location (24" o.c.).

Figure 8 - Two Hour Corridor Ceiling or Underside Stair Assembly and Limiting Spans

AER-09038

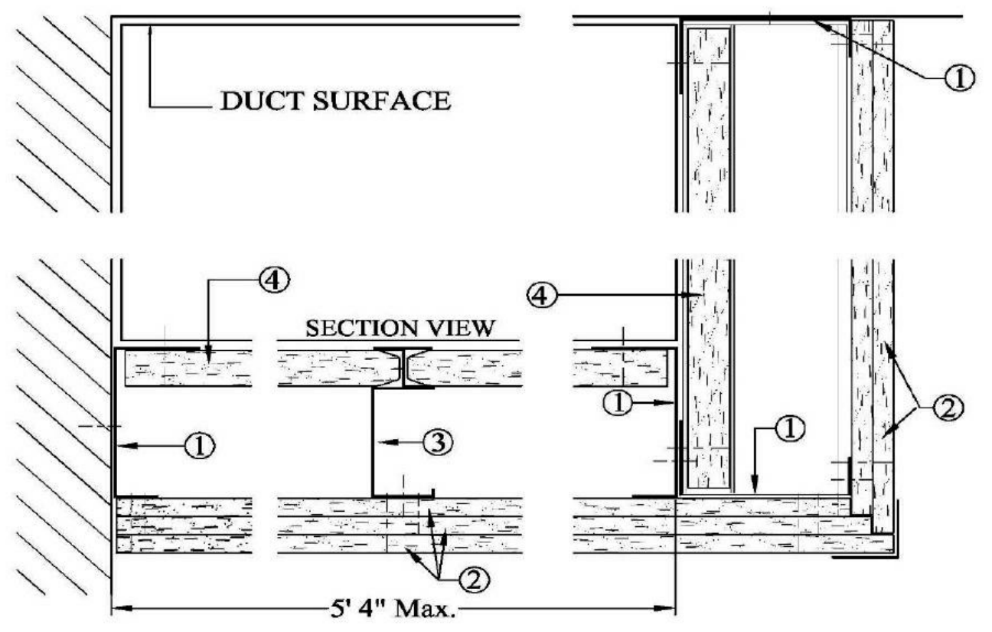
Two-Hour Horizontal Gypsum Duct Enclosure, See Figure 9

1. A minimum 2-1/2" deep 24 gauge J-runners attached horizontally to the perimeter or boundary wall, with power actuated fasteners. Connection of the vertical C-H stud to the top J-runner and connection of the top J-runner to the structure shall be capable of carrying the weight of the duct enclosure and verified by a registered design professional.

2. Attach three (3) layers of 1/2" (minimum) SHEETROCK® Brand FIRECODE® C Core Gypsum Panels to the underside "ceiling" side of the assembly. The Base layer is attached with 1" long Type S Screws that are spaced 24" o.c. The second layer is attached with 1-5/8" long Type S screws that are spaced 12" o.c., with all the joints staggered 24" o.c. from the base layer. The Face layer is attached perpendicular to the C-H Studs with 2" long Type S screws that are spaced 12" o.c. and the joints are staggered 24" o.c. from the base layer.

3. Install the C-H studs perpendicular to the J-runners, spacing them 24" o.c. with the C-section of the C-H stud facing downward towards the corridor side of the assembly with two (2) screws a minimum of 1/2" long Type S-12 screws, one on each end.

4. 1" thick SHEETROCK® Brand Gypsum Liner Panel - Friction-fitted in "H" portion of C-H studs.



2-Hour Horizontal Membrane or Metal Duct Enclosure[a,b]	
Triple-layer 1/2" gypsum panels	Maximum Span
All Stud Sizes	5' - 4"

Notes:
a) Horizontal membrane maximum span based upon the maximum 5'-4" span tested in accordance with ASTM E119.
b) J-Runner connection to vertical C-H Stud shall consist of two #8 screws (or equivalent). J-Runner connection to wall/building shall meet the same requirments as the ceiling applications in Figures 7 and 8.

Figure 8 - Two Hour Horizontal Duct Enclosure Assembly and Limiting Spans

AER-09038

General Product Usage and Limitations

1. These products shall be installed in accordance with ASTM C 840 *Standard Specification for Application and Finishing of Gypsum Board,* and in accordance with **USG** Product Literature.

2. The **USG** SHEETROCK® Brand Cavity Shaftwall system is designed to enclose stairwalls, elevator shafts, mechanical components and other vertical shafts.

3. For horizontal ceiling and ductwork applications, please see manufacturer's product brochure *SA926 Shaft Wall Systems*.

4. Non-load bearing and limited to fire-resistance only. Structural and other requirements shall be in accordance with pertinent building code and manufacturer's requirements.

Product Labeling

Each assembled **USG** Drywall Shaft Partition System that is covered by this **AER**, must be marked with the following information:
1. **USG** Name
2. Product Name
3. Plant Identifier & Date Code
4. UL Classification label for Firecode Resistance, surface burning characteristics and non-combustibility.

Tested to

ICC-ES (Formerly ICBO) AC86 (1995) - Acceptance Criteria for determining limiting height of composite walls constructed of gypsum and steel studs to revision - Date: July 1995.

ASTM E84 - Standard Test for Surface Burning Characteristics of Building Materials.

ASTM E330-97 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Differences, following procedure A. (Test Reports 2004-0329 B-L were based on this test method)

ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials

Product Documentation

USG Drywall Shaft Partition System Product Installation Guidelines SA926 (Rev 1/2015)

An Assembly Evaluation Service Agreement between *Pei* **Evaluation Service** and **USG Company**

Test report No. R1319, Project 04NK2667 - Shaftwall Assembly With Horizontal Placement of Studs and Gypsum Liner Panels - Dated: 2/10/2004.

Test report No. R1319, Project 04NK2667 - Shaftwall Assembly With Horizontal Placement of Studs and Gypsum Liner Panels - Dated: 3/02/2004.

Test report No. WHI-495-PSH-0154/0167 - Two Pilot Scale Horizontal Fire Endurance Tests on a Corridor Ceiling/Duct Assembly with Either Side as the Exposed Face - Dated: 2/05/1990 & 5/23/1990.

Test report No. R1319, Project No. 82NK27438 - Engineering Study - Classification of A 2 H Fire Resistance Shaft Wall Constructed of 1/2" Type C Gypsum Wallboard and 1" Gypsum Board Liner - Dated: 12/17/1982.

Test report - Fire Tests of Two-Hour Cavity Shaft Wall System Having C-H Vented Studs - Dated: 6/23/1975

Test report - Fire Tests of Two-Hour Cavity Shaft Wall System Having C-H Vented Studs - Dated: 4/02/1975

A *Pei* test report No. 2003-1150 (A) - ICBO AC86 Limiting Height Test on a 2 Hour Shaftwall Using a 2-1/2" X 25 ga. CH Stud 8 ft. Wall Height - Dated: 12/01/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (B) - ICBO AC86 Limiting Height Test on a 2 Hour Shaftwall Using a 2-1/2" X 20 ga. CH Stud 8 ft. & 10 ft. Wall Heights - Dated: 12/17/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (C) - ICBO AC86 Limiting Height Test on a 2 Hour Shaftwall Using a 4" X 25 ga. CH Stud 8 ft. & 10 ft. Wall Heights - Dated: 12/18/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (D) - ICBO AC86 Limiting Height Test on a 2 Hour Shaftwall Using a 4" X 20 ga. CH Stud 8 ft. & 12 ft. Wall Heights - Dated: 12/23/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (E) - ICBO AC86 Limiting Height Test on a 2 Hour Shaftwall Using a 6" X 20 ga. CH Stud 8 ft. & 16 ft. Wall Heights - Dated: 12/11/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (F) - ICBO AC86 Limiting Height Test on a 2 Hour Stairwall Using a 2-1/2" X 25 ga. CH Stud 8 ft. Wall Heights - Dated: 11/26/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (G) - ICBO AC86 Limiting Height Test on a 2 Hour Stairwall Using a 2-1/2" X 20 ga. CH Stud 8 ft. & 10 ft. Wall Heights - Dated: 12/17/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (H) - ICBO AC86 Limiting Height Test on a 2 Hour Stairwall Using a 4" X 25 ga. CH Stud 8 ft. & 10 ft. Wall Heights - Dated: 12/19/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (I) - ICBO AC86 Limiting Height Test on a 2 Hour Stairwall Using a 4" X 20 ga. C-H Stud 8 ft. & 12 ft. Wall Heights - Dated: 12/23/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (J) - ICBO AC86 Limiting Height Test on a 2 Hour Stairwall Using a 6" X 20 ga. CH Stud 8 ft. & 16 ft. Wall Heights - Dated: 12/11/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (K) - ICBO AC86 Limiting Height Test on a 1 Hour Shaft/Stairwall Using a 2-1/2" X 25 ga. CH Stud 8 ft. Wall Heights - Dated: 12/29/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (L) - ICBO AC86 Limiting Height Test on a 1 Hour Shaft/Stairwall Using a 2-1/2" X 20 ga. CH Stud - Dated: 12/18/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (N) - ICBO AC86 Limiting Height Test on a 1 Hour Shaft/Stairwall Using a 4" X 20 ga. CH Stud on 8 ft. and 12 ft. Wall Heights - Dated: 12/26/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (O) - ICBO AC86 Limiting Height Test on a 1 Hour Shaft/Stairwall Using a 6" X 20 ga. CH Stud on 8 ft. and 16 ft. Wall Heights - Dated: 12/10/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2003-1150 (P) - ICBO AC86 Limiting Height Test on a 1 Hour Shaft/Stairwall Using a 2-1/2" X 20 ga. CH Stud on 8 ft. and 10 ft. Wall Heights - Dated: 12/10/2003 - Stamped by a professional engineer.

A *Pei* test report No. 2013-1290 - ASTM C1396 / C1396M - 13 Gypsum Board Specifications - Evaluation of the 5/8" USG SHEETROCK® Brand Mold Tough® VHI FIRECODE® Core Panels - Dated: 10/24/2013.

NYC Department of Buildings, Report MEA 309-03-M Volume 2 - Fire Rated Gypsum Panels, Non- Load Bearing Shaft Wall Assembly - Dated: 4/23/2007

Test report No. Tz871, Book 22E - Fire Tests of One-Hour Cavity Shaft Wall System Having C-H Vented Studs - Dated: 4/3/1975.

Test report for - Fire Resistance of United States Gypsum Company's 3-Hour Cavity Shaft Wall System - Dated: 2/16/1972.

Test report for - Fire Tests of Two-Hour Cavity Shaft Wall System Having C-H Vented Studs - Dated: 6/23/1975.

Wiss, Janney, Elstner Associates, Inc. report no. 2006.0351 - New York Local Law 26; Rule 32-05 Impact Resistance Testing for Stair and Elevator Enclosures using USG Shaft Wall System with FIBEROCK® VHI and SHEETROCK® FIRECODE® Core Panels - Dated: 2/16/2007.

Opinion Letter for USG's Shaft Wall Systems - Fire Resistance Classification - Dated: 10/13/2010.

PE Sealed Engineering Calculations - Project No. 2015-0572-r1 USG C-H Stud Shaftwall Horizontal Limiting Spans - Dated: 6/19/2015

X4

BXUV - Fire Resistance Ratings - ANSI/UL 263

BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

See General Information for Fire-resistance Ratings - ANSI/UL 263

See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

Design No. P732

December 29, 2016

Restrained Assembly Ratings — 1, 1-1/2, 2 or 3 Hr (See Item 10)

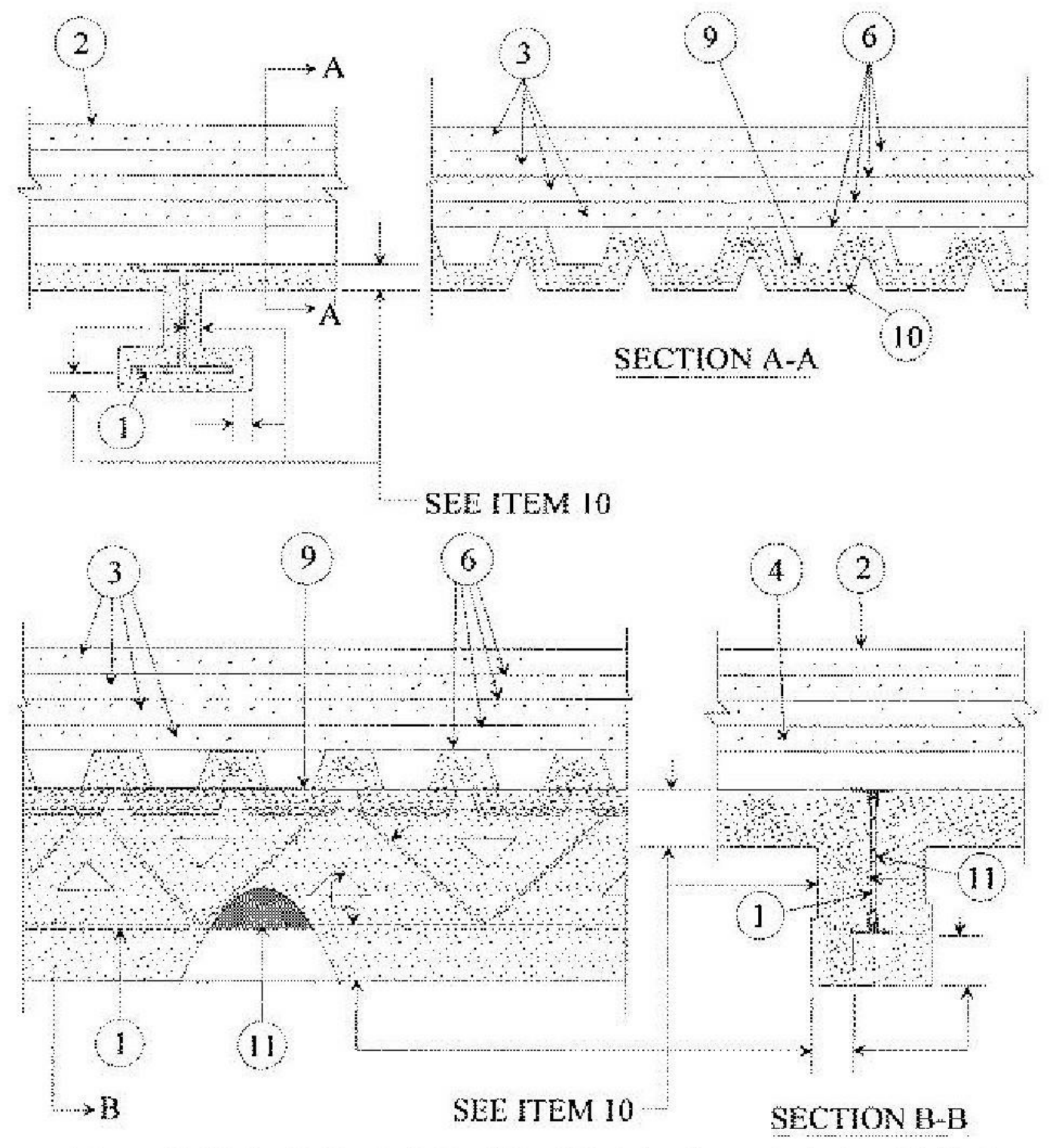
Unrestrained Assembly Ratings — 3/4, 1, 1-1/2, 2 or 3 Hr (See Item 10)

Unrestrained Beam Ratings — 1, 1-1/2, 2 or 3 Hr (See Item 10)

Restricted Load Condition — See Items 1 and 10C

This design was evaluated using a load design method other than the Limit States Design Method (e.g., Working Stress Design Method). For jurisdictions employing the Limit States Design Method, such as Canada, a load restriction factor shall be used — See Guide BXUV or BXUV7

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**



1. **Beam —** Min W6x16 or W8x28 or Steel Joist — 10K1 or 16K2 min size with a max tensile stress of 30,000 psi or 12K3 or 12K5 min size with a max tensile stress of 24,000 psi.

2. **Roof Covering* —** Consisting of hot mopped or cold application bituminous materials compatible with the insulation(s) described herein which provide Class A, B or C coverings. See Roofing Materials and Systems Directory — Roof Covering Materials (TEVT).

2A. **In lieu of Item 2, roof covering consisting of single-ply Roofing Membrane* —** that is either ballasted, adhered or mechanically attached as permitted under the respective manufacturer's Classification. See Fire Resistance Directory — Roof Membrane (CHCI).

2B. **Metal Roof Deck Panels* —** (Not shown) — In addition to or in lieu of Item 2 or 2A, the roof covering may consist of a mechanically fastened metal roof deck panel assembly. See Fire Resistance Directory — Metal Roof Deck Panels (CETW).

3. **Roof Insulation — Foamed Plastic —** Polyisocyanurate foamed plastic insulation boards nom 48 by 48 or 96 in., to be applied in one or more layers. Boards to be installed with end joints staggered a min of 6 in. Min thickness shall be selected from the Table below. No limit on max overall thickness.

Restrained or Unrestrained Assembly Rating Hr	Min Insulation Thkns In.	
	With Gypsum Wallboard	Without Gypsum Wallboard
1	1	2
1-1/2	1-1/2	3
2	2	3
3	2	3

ATLAS ROOFING CORP — Type ACFoam II, ACFoam III, ACFoam-II SL, ACFoam IV.

CARLISLE SYNTEC INCORPORATED — Types HP, HP-H, HP-N, HP-W.

DOW ROOFING SYSTEMS L L C — "Dow Termico Polyisocyanurate Insulation", "Dow Termico ISO 3000 Insulation", "Dow Termico ISO HP-FR".

FIRESTONE BUILDING PRODUCTS CO L L C — "ISO 95+ GL", "ISO 95+ FK", "ISO 95+ CAN", "ISO 95+ GL NH", "ISOGARD HD Composite Board" or "RESISTA".

GAF — EnergyGuard RH, Tapered EnergyGuard RH

HUNTER PANELS — H Shield

JOHNS MANVILLE — ENRGY 3 25 psi, ENRGY 3, Tapered ENRGY 3, Tapered ENRGY 3 25 psi, ENRGY 3 AGF, Tapered ENRGY 3 AGF, ENRGY 3 25 psi AGF, Tapered ENRGY 3 25 psi AGF, ENRGY 3 CGF, Tapered ENRGY 3 CGF, ENRGY 3 25 psi CGF, Tapered ENRGY 3 25 psi CGF, ISO-3, Tapered ISO-3, ValuTherm, Tapered ValuTherm, ValuTherm 25 psi, Tapered ValuTherm 25 psi, ValuTherm AGF, Tapered ValuTherm AGF, ValuTherm 25 psi AGF, Tapered ValuTherm 25 psi AGF, ValuTherm CGF, Tapered ValuTherm CGF, ValuTherm 25 psi CGF, Tapered ValuTherm 25 psi CGF.

LOADMASTER SYSTEMS INC — Type Loadmaster polyisocyanurate insulation

MARTIN FIREPROOFING CORP — "Perform-A-Deck I"

RMAX OPERATING L L C — Type Multi-Max-3, Multi-Max FA-3, Ultra-Max, Ultra-Max Plus, Tapered Ultra-Max Plus, Tapered Thermaroof-3, Tapered Thermaroof FA-3, Tapered Ultra-Max.

SIKA SARNAFIL INC — Sarnatherm r, Sarnatherm r Ultra, Sarnatherm r Tapered, Sarnatherm r Ultra Tapered.

SOPREMA INC — Sopra-ISO s, Sopra-ISO s Tapered, Sopra-ISO+ s, Sopra-ISO+ s Tapered, Sopra-ISO H+ s, Sopra-ISO H+ s Tapered.

3A. **Building Units* —** Not Shown — As an alternate to Item 3, composite polyisocyanurate foamed plastic insulation board with an adhered nailing surface, nom 48 by 48 or 96 in. may be used with the following limitations. These composite building units have ventilation slots internal to the panels. The thickness of the panel depends upon the thinnest portion of the polyisocyanurate insulation. The following dimensions apply to the polyisocyanurate insulation, min thickness is as measured in accordance with Item 3. There is no limit on the max insulation thickness.

JOHNS MANVILLE — Type ISO-VENT.

3B. **Building Units* —** Polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on the top surface with oriented strand board or plywood. Min thickness of the polyisocyanurate core is 1.3 in. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows. Adhesive (Item 6) may be applied between the building units and the vapor retarder (or gypsum wallboard if vapor retarder is not used).

ATLAS ROOFING CORP — ACFoam Nail Base Insulation, Vented R, ACFoam CrossVent, ACFoam III Nail Base Insulation, ACFoam III CrossVent

FIRESTONE BUILDING PRODUCTS CO L L C — Nail Base.

SOPREMA INC — Sopra-ISO CV s.

3C. **Roof Insulation-Mineral and Fiber Boards* —** (Not Shown) — Optional, Applied in one or more layers over the Foamed Plastic (Item 3) to be applied with adhesive (Item 6), asphalt or coal tar pitch (Item 7) or mechanically fastened (Item 8).

JOHNS MANVILLE

ROXUL INC — MonoBoard™, MonoBoard™ Plus, "MonoBoard Plus S", TopRock®DD, TopRock® DD Plus or TopRock DD Plus S.

SOPREMA INC — SopraRock®MD, SopraRock®MD Plus, SopraRock®DD and SopraRock®DD Plus.

3D. **Building Units* —** As an alternate to Item 3, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on the top surface with oriented strand board. Min thickness of the polyisocyanurate core is 1.3 in. for the 1 hr rating without gypsum wallboard (Item 4) and for the 1, 1-1/2 and 2 hr ratings with gypsum wallboard and 2.6 for the 1-1/2 hr ratings without gypsum wallboard. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.

JOHNS MANVILLE — Nailboard.

3E. **Building Units* —** As an alternate to Item 3, polyisocyanurate foamed plastic insulation boards faced on the underside (or both sides) with mineral fiber board. Min thickness of the polyisocyanurate core is 1.3 in. for the 1 hr rating without gypsum wallboard (Item 4) and for the 1-1/2 and 2 hr ratings with wallboard and 2.6 in. for the 1-1/2 hr ratings without gypsum wallboard. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. adjacent rows. Adhesive (Item 6) may be applied between the building units and the vapor retarder (or gypsum wallboard if vapor retarder is not used).

FIRESTONE BUILDING PRODUCTS CO L L C — "ISO 95+ Composite"

JOHNS MANVILLE — Fesco-Foam.

3F. **Building Units* —** As an alternate to Item 3, polyisocyanurate foamed plastic insulation boards faced on the underside with wood fiber board. Min thickness of the polyisocyanurate core is 1.3 in. for the 1 hr rating without gypsum wallboard (Item 4) and for the 1-1/2 and 2 hr ratings with wallboard and 2.6 in. for the 1-1/2 hr ratings without gypsum wallboard. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows.

FIRESTONE BUILDING PRODUCTS CO L L C — "ISO 95+ Composite".

JOHNS MANVILLE — ENRGY-2 Plus.

3G. **Building Units* —** As an alternate to Item 3, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on the top surface with gypsum board. Min thickness of the polyisocyanurate core is 1.3 in. for 1 hr rating without gypsum wallboard (Item 4) and for the 1-1/2 and 2 hr ratings with wallboard (Item 4) and 2.6 in. for the 1-1/2 ratings without gypsum wallboard (Item 4). No limit on overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows. Adhesive (Item 6) may be applied between the building units and the vapor retarder (or gypsum wallboard if vapor retarder is not used).

JOHNS MANVILLE — ENRGY 2 Gypsum Composite.

3H. **Roof Insulation — Mineral and Fiber Boards* —** As an alternate to Item 3 , to be applied in one or more layers with or without adhesive applied between vapor barrier and roof deck units, vapor barrier and board and each layer of board. When more than one layer is required, each layer of board to be offset in both directions from layer below a min of 6 in. in order to lap all joints. Min thickness is 2 in. when Item 2A or 2B is used. Min thickness is 1 in. otherwise.

BMCA INSULATION PRODUCTS INC — Permalite.

GAF — GARTEMP Perlite.

JOHNS MANVILLE

3I. **Roof Insulation - Foamed Plastic* —** (Not Shown) As an alternate to Item 3 through 3H, polystyrene foamed plastic insulation boards, applied in one or more layers over gypsum wallboard. Min. thickness is 1.0 in. with no max overall thickness max density 2.5 pcf. When applied in more than one layer, each layer to be offset in both directions from layer below a min. of 6 in. in order to lap all joints. Boards secured to gypsum wallboard (Item 4) with asphalt glaze coat or adhesive (Item 6). Adhesive and/or asphalt glaze coat may be omitted when Item 2A is used. See Foamed Plastic (BRYX) category in the Building Materials Directory or Foamed Plastic (CCVW) category in the Fire Resistance Directory of for names of manufacturers.

3J. **Fiber, Sprayed* —** (Not Shown) — For 1 hr rating only — As an alternate to Items 3 through 3I, Spray applied cellulose insulation material. The fiber is applied with water to a min. thickness of 10 in. as measured from the top plane of the roof deck in accordance with the application instructions supplied with the product. Minimum density of 2.6 pcf. Gypsum board not required over steel roof deck. Min. 1 in. thickness of Spray-Applied Fire Resistive Material* (Items 10, 10A, 10B) required on underside of steel deck. When Item 3J is used, Roof Covering (Items 2, 2A and 2B) shall not be directly applied over sprayed fiber.

U S GREENFIBER L L C — Cocoon stabilized cellulose insulation.

3K. **Roof Insulation - Foamed Plastic* —** (Not Shown) - Optional, a minimum of 1/4 in. thick - Placed over minimum 1-1/2 in. thick polyisocyanurate Foamed Plastic (Item 3) to be applied with adhesive (Item 6), asphalt or coat tar pitch ((tem 7) or mechanically fastened (Item 8). Boards to be installed with end joints to be offset in both directions from layer below a min of 6 in. in order to lap all joints.

JOHNS MANVILLE — Invinsa

3L. **Foamed Plastic* —** Optional - (Not Shown) - Maximum 1 in. thick polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in. Boards may be applied as the top layer in addition to the specified minimum thickness of any roofing system described herein, as long as the roofing system states that there is no limit on maximum thickness. Joints offset in both directions from layer below.

FIRESTONE BUILDING PRODUCTS CO L L C — "ISOGARD HD"

3M. **Foamed Plastic* —** As an alternate to Items 3 - 3J, polyurethane foamed plastic roof insulation. When used, gypsum board (item 4) is required. Formed by the simultaneous spraying of two liquid components applied over the gypsum board (item 4) in accordance with the manufacturer's instructions. Min thickness shall be selected from the table above. No limit on max overall thickness.

BASF CORP — Types FE 303 2.7, FE-348, FE348-2.5, FE348-2.7, FE348-2.8, FE348-3.0, ELASTOSPRAY 81255, ELASTOSPRAY 81275, ELASTOSPRAY 81285 or ELASTOSPRAY 81305.

BASF CORP — Elastospray 5100-2.0, Elastospray 5100-2.5, Elastospray 81302, Elastospray 81272, Elastospray Alpha System, Elastospray 81252

3N. **Building Units* —** Not Shown — For restrained assembly rating 1, 1-1/2 hr and unrestrained assembly rating 3/4, 1 hr and unrestrained beam rating, 1 hr only - As an alternate to Items 3 - 3M, composite polyisocyanurate foamed plastic insulation board with an adhered nailing surface, nom 48 by 48 or 96 in. may be used with the following limitations. These composite building units have ventilation slots internal to the panels. The thickness of the panel depends upon the thinnest portion of the polyisocyanurate insulation. The following dimensions apply to the polyisocyanurate insulation, min thickness is 2.0 in. There is no limit on the max insulation thickness.

GAF — "ThermaCal® 1" and "ThermaCal® 2"

3O. **Building Units* —** Not Shown - For restrained assembly rating 1, 1-1/2 hr and unrestrained assembly rating 3/4, 1 hr and unrestrained beam rating, 1 hr only - As an alternate to Items 3 - 3N, Polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in., faced on the top surface with oriented strand board or plywood. Min thickness of the polyisocyanurate core is 2.0 in. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows. Adhesive (Item 6) may be applied between the building units and the vapor retarder (or gypsum wallboard if vapor retarder is not used).

GAF — "ThermaCal®"

4. **Gypsum Board —** (Not shown) — (Classified or Unclassified) — May be used to obtain various Restrained or Unrestrained Assembly Ratings as described in Item 10. Supplied in sheets nom 4 by 8 or 12 ft by 5/8 in. thick. Min weight 2.2 psf. Applied perpendicular to steel roof deck direction with end joints staggered 2 ft in adjacent rows. End joints to occur over crests of steel roof units.

ACADIA DRYWALL SUPPLIES LTD (View Classification) — CKNX.R25370

AMERICAN GYPSUM CO (View Classification) — CKNX.R14196

BEIJING NEW BUILDING MATERIALS PUBLIC LTD CO (View Classification) — CKNX.R19374

CERTAINTEED GYPSUM INC (View Classification) — CKNX.R3660

CGC INC (View Classification) — CKNX.R19751

CONTINENTAL BUILDING PRODUCTS OPERATING CO, L L C (View Classification) — CKNX.R18482

GEORGIA-PACIFIC GYPSUM L L C (View Classification) — CKNX.R2717

LOADMASTER SYSTEMS INC (View Classification) — CKNX.R11809

NATIONAL GYPSUM CO (View Classification) — CKNX.R3501

PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM (View Classification) — CKNX.R7094

PANEL REY S A (View Classification) — CKNX.R21796

SIAM GYPSUM INDUSTRY (SARABURI) CO LTD (View Classification) — CKNX.R19262

THAI GYPSUM PRODUCTS PCL (View Classification) — CKNX.R27517

UNITED STATES GYPSUM CO (View Classification) — CKNX.R1319

USG MEXICO S A DE C V (View Classification) — CKNX.R16089

5. **Vapor Retarder — Sheathing Material* —** (Optional) — (Not shown) — Vinyl film or paper scrim vapor barrier, applied to steel roof deck or gypsum wallboard with adhesive (Item 6), hot asphalt (Item 7) or laid loosely, overlapped approx 2 in. on adjacent sheets. See **Sheathing Material** (CHIZ) category for names of manufacturers.

5A. **Sheathing Material* —** (Optional) — In lieu of Item 5, a self-adhered rubberized asphalt roofing underlayment membrane which may be placed on top of steel roof deck, gypsum wallboard or on the roof insulation.

GCP APPLIED TECHNOLOGIES INC — Grace Ice and Water Shield, Grace Ice and Water Shield-HT®, Grace Select, Grace Ultra, and Grace Basik.

6. **Adhesive* — (Optional) —** The vapor retarder, the gypsum wallboard or the first layer of roof insulation may be secured with adhesive to the steel crest surfaces. Also used to attach the vapor retarder to gypsum wallboard, the first layer of insulation to vapor retarder or gypsum wallboard and each additional layer of insulation. Applied in 1/2 in. wide ribbons 6 in. OC at 0.4 gal/100 sq ft. See **Adhesives** (BYWR) category for names of manufacturers.

6A. **Adhesive* -(Optional) —** - (Bearing the UL Classification Marking for Roof Systems (TGFU)) - When FAST 100 adhesive is used, the Unrestrained Assembly Ratings are limited to 1, 1-1/2 and 2 hr. The vapor retarder, the gypsum wallboard or the first layer of roof insulation may be secured with adhesive to the steel crest surfaces. Also used to attach the vapor retarder to gypsum wallboard, the first layer of insulation to vapor retarder or gypsum wallboard and each additional layer of insulation. Applied at a max rate of 19.8 g/ft^2. When FAST 100 adhesive is used, additional **Spray-Applied Fire Resistance Materials* (CHPX)** is required on the deck for the 1-1/2 and 2 hr Unrestrained Assembly Ratings. The thickness specified for the deck shall be increased by 1/16 in. for 1-1/2 hr Unrestrained Assembly Rating and 1/4 in. for 2 hr Unrestrained Assembly Rating.

CARLISLE SYNTEC INCORPORATED — FAST 100

7. **Asphalt or Coal Tar Pitch* —** (Optional) — (Not shown) — The vapor retarder, the gypsum wallboard of the first layer of roof insulation may be secured with asphalt or coal tar pitch to the steel crest surfaces at a max rate of 15 lb/100 sq ft. Also used to attach the vapor retarder to gypsum wallboard, the first layer of insulation to vapor retarder or gypsum wallboard and each additional layer of roof insulation, applied at a max rate of 25 lb/100 sq ft.

8. **Mechanical Fasteners — (Optional) —** (Not shown) — Mechanical screw-type fastener with metal or plastic washer designed for the purpose may be used to attach one or more layers of insulation to steel roof deck.

9. **Steel Roof Deck —** (Unclassified) — Min 1-1/2 in. deep and 36 in. wide galv fluted steel deck. Min gauge is No. 22 MSG. Ends overlapped at supports a min 1-1/2 in. and welded to supports 12 in. OC and at side laps. Side laps fastened with 1/2 in. long hex head, self-drilling, self-tapping steel screws spaced a max of 36 in. OC. **Classified Steel Floor and Form Units* —** Noncomposite 1-1/2 to 3 in. deep, 24 to 36 in. wide, min 22 MSG galvanized steel fluted units. Ends overlapped at supports a min 1-1/2 in. and welded to supports 12 in. OC and at side laps. Side laps fastened with 3/4 in. long No. 12 self-drilling, self-tapping steel screws at 36 in. OC. As alternate to screw fasteners adjacent units may be button-punched or welded together 36 in. OC along side joints.

ASC STEEL DECK, DIV OF ASC PROFILES L L C — Types BH-36, BHN-36, BHN-35-1/4, DGB-36, B-36, BN-36, BN-35-1/4, NH-32, NHN-32, DGN-32, N-32 and NN-32. All units may be galvanized or Prime Shield™. Non-cellular decks may be vented designated with a "V" suffix to the product name.

CANAM STEEL CORP — Type P-3606, P-3615, P-2436, P-2404, P-2403, and P-2438 noncomposite.

CANAM STEEL CORP — Types B, F, N. Units may be phos./ptd or ptd/ptd.

NEW MILLENNIUM BUILDING SYSTEMS L L C — Types B, BI, F, N and NI. Units may be ptd/ptd.

NEW MILLENNIUM BUILDING SYSTEMS L L C — Types B, BI, F, N. Units may be phos/painted, ptd/ptd, or galvanized. Painted units may be used for ratings up to 2 h.

VERCO DECKING INC - A NUCOR CO — Deck types PLB, HSB, PLN3, HSN3, PLN, N; FORMLOK™ deck types PLB, B, PLN3, N3, PLN, N. Units may be galvanized or phos./ptd.

VULCRAFT, DIV OF NUCOR CORP — Types BW, F, High Strength B, High Strength BW, N, ptd/ptd units may be used for ratings up to 2 h.

VULCRAFT, DIV OF NUCOR CORP — Galv Types 1.5B, 1.5BI, 1.5PLB, 1.5F, 3N, 3NI, and 3.0PLN, ptd/ptd units may be used for ratings up to 2 h.

Note: Type Z-106 Spray-Applied Fire Resistive Materials to be used with galv steel roof units only.

10. **Spray-Applied Resistive Material* —** Applied by mixing with water and spraying in more than one coat to final thicknesses as shown in the illustration above and in the table below to steel surfaces which must be clean and free of dirt, loose scale and oil. Steel deck surface must be "spatter" coated with Type SK-3 Spray-Applied Fire Resistive Materials prior to application of spray-applied resistive material. Type SK-3 spray-applied resistive material applied in accordance with the manufacturer's application instructions. When steel deck is used the area between the steel deck and the beams top flange shall be filled. Min average and min individual density of 15/14 pcf, respectively. For method of density determination, see Design Information Section. Thickness of the spatter coat is included in the total final thickness of the protection material.

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Steel deck thickness #		Beam Thickness	
			with Gypsum Wallboard	Without Gypsum Wallboard	full flange W8x28 Beam	1/2 flange## W8x28 Beam
1	0@	1	N/A	1	7/16	1/2
1	1	1	9/16 ***	1	7/16	1/2
1	1	1	5/8	1	7/16	1/2
1	1	1	1 *	1-5/8 *	7/16	1/2
1 1/2	1	1	3/4	1 1/4	9/16	13/16
1 1/2	1 1/2	1 1/2	13/16	1 3/8	5/8	13/16
1 1/2	1 1/2	1 1/2	1 1/2 *	2 1/8 *	5/8	13/16
2	1	1	1	1 1/2	3/4	1 1/16
2	1 1/2	1 1/2	1	1 1/2	3/4	1 1/16
2	2	2	1 1/8	1 11/16	7/8	1 1/16
2	2	2	2 *	2 5/8 *	7/8	1 1/16
3	1 1/2	1 1/2	1 1/2	2 1/8	1 3/16	1 5/8
3	2	2	1 1/2	2 1/8	1 3/16	1 5/8
3	3	3	1 5/8	2 3/8	1 3/8	1 5/8

# The required minimum thickness of Spray-Applied Fire Resistive Materials on the steel deck is increased by 1/16 inch for 1-1/2 hr Un-restrained assembly rating and 1/4 inch for 2 hr Unrestrained Assembly rating when Item 6A is used.

## When the thickness applied to the lower flange edges is reduced by one half, the 1/2 flange thickness is applicable.

* No minimum insulation thickness required

*** Minimum insulation thickness (Item 3) 2 inches.

@ When the maximum clear span of the steel decking is 5 ft. 2 in. or less, the Unrestrained Assembly Rating is 1-hour.

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Joist thickness 10K1 more than 4 ft OC	10K1 less than 4 ft OC	16K2 more than 4 ft OC	16K2 less than 4 ft OC
1	0@	1	1 1/8	1	15/16	15/16
1	1	1	1 1/8	1	15/16	15/16
1 1/2	1	1	1 5/16	1 5/16	1 1/4	1 3/16
1 1/2	1 1/2	1 1/2	1 7/16	1 7/16	1 1/4	1 3/16
2	1	1	1 7/16	1 7/16	1 9/16	1 1/2
2	1 1/2	1 1/2	1 7/16	1 7/16	1 9/16	1 1/2
2	2	2	2 3/16	2 3/16	1 9/16	1 1/2
3	1 1/2	1 1/2	3 1/4	2 13/16	2 1/4	2 1/8
3	2	2	3 1/4	2 13/16	2 1/4	2 1/8
3	3	3	3 1/4	2 13/16	2 1/4	2 1/8

@ When the maximum clear span of the steel decking is 5 ft. 2 in. or less, the Unrestrained Assembly Rating is 1-hour.

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	W6x16 Beam Thickness
1	1	1	9/16
1 1/2	1	1	5/8
1 1/2	1 1/2	1 1/2	13/16
2	1	1	7/8
2	1 1/2	1 1/2	7/8
2	2	2	1 1/16
3	1 1/2	1 1/2	1 1/4
3	2	2	1 1/4
3	3	3	1 1/2

ARABIAN VERMICULITE INDUSTRIES — Types MK-6/HY, MK-6/HY Extended Set, MK-10 HB, MK-10 HB Extended Set, MK-6/HB, MK-6s, MK-6 GF, MK-6 GF Extended Set, MK-1000/HB, MK-1000/HB Extended Set, SK-3.

GCP KOREA INC — Types MK-6/HY, MK-6/HY Extended Set, MK-6/HB, MK-6s, MK-6 GF, MK-6 GF Extended Set, MK-10 HB, MK-10 HB Extended Set, MK-1000/HB, MK-1000/HB Extended Set, SK-3.

GCP APPLIED TECHNOLOGIES INC — Types MK-6/HY, MK-6/HY Extended Set, MK-6/HB, MK-6s, MK-6 GF, MK-6 GF Extended Set, MK-10 HB, MK-10 HB Extended Set, MK-1000/HB, MK-1000/HB Extended Set, RG, SK-3.

10A. **Alternate Spray-Applied Fire Resistive Materials* —** Applied by mixing with water and spraying in one or more coats to final thicknesses as shown in the table below to steel beam surfaces which must be clean and free of dirt, loose scale and oil. When Type Z-106/G is used, the steel deck surface must be "spatter" coated with Type SK-3 Spray-Applied Fire Resistive Materials prior to application of spray-applied resistive material. Type SK-3 spray-applied resistive material applied in accordance with the manufacturer's application instructions. When steel deck is used the area between the steel deck and the beams top flange shall be filled. Min avg and min ind density of 22/19 pcf, respectively. For method of density determination, refer to Design Information Section.

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Steel deck thickness #		Beam Thickness	
			with Gypsum Wallboard	Without Gypsum Wallboard	full flange W8x28 Beam	1/2 flange## W8x28 Beam
1	0@	1	N/A	1	7/16	1/2
1	1	1	9/16 ***	1	7/16	1/2
1	1	1	5/8	1	7/16	1/2
1	1	1	1 *	1-5/8 *	7/16	1/2
1 1/2	1	1	3/4	1 1/4	9/16	13/16
1 1/2	1 1/2	1 1/2	13/16	1 3/8	5/8	13/16
1 1/2	1 1/2	1 1/2	1 1/2 *	2 1/8 *	5/8	13/16
2	1	1	1	1 1/2	3/4	1 1/16
2	1 1/2	1 1/2	1	1 1/2	3/4	1 1/16
2	2	2	1 1/8	1 11/16	7/8	1 1/16
2	2	2	2 *	2 5/8 *	7/8	1 1/16
3	1 1/2	1 1/2	1 1/2	2 1/8	1 3/16	1 5/8
3	2	2	1 1/2	2 1/8	1 3/16	1 5/8
3	3	3	1 5/8	2 3/8	1 3/8	1 5/8

# The required minimum thickness of Spray-Applied Fire Resistive Materials on the steel deck is increased by 1/16 inch for 1-1/2 hr Un-restrained assembly rating and 1/4 inch for 2 hr Unrestrained Assembly rating when Item 6A is used.

## When the thickness applied to the lower flange edges is reduced by one half, the 1/2 flange thickness is applicable.

* No minimum insulation thickness required

*** Minimum insulation thickness (Item 3) 2 inches.

@ When the maximum clear span of the steel decking is 5 ft. 2 in. or less, the Unrestrained Assembly Rating is 1-hour.

Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	Unrestrained Beam Rating Hr	Joist thickness			
			10K1 more than 4 ft OC	10K1 less than 4 ft OC	16K2 more than 4 ft OC	16K2 less than 4 ft OC
1	0@	1	1 1/8	1	15/16	15/16
1	1	1	1 1/8	1	15/16	15/16
1 1/2	1	1	1 5/16	1 5/16	1 1/4	1 3/16
1 1/2	1 1/2	1 1/2	1 7/16	1 7/16	1 1/4	1 3/16
2	1	1	1 7/16	1 7/16	1 9/16	1 1/2
2	1 1/2	1 1/2	1 7/16	1 7/16	1 9/16	1 1/2
2	2	2	2 3/16	2 3/16	1 9/16	1 1/2

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Dobo Hall Renovation - Package A

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UNC Wilmington
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PROJECT NO. 580999	DATE: MARCH 27, 2019
REVISIONS	
DATE	DESCRIPTION

FIRE RESISTANCE ASSEMBLIES

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