EXISTING EQUIPMENT OR EQUIPMENT BY OTHERS

4. BELOW IS AN EXAMPLE OF EACH:

EQUIPMENT TO BE DEMOLISHED

NEW OR RELOCATED EQUIPMENT

CODE REFERENCES	
CODE REFERENCE	EDITION
NORTH CAROLINA BUILDING CODE	2018
NORTH CAROLINA MECHANICAL CODE	2018
NORTH CAROLINA PLUMBING CODE	2018
NORTH CORALINA ENERGY CONSERVATION CODE	2018

CATEGORY	DATA VALUE
CLIMATIC DESIGN LOCATION:	WILMINGTON, NC, US (WMO:723020)
LATITUDE:	34.268 N
LONGITUDE:	77.9 W
ELEVATION:	23 FT.
STANDARD DESIGN CONDITIONS	
WINTER DESIGN DRY BULB (99.0%):	24.8 °F
SUMMER DESIGN DRY BULB (1.0%):	91.4 °F
OLINANAED DEGLONIVACET DI IL D. (4.00/.)	77 4 OF

HVAC DESIGN CRITERIA

SOMMEN DESIGN DIXT DOLD (1.070).	91.4
SUMMER DESIGN WET BULB (1.0%):	77.1 °F
EHUMIDIFICATION DESIGN CONDITIONS	
DEWPOINT (1.0%):	76.9 °F
HUMIDITY RATIO (1.0%):	140.4
MEAN COINCIDENT DRY BULB (1.0%):	82.8 °F

INDOOR DE	ESIGN		DITIC	DNS	
	C	COOLING		HE	ATING
	OCC. DRY BULB	UNOCC. DRY BULB	OCC.	OCC. DRY BULB	UNOCC. DRY BULB
SPACE CATEGORY	(°F)	(°F)	(°F)	(°F)	(°F)
ADMINISTRATION SPACES	75	82	55.1	70	65
COMM / ELECTRICAL ROOMS	75	75	62.5	65	65
FIRE PUMP ROOM	101	101	N/A	40	40
HEATED RESTROOMS	N/A	N/A	N/A	60	60
SERVICE AREA / PARTS STORAGE AREA	75	82	55.1	70	65
WAREHOUSE	85	90	57.9	60	55

MECHANICAL GENERAL NOTES:

DIAGRAMMATIC IN NATURE. PROVIDE ALL TRANSITIONS. ELBOWS. ETC. REQUIRED TO AVOID CONFLICTS WITH OTHER TRADES AND BUILDING ELEMENTS. EQUIPMENT, PIPING, OR DUCTWORK INTERFERING WITH OTHER TRADES MUST BE RELOCATED AS REQUIRED AT NO ADDITIONAL COST TO THE OWNER. DO NOT SCALE THE DRAWINGS.

2. THE MECHANICAL EQUIPMENT AND INSTALLATION MUST CONFORM TO THE CODE REFERENCES TABLE SHOWN HEREIN.

3. AT THE START OF CONSTRUCTION, PREPARE TYPED LISTS OF EQUIPMENT THAT ARE SUPPLIED REQUIRING ELECTRICAL WORK, AND SEND LISTS TO THE ELECTRICAL CONTRACTOR FOR REVIEW AND COORDINATION

4. WRITTEN DIMENSIONS ON DRAWINGS HAVE PRECEDENCE OVER SCALED DIMENSIONS

5. "PROVIDE" IS AN INCLUSIVE TERM USED TO DESCRIBE ASPECTS OF THE WORK THAT MUST BE ACCOMPLISHED AND IS HEREBY DEFINED TO REQUIRE TO STORE, FURNISH, INSTALL, MOUNT, CONNECT, CONTROL AND POWER EQUIPMENT INDICATED, AS WELL AS ALL APPURTENANCES REQUIRED TO MAKE SYSTEMS OPERATE AS INDICATED WITHIN THESE DRAWINGS AND SPECIFICATIONS AND TO FULFILL THE SCOPE OF WORK.

6. COORDINATE MECHANICAL AND ELECTRICAL WORK SUCH THAT MECHANICAL PIPING, DUCTWORK AND EQUIPMENT IS NOT LOCATED OVER OR ABOVE ANY ELECTRICAL, COMMUNICATIONS, OR DATA EQUIPMENT.

7. ALL EQUIPMENT MUST BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S APPROVED PUBLISHED LITERATURE MORE STRINGENT.

8. INSTALLATION OF EQUIPMENT MUST PERMIT ACCESSIBILITY FOR SERVICE AND/OR REPLACEMENT WITHOUT NECESSITATING REMOVAL OR MODIFICATION TO OTHER PIPING, WIRING, OR EQUIPMENT.

9. CEILING-MOUNTED EQUIPMENT MUST BE INSTALLED IN SUCH A MANNER THAT LIGHTS, PIPING, DUCTWORK, ETC., DO NOT BLOCK ACCESS TO EQUIPMENT AND RELATED ACCESSORIES.

10. COORDINATE WALL, FLOOR, AND ROOF PENETRATIONS WITH THE GENERAL CONTRACTOR.

11. CAULK WITH SILICONE ALL UNUSED PENETRATION GAPS BETWEEN WALL, CEILING AND FLOOR OPENINGS, AND HVAC EQUIPMENT PENETRATIONS AS SHOWN ON MECHANICAL DETAILS. PATCH LARGE GAPS BEFORE CAULKING IS APPLIED.

12. SUPPLEMENTAL STEEL MEMBERS REQUIRED TO SUPPORT HVAC EQUIPMENT FROM MAIN STRUCTURE MUST BE PROVIDED BY THE HVAC CONTRACTOR UNLESS SPECIFICALLY NOTED OTHERWISE. REFER TO STRUCTURAL DRAWINGS AND SPECIFICATIONS 37. PROVIDE SHUT-OFF VALVES AND FLEXIBLE CONNECTIONS AT PIPE CONNECTIONS TO HVAC EQUIPMENT. FOR CONSTRUCTION TYPES. PROCURE AND INSTALL UPON APPROVAL FROM GENERAL CONTRACTOR. PROVIDE STRUCTURAL STEEL SUPPORT SUBMITTAL TO ENGINEER OF RECORD FOR REVIEW.

13. DUCTWORK AIR DISTRIBUTION SYSTEMS MUST BE INSTALLED IN ACCORDANCE WITH SMACNA STANDARDS AND THE PRESSURE CLASSIFICATION OF EACH INDIVIDUAL DUCTWORK SYSTEM

14. VOLUME DAMPERS MUST BE PROVIDED AT EACH NEW MAIN BRANCH TAKE-OFF AND IN SUCH OTHER LOCATIONS WHERE REQUIRED TO PROPERLY BALANCE THE SYSTEM. ALL REQUIRED VOLUME DAMPERS MAY NOT BE SHOWN ON THE PLANS, BUT MUST BE PROVIDED AT NO ADDITIONAL COST TO THE PROJECT.

15. INSTRUMENT TEST HOLES MUST BE PROVIDED IN AIR DISTRIBUTION SYSTEMS WHEREVER VOLUME DAMPERS ARE INSTALLED. HOLES MUST BE SEAL WITH RUBBER OR PLASTIC TEST HOLE PLUGS

16. DUCT SIZES SHOWN ARE METAL DUCT DIMENSIONS.

17. SQUARE ELBOWS SHALL ONLY BE USED WHERE SPACE LIMITATIONS PREVENT USE OF 1.5 RADIUS ELBOW AND ONLY UPON APPROVAL OF GENERAL CONTRACTOR. PROVIDE TURNING VANES IN ALL SQUARE ELBOWS 45 DEGREES OR GREATER. TURNING VANES MUST BE SINGLE THICKNESS TYPE WITHOUT TRAILING EDGE. TURNING VANES LONGER THAN 36 INCHES MUST BE DOUBLE THICKNESS TYPE.

18. DUCTWORK RUNOUTS TO AIR DISTRIBUTION DEVICES MUST BE THE SAME DIAMETER AS THE AIR DISTRIBUTION DEVICE INLET CONNECTION UNLESS OTHERWISE NOTED ON THE DRAWINGS. DIMENSIONS SHOWN FOR DIFFUSERS AND GRILLES ARE NECK DIMENSIONS.

19. FLEXIBLE DUCTWORK RUNOUTS FROM BRANCH DUCTS TO AIR DISTRIBUTION DEVICES MUST NOT EXCEED 5 FEET IN LENGTH. BENDS IN FLEXIBLE DUCTWORK MUST NOT EXCEED A MAXIMUM OF 45 DEGREE CHANGE OF DIRECTION AND BE SUPPORTED SUCH THAT THE BEND RADIUS IS NOT RESTRICTIVE TO AIR FLOW THROUGH THE DUCT. FLEXIBLE DUCTWORK MUST NOT BE CRUSHED OR DISTORTED IN ITS FINAL CONFIGURATION.

20. ROUND DUCTWORK CONNECTIONS BETWEEN MAIN DUCT AND TERMINAL UNITS MUST BE RIGID DUCT OF THE SAME DIAMETER AS TERMINAL UNIT INLET CONNECTION UNLESS OTHERWISE NOTED ON THE DRAWINGS.

21. PROVIDE SHEETMETAL TRANSITIONS AT AIR HANDLING UNITS, HEAT PUMP UNITS, FANS, AND OTHER SIMILAR HVAC EQUIPMENT. TRANSITION TO FULL SIZE OF CONNECTION ON UNIT. FLEXIBLE DUCT CONNECTORS MUST BE USED ON FINAL CONNECTION TO AIR HANDLING EQUIPMENT, UNLESS NOTED OTHERWISE.

22. OPEN-ENDED AIR TRANSFER DUCTS AND OPEN-ENDED RETURN AIR DUCTS IN THE CEILING PLENUM MUST BE UNOBSTRUCTED. FOR A MINIMUM DISTANCE OF 24 INCHES FROM THE OPENING TO ALLOW FOR FREE AIRFLOW. OPEN-ENDED AIR TRANSFER DUCTS AND OPEN-ENDED RETURN AIR DUCTS IN THE CEILING PLENUM MUST HAVE A 90 DEGREE ELBOW FOR SOUND ATTENUATION AND MUST HAVE WIRE MESH SCREEN COVERS. WIRE MESH SCREENS MUST BE ALUMINUM WITH 1/2" SQUARE HOLES. SIZE FOR MAXIMUM VELOCITY OF 400 FPM.

23. LOUVERED SUPPLY AIR DIFFUSERS MUST BE 4-WAY FLOW UNLESS OTHERWISE SHOWN BY FLOW ARROWS ON THE DRAWINGS. LINEAR DIFFUSERS MUST BE ADJUSTABLE 2-WAY FLOW. PROVIDE BATT INSULATION ON DIFFUSER AND GRILLES THAT ARE EXPOSED TO CEILING PLENUM.

24. EXACT LOCATION OF CEILING AIR DEVICES MUST BE DETERMINED BY ARCHITECTURAL REFLECTED CEILING PLAN.

25. BLANK OFF AND INSULATE INACTIVE PORTIONS OF LOUVERS. ENTIRE LOUVERS NOT UTILIZED MUST BE BLANKED OFF AND INSULATED BY THE LOUVER MANUFACTURER. REFER TO ARCHITECTURAL DRAWINGS FOR LOUVER LOCATIONS AND HVAC DRAWINGS FOR HVAC EQUIPMENT CONNECTIONS.

26. LOUVER PLENUMS MUST BE PITCHED DOWN TOWARD THE BOTTOM OF THE LOUVER. WHERE THIS IS NOT POSSIBLE, PROVIDE 3/4" DRAIN PIPING WITH P-TRAP FROM BOTTOM OF LOUVER TO NO MORE THAN 6" ABOVE NEAREST SANITARY DRAIN. DRAIN LINE MUST SLOPE DOWN TOWARDS DISCHARGE LOCATION AT A MINIMUM OF 1/8" PER LINEAR FOOT.

27. EXACT LOCATIONS OF THERMOSTATS, SENSORS, AND HVAC CONTROL APPURTENANCES MUST BE COORDINATED WITH FINAL LOCATIONS OF WALL-MOUNTED ARCHITECTURAL, FIRE PROTECTION, AND ELECTRICAL EQUIPMENT. MOUNT THERMOSTATS AND SENSORS MINIMUM 4'-0" ABOVE FINISHED FLOOR.

28. PROVIDE ACCESS PANELS TO ACCESS DAMPERS, EQUIPMENT, AND VALVES LOCATED ABOVE HARD CEILINGS OR IN WALLS. ACTUAL ACCESS PANEL LOCATIONS MUST BE FIELD DETERMINED

1. INSTALLATION OF HVAC WORK MUST BE COORDINATED WITH OTHER TRADES BEFORE ANY INSTALLATION IS MADE. PLANS ARE 29. UNLESS NOTED OTHERWISE. ACCESS MUST BE PROVIDED AT EACH INSTANCE OF THE FOLLOWING: MOTOR OPERATED DAMPERS AND FIRE DAMPERS. DUCT ACCESS DOORS MUST BE LOCATED CLOSE TO EACH COMPONENT LISTED ABOVE TO ALLOW FOR INSPECTION. IF FEASIBLE, LOCATE DUCT ACCESS DOOR ON THE UNDERSIDE OF THE DUCT RATHER THAN THE SIDE. MINIMUM DUCT ACCESS DOOR SIZE MUST BE BASED ON DUCT SIZE AS FOLLOWS:

> ACCESS DOOR SIZE 12" LONG FLANGED & GASKETED REMOVABLE DUCT SECTION 12" AND SMALLER 13" TO 17" 12" X 12"

18" TO 24" 16" X 18" 25" AND LARGER 24" X 16"

30. EXPOSED DUCTWORK, WITH THE EXCEPTION OF DUCTWORK IN MECHANICAL ROOMS, MUST BE DOUBLE-WALL, SPIRAL DUCTWORK WITH PAINT GRIP COATING. PAINT SPIRAL DUCTWORK TO MATCH ADJACENT EXPOSED SURFACE.

31. AIR HANDLING UNITS SERVING OFFICE AREAS MUST HAVE MINIMUM MERV 13 FILTERS. AIR HANDLING UNITS SERVING WAREHOUSE MUST HAVE MINIMUM MERV 8 FILTERS. UNITS NOT SERVING OCCUPIED ZONES MUST HAVE MINIMUM MERV [8] FILTER. FILTERS MUST BE INDUSTRY STANDARD SIZE. FILTERS MUST NOT CREATE PRESSURE DROP EXCEEDING 10% OF EXTERNAL STATIC PRESSURE (ESP) CAPACITY LISTED IN EQUIPMENT SCHEDULE.

32. SUPPLY, RETURN, AND OUTDOOR AIR DUCTWORK MUST BE INSULATED TO MEET OR EXCEED ASHRAE 90.1-2013. EXTERIOR SUPPLY AND RETURN AIR DUCTWORK MUST BE PROVIDED WITH WEATHER-PROOF COVER.

(INCLUDING SERVICE CLEARANCE), AND INTERNATIONAL BUILDING CODE / INTERNATIONAL MECHANICAL CODE, WHICHEVER IS 33, PIPING INSULATION MUST BE PROVIDED ON ALL PIPING SYSTEMS INCLUDING (BUT NOT LIMITED TO) CHILLED WATER, HEATING HOT WATER, CONDENSER WATER, REFRIGERANT, AND CONDENSATE DRAIN IN ACCORDANCE WITH ASHRAE 90.1-2013.

> 34. SIZE REFRIGERANT LINES PER MANUFACTURER'S INSTRUCTIONS BASED ON ACTUAL LINE LENGTHS AND EQUIPMENT ELEVATIONS INSTALLED. USE OF HCFC AND CFC REFRIGERANTS IS PROHIBITED. INSULATION ON REFRIGERANT LINES EXPOSED TO WEATHER MUST HAVE ALUMINUM JACKETING.

35. PIPING CONTAINING WATER THAT IS EXPOSED TO FREEZING TEMPERATURES MUST BE INSULATED AND HEAT-TRACED.

36. COORDINATE LOCATIONS OF CONDENSATE DRAIN PIPING. PROVIDE CONDENSATE PUMPS WHERE SUFFICIENT SLOPE IS NOT AVAILABLE FOR STANDARD GRAVITY DRAIN. PROVIDE WITH OVERFLOW SWITCH TO POWER DOWN THE ASSOCIATED AIR HANDLING EQUIPMENT IN CASE OF CONDENSATE PUMP FAILURE. CONDENSATE DRAIN LINE MUST SLOPE DOWN TOWARDS DISCHARGE LOCATION AT A MINIMUM OF 1/8" PER LINEAR FOOT. INSULATE INDOOR CONDENSATE PIPING WITH 3/4" CLOSED CELL FOAM INSULATION.

38. PROVIDE SUPPORTS FOR PIPING AND DUCTWORK IN ACCORDANCE WITH SPECIFICATIONS.

39. WHERE A DUCT OR PIPING SYSTEM CROSSES A BUILDING EXPANSION JOINT, PROVIDE A MANUFACTURED EXPANSION DEVICE, FABRICATED EXPANSION LOOP (PIPING SYSTEM ONLY), OR (WHERE INDICATED ON THE DRAWINGS) AN ENLARGED THROUGH-WALL SLEEVE THAT ALLOWS FOR BUILDING MOVEMENT. WHERE AN ENLARGED THROUGH-WALL SLEEVE IS PERMITTED, FILL SLEEVE OPENING AROUND THE DUCT OR PIPE WITH FLEXIBLE CAULK THAT WILL NOT IMPEDE DUCT OR PIPE MOVEMENT

40. PROVIDE HOUSEKEEPING PADS FOR MECHANICAL EQUIPMENT. COORDINATE WITH STRUCTURAL.

41. CONTROL WIRING (I.E. 120 VOLT AND BELOW) INCLUDING 120 VOLT CONTROL POWER TO MOTOR OPERATED DAMPERS, VALVES, AND VARIABLE VOLUME BOXES MUST BE PROVIDED UNDER THIS DIVISION UNLESS SHOWN ON THE ELECTRICAL DRAWINGS. POWER WIRING (120V) TO CONTROL PANELS MUST BE PROVIDED BY ELECTRICAL. POWER (120V) AND CONTROL (24V) WIRING TO APPLICATION-SPECIFIC CONTROLLERS AND OTHER CONTROL SYSTEM COMPONENTS MUST ORIGINATE AT CONTROL PANELS AND BE PROVIDED UNDER THIS DIVISION.

42. INSTALL EXPOSED CONTROL WIRING IN CONDUIT. SEE DIVISION 26 SPECIFICATIONS FOR REQUIREMENTS.

43. VARIABLE FREQUENCY DRIVES FOR 3 PHASE MOTORS MUST BE 3 POLE TYPE.

44. ALL EQUIPMENT WITH NATURAL GAS COMBUSTION MUST BE VENTED PER THE APPLICABLE CODES.

45. MANUFACTURER NAME AND MODEL NUMBERS ARE BASIS OF DESIGN AND ARE SHOWN FOR INFORMATION ONLY. REFER TO SPECIFICATIONS FOR COMPLETE REQUIREMENTS.

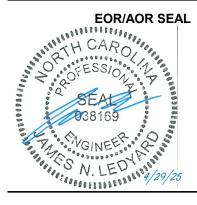
46. EQUIPMENT LAYOUT IS BASED ON ONE MANUFACTURER'S PRODUCT. WHERE EQUIPMENT SELECTED BY THE CONTRACTOR FOR USE ON THE JOB DIFFERS FROM LAYOUT, THE CONTRACTOR MUST BE RESPONSIBLE FOR COORDINATING SPACE REQUIREMENTS AND EQUIPMENT CONNECTION ARRANGEMENTS.

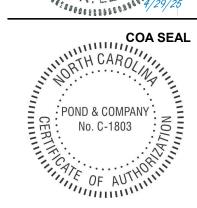
47. SPECIFICATIONS TAKE PRECEDENCE OVER DRAWINGS. HOWEVER, ITEMS SHOWN ON DRAWING BUT NOT IN THE SPECIFICATIONS ARE REQUIRED WITHIN THE PROJECT SCOPE. IN ADDITION, SPECIFIC ITEMS SHOWN ON THE DRAWINGS TAKE PRECEDENCE OVER SPECIFICATIONS IN CASES WHERE THE SPECIFICATION HAS OPTIONS.

48. FACTORY PAINTED EQUIPMENT THAT HAS BEEN SCRATCHED OR MARRED MUST BE REPAINTED TO MATCH ORIGINAL COLOR. STEEL EQUIPMENT HANGERS, THREADED RODS, BOLTS, NUTS, SUPPORTS, AND UNINSULATED BLACK STEEL PIPE EXPOSED TO SIGHT INSIDE OR OUTSIDE THE BUILDING WHICH ARE NOT PROVIDED WITH A FACTORY APPLIED PRIME COAT MUST BE CLEANED OF RUST, GREASE, AND SCALE. AFTER CLEANING THE HANGERS, SUPPORTS AND PIPE, A FIELD APPLIED PRIME COAT MUST BE PROVIDED. IN ADDITION, SUCH ITEMS IN FINISHED SPACES MUST ALSO BE PROVIDED WITH TWO COATS OF FINISH PAINT IN A COLOR TO MATCH ADJACENT SURFACES OR AS NOTED; SUCH ITEMS OUTSIDE THE BUILDING MUST ALSO BE PROVIDED WITH TWO COATS OF BITUMINOUS ALUMINUM PAINT. INSULATED PIPES OUTSIDE THE BUILDING MUST BE CLEANED OF RUST, GREASE AND SCALE, AND PROVIDED WITH A FIELD APPLIED PRIME COAT BEFORE INSTALLING INSULATION.

49. NOT ALL MECHANICAL ABBREVIATIONS SHOWN WILL BE USED FOR THIS PROJECT.

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CLIENT INFORMATION SEEFRIED

INDUSTRIAL **PROPERTIES**

PROJECT NAM

WAREHOUSE DEVELOPMEN^T

DRIVE WILMINGTON, **NORTH CAROLINA** 28435

DRAWING ISSUE

DESIGNED BY: DRAWN BY: CHECKED BY:

SUBMITTED BY: DATE: PROJECT #: 1240989 SHEET TITLE **MECHANICAL**

GENERAL NOTES AND DESIGN

CRITERIA

ORIGINAL SHEET SIZE: 30" X 42"

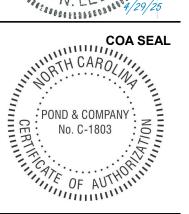
M-001

FLEXIBLE PIPE

3500 Parkway Lane
Suite 500
Peachtree Corners
Georgia 30092

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SEEFRIED INDUSTRIAL

PROPERTIES

PROJECT NAME

OFFICE/ WAREHOUSE DEVELOPMENT

34 CORPORATE DRIVE WILMINGTON, NORTH CAROLINA 28435

DRAWING ISSUE

DCD8_BTS & V_CD100_REV0_05012025 DESCRIPTION

O WW DESIGNED BY: JAA

DRAWN BY: GJB
CHECKED BY: WWC
SUBMITTED BY: DP
DATE: 05/01/2025
PROJECT#: 1240989

SHEET TITLE

MECHANCIAL ABBREVIATIONS AND LEGENDS

SHEET NUMBER

M-002

Mechanical Compliance Certificate

Project Information

90.1 (2016) Standard **Energy Code: FSC BUILDING** Project Title: Wilmington, North Carolina Location: Climate Zone: **New Construction** Project Type:

Construction Site:

34 CORPORATE DRIVE WILMINGTON, North Carolina 28435

Owner/Agent:

Designer/Contractor: Pond & Company 3500 Parkway Lane Peachtree Corners, Georgia 30092 678-336-7740

Mechanical Systems List

Quantity System Type & Description

1 ERU-01 (Unknown): DOAS, Air Source w/ Heat Recovery Heat Pump Heating Mode: Capacity = 181 kBtu/h, Proposed Efficiency = 3.70 ISCOP, Required Efficiency = 3.30 ISCOP Cooling Mode: Capacity = 315 kBtu/h, , Air Economizer Proposed Efficiency = 5.70 ISMRE, Required Efficiency: 5.20 ISMRE Fan System: ERU-01 -- Compliance (Motor nameplate HP method): Passes

SUPPLY Supply, Single-Zone VAV, 6850 CFM, 7.5 motor nameplate hp, 85.0 fan efficiency grade

DSS-01 (Single Zone): Split System Heat Pump Heating Mode: Capacity = 22 kBtu/h, Proposed Efficiency = 8.90 HSPF, Required Efficiency = 8.20 HSPF Cooling Mode: Capacity = 18 kBtu/h, Proposed Efficiency = 19.50 SEER, Required Efficiency: 14.00 SEER Fan System: DSS-01 | IT ROOM -- Compliance (Motor nameplate HP method) : Passes

DSS-01 Supply, Single-Zone VAV, 920 CFM, 0.1 motor nameplate hp, 0.0 fan efficiency grade

DSS-02 (Single Zone): Split System Heat Pump Heating Mode: Capacity = 18 kBtu/h, Proposed Efficiency = 10.10 HSPF, Required Efficiency = 8.20 HSPF Cooling Mode: Capacity = 12 kBtu/h, Proposed Efficiency = 21.10 SEER, Required Efficiency: 14.00 SEER Fan System: DSS-02 | ELECTRICAL ROOM -- Compliance (Motor nameplate HP method) : Passes DSS-02 Supply, Single-Zone VAV, 920 CFM, 0.1 motor nameplate hp, 0.0 fan efficiency grade 1 AHU-01 (Single Zone): Single Package Heat Pump Heating Mode: Capacity = 45 kBtu/h, Proposed Efficiency = 12.97 HSPF, Required Efficiency = 8.00 HSPF

Cooling Mode: Capacity = 59 kBtu/h, , Air Economizer

Proposed Efficiency = 16.40 SEER, Required Efficiency: 14.00 SEER

Quantity System Type & Description

Fan System: AHU-01 -- Compliance (Motor nameplate HP method): Passes

AHU-01 Supply, Single-Zone VAV, 1000 CFM, 3.0 motor nameplate hp, 0.0 fan efficiency grade

EUH-01 / EUH-03 / EUH-04 (Unknown w/ PerimeterSystem): Heating: 3 each - Unit Heater, Electric, Capacity = 10 kBtu/h

No minimum efficiency requirement applies Fan System: FAN SYSTEM 1 -- Compliance (Motor nameplate HP method): Passes

EUH-01 / EUH-03 / EUH-04 Supply, Constant Volume, 100 CFM, 0.1 motor nameplate hp, 0.0 fan efficiency grade

EUH-02 (Unknown w/ PerimeterSystem):

Heating: 1 each - Unit Heater, Electric, Capacity = 5 kBtu/h

No minimum efficiency requirement applies Fan System: FAN SYSTEM 1 -- Compliance (Motor nameplate HP method): Passes

EUH-01 / EUH-03 / EUH-04 Supply, Constant Volume, 100 CFM, 0.1 motor nameplate hp, 0.0 fan efficiency grade

EUH-05 / EUH-06 / EUH-07 / EUH-08 (Unknown w/ PerimeterSystem):

Heating: 4 each - Unit Heater, Electric, Capacity = 12 kBtu/h No minimum efficiency requirement applies

Fan System: FAN SYSTEM 2 -- Compliance (Motor nameplate HP method): Passes

FAN 7 Supply, Constant Volume, 270 CFM, 0.1 motor nameplate hp, 0.0 fan efficiency grade

EUH-09 (Unknown w/ PerimeterSystem):

Heating: 1 each - Unit Heater, Electric, Capacity = 5 kBtu/h

No minimum efficiency requirement applies Fan System: FAN SYSTEM 3 -- Compliance (Motor nameplate HP method): Passes

FAN 8 Supply, Constant Volume, 150 CFM, 0.1 motor nameplate hp, 0.0 fan efficiency grade

EUH-10 (Unknown w/ PerimeterSystem): Heating: 1 each - Unit Heater, Electric, Capacity = 16 kBtu/h

No minimum efficiency requirement applies

Fan System: FAN SYSTEM 4 -- Compliance (Motor nameplate HP method): Passes

FAN 9 Supply, Constant Volume, 100 CFM, 0.1 motor nameplate hp, 0.0 fan efficiency grade

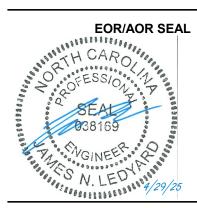
Mechanical Compliance Statement

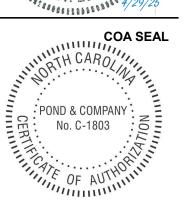
Compliance Statement: The proposed mechanical design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 90.1 (2016) Standard requirements in COMcheck Version 4.1.5.5 and to comply with any applicable

James Ledyard - PE

Name - Title

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CLIENT INFORMATION

SEEFRIED INDUSTRIAL **PROPERTIES**

PROJECT NAME

OFFICE/ WAREHOUSE DEVELOPMENT

34 CORPORATE DRIVE WILMINGTON, NORTH CAROLINA 28435

DRAWING ISSUE

DESIGNED BY: DRAWN BY: CHECKED BY: SUBMITTED BY: DATE: PROJECT #:

> MECHANICAL COMCHECK

M-004

Designer/Contractor:

Project Information

90.1 (2016) Standard Energy Code: BTS BUILDING Project Title: Wilmington, North Carolina Location: Climate Zone: Project Type: **New Construction**

Construction Site: Owner/Agent: 34 CORPORATE DRIVE Pond & Company WILMINGTON, North Carolina 28435 3500 Parkway Lane Peachtree Corners, Georgia 30092

Mechanical Systems List

Quantity System Type & Description

1 RTU-2 (Single Zone):

Fans:

2 ERU-01,02 (Unknown): DOAS, Air Source w/ Heat Recovery Heat Pump Heating Mode: Capacity = 152 kBtu/h,

> Proposed Efficiency = 4.01 ISCOP, Required Efficiency = 3.30 ISCOP Cooling Mode: Capacity = 301 kBtu/h, , Air Economizer Proposed Efficiency = 6.90 ISMRE, Required Efficiency: 5.20 ISMRE Fan System: FAN SYSTEM 1 -- Compliance (Motor nameplate HP method): Passes

FAN Supply, Single-Zone VAV, 6850 CFM, 7.5 motor nameplate hp, 0.0 fan efficiency grade

678-336-7740

RTU-1 (Single Zone): Single Package Heat Pump Heating Mode: Capacity = 56 kBtu/h, Proposed Efficiency = 12.97 HSPF, Required Efficiency = 8.00 HSPF Cooling Mode: Capacity = 60 kBtu/h, , Air Economizer Proposed Efficiency = 16.40 SEER, Required Efficiency: 14.00 SEER Fan System: RTU-1 -- Compliance (Motor nameplate HP method): Passes

RTU-1 Supply, Single-Zone VAV, 1700 CFM, 3.0 motor nameplate hp, 0.0 fan efficiency grade

Single Package Heat Pump Heating Mode: Capacity = 34 kBtu/h, Proposed Efficiency = 12.97 HSPF, Required Efficiency = 8.00 HSPF Cooling Mode: Capacity = 35 kBtu/h, Proposed Efficiency = 16.80 SEER, Required Efficiency: 14.00 SEER Fan System: RTU-2 -- Compliance (Motor nameplate HP method): Passes

FAN 6 Supply, Multi-Zone VAV, 900 CFM, 3.0 motor nameplate hp, 0.0 fan efficiency grade RTU-3 (Single Zone):

Single Package Heat Pump Heating Mode: Capacity = 119 kBtu/h, Proposed Efficiency = 3.31 COP, Required Efficiency = 3.20 COP Cooling Mode: Capacity = 195 kBtu/h, , Air Economizer Proposed Efficiency = 10.60 EER, Required Efficiency: 10.60 EER + 11.6 IEER Fan System: RTU-3 -- Compliance (Motor nameplate HP method): Passes

Quantity System Type & Description

RTU-3 Supply, Multi-Zone VAV, 5500 CFM, 7.5 motor nameplate hp, 0.0 fan efficiency grade

RTU-4 (Single Zone): Single Package Heat Pump Heating Mode: Capacity = 34 kBtu/h, Proposed Efficiency = 12.97 HSPF, Required Efficiency = 8.00 HSPF Cooling Mode: Capacity = 36 kBtu/h, Proposed Efficiency = 16.80 SEER, Required Efficiency: 14.00 SEER Fan System: RTU-4 -- Compliance (Motor nameplate HP method): Passes

RTU-4 Supply, Multi-Zone VAV, 1145 CFM, 3.0 motor nameplate hp, 0.0 fan efficiency grade

RTU-5 (Single Zone): Single Package Heat Pump Heating Mode: Capacity = 50 kBtu/h, Proposed Efficiency = 3.41 COP, Required Efficiency = 3.30 COP Cooling Mode: Capacity = 92 kBtu/h, , Air Economizer Proposed Efficiency = 11.10 EER, Required Efficiency: 11.00 EER + 12.2 IEER Fan System: RTU-5 -- Compliance (Motor nameplate HP method): Passes

FAN 8 Exhaust, Multi-Zone VAV, 1250 CFM, 1.0 motor nameplate hp, 0.0 fan efficiency grade RTU-5 Supply, Multi-Zone VAV, 2500 CFM, 1.5 motor nameplate hp, 0.0 fan efficiency grade

RTU-6 (Single Zone): Single Package Heat Pump Heating Mode: Capacity = 201 kBtu/h, Proposed Efficiency = 3.60 COP, Required Efficiency = 3.20 COP Cooling Mode: Capacity = 237 kBtu/h, , Air Economizer Proposed Efficiency = 11.30 EER, Required Efficiency: 10.60 EER + 11.6 IEER Fan System: RTU-6 -- Compliance (Motor nameplate HP method): Passes

FAN 10 Supply, Multi-Zone VAV, 3593 CFM, 2.9 motor nameplate hp, 0.0 fan efficiency grade FAN 9 Supply, Multi-Zone VAV, 3593 CFM, 2.9 motor nameplate hp, 0.0 fan efficiency grade DSS-1 (Single Zone):

Split System Heat Pump Heating Mode: Capacity = 40 kBtu/h, Proposed Efficiency = 9.40 HSPF, Required Efficiency = 8.20 HSPF Cooling Mode: Capacity = 36 kBtu/h, Proposed Efficiency = 20.30 SEER, Required Efficiency: 14.00 SEER DSS-2 (Single Zone): Split System Heat Pump Heating Mode: Capacity = 24 kBtu/h, Proposed Efficiency = 8.90 HSPF, Required Efficiency = 8.20 HSPF Cooling Mode: Capacity = 18 kBtu/h,

Proposed Efficiency = 19.50 SEER, Required Efficiency: 14.00 SEER EUH 1,2,4 (Unknown w/ PerimeterSystem): Heating: 1 each - Unit Heater, Electric, Capacity = 5 kBtu/h No minimum efficiency requirement applies

EUH 3 (Unknown w/ PerimeterSystem): Heating: 1 each - Unit Heater, Electric, Capacity = 16 kBtu/h No minimum efficiency requirement applies

EUH 5 (Unknown w/ PerimeterSystem): Heating: 1 each - Unit Heater, Electric, Capacity = 3 kBtu/h No minimum efficiency requirement applies

EUH 6 (Unknown w/ PerimeterSystem): Heating: 1 each - Unit Heater, Electric, Capacity = 16 kBtu/h Quantity System Type & Description

No minimum efficiency requirement applies

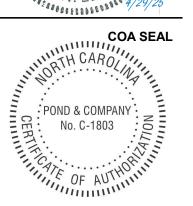
Mechanical Compliance Statement

Compliance Statement: The proposed mechanical design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 90.1 (2016) Standard requirements in COMcheck Version 4.1.5.5 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

James Ledyard - PE Name - Title

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CLIENT INFORMATION SEEFRIED

INDUSTRIAL **PROPERTIES**

PROJECT NAME

OFFICE/ WAREHOUSE DEVELOPMENT

> 34 CORPORATE DRIVE WILMINGTON, NORTH CAROLINA 28435

> > **DRAWING ISSUE**

DESIGNED BY: DRAWN BY: CHECKED BY: SUBMITTED BY:

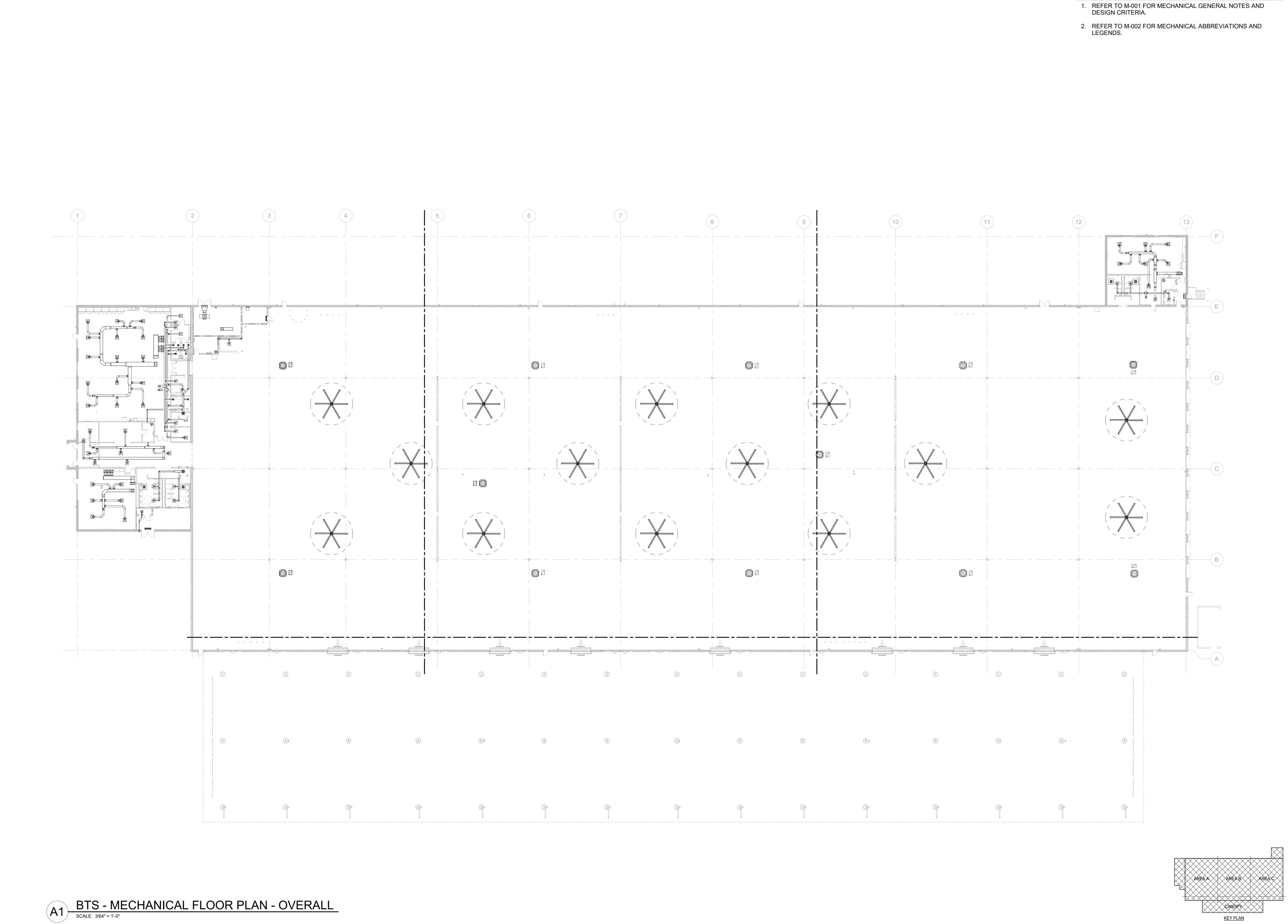
DATE:

PROJECT #:

0

MECHANICAL COMCHECK

M-003



3500 Parkway Lane Suite 500 Peachtree Corners Georgia 30092

SHEET NOTES

EOR/AOR SEAL

CARO

SEAL

SEAL

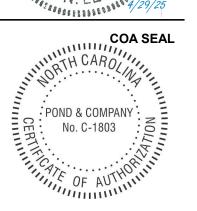
SOURCESSION

WINGINEER

N. LED

1/29/25

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SEEFRIED INDUSTRIAL PROPERTIES

PROJECT NAME

OFFICE/ WAREHOUSE DEVELOPMENT

34 CORPORATE DRIVE WILMINGTON, NORTH CAROLINA 28435

DRAWING ISS

BTS & EV0_05012025

> 0 EV_CI

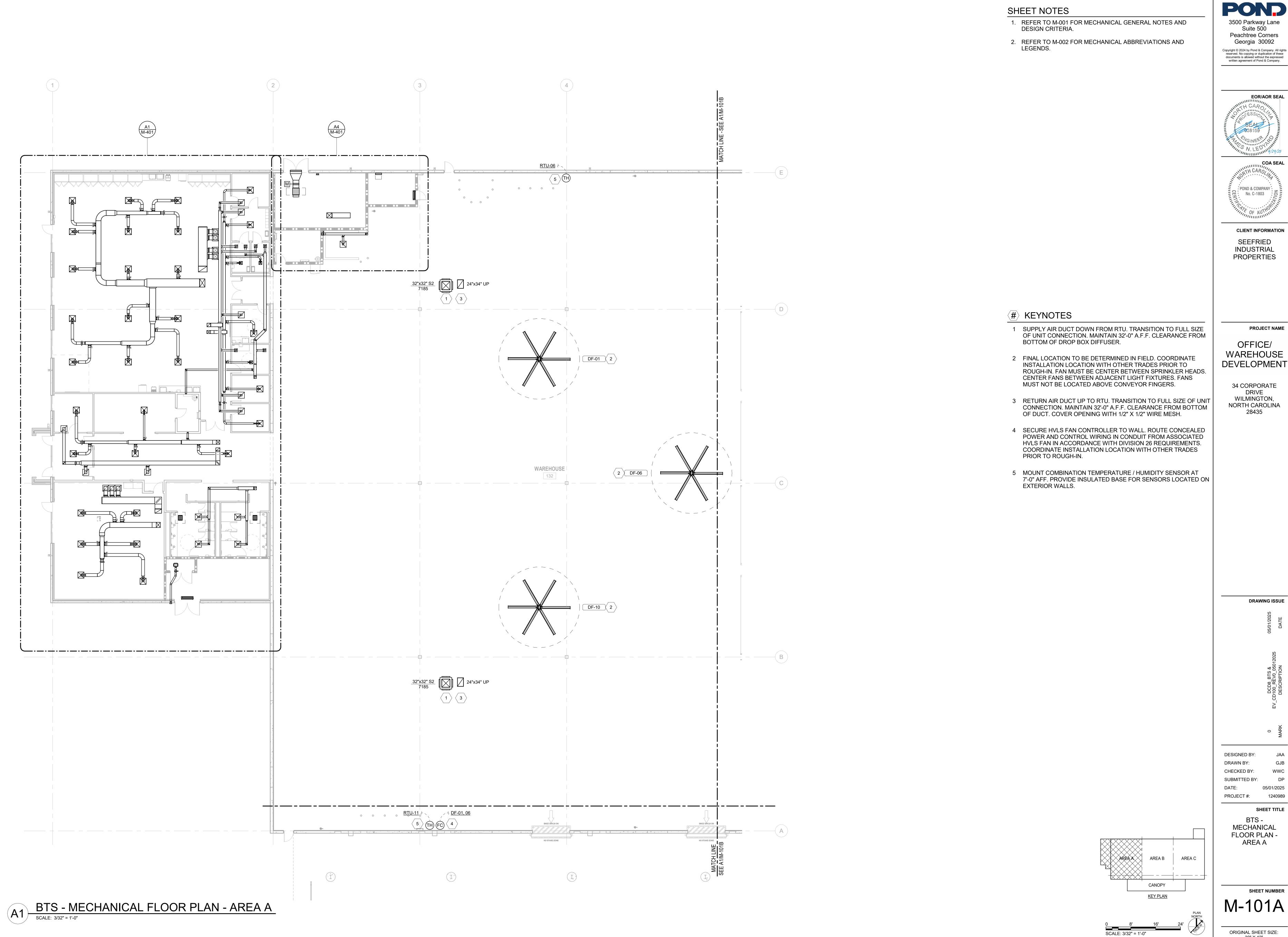
ESIGNED BY: JAA
RAWN BY: GJB
HECKED BY: WWC
UBMITTED BY: DP
ATE: 05/01/2025

SUBMITTED BY: DP
DATE: 05/01/2025
PROJECT #: 1240989

SHEET TITLE

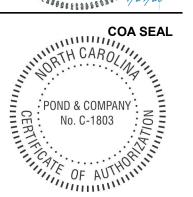
BTS -MECHANICAL FLOOR PLAN -OVERALL

SHEET NUMBER



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CLIENT INFORMATION SEEFRIED INDUSTRIAL

PROJECT NAME OFFICE/

WAREHOUSE DEVELOPMENT 34 CORPORATE

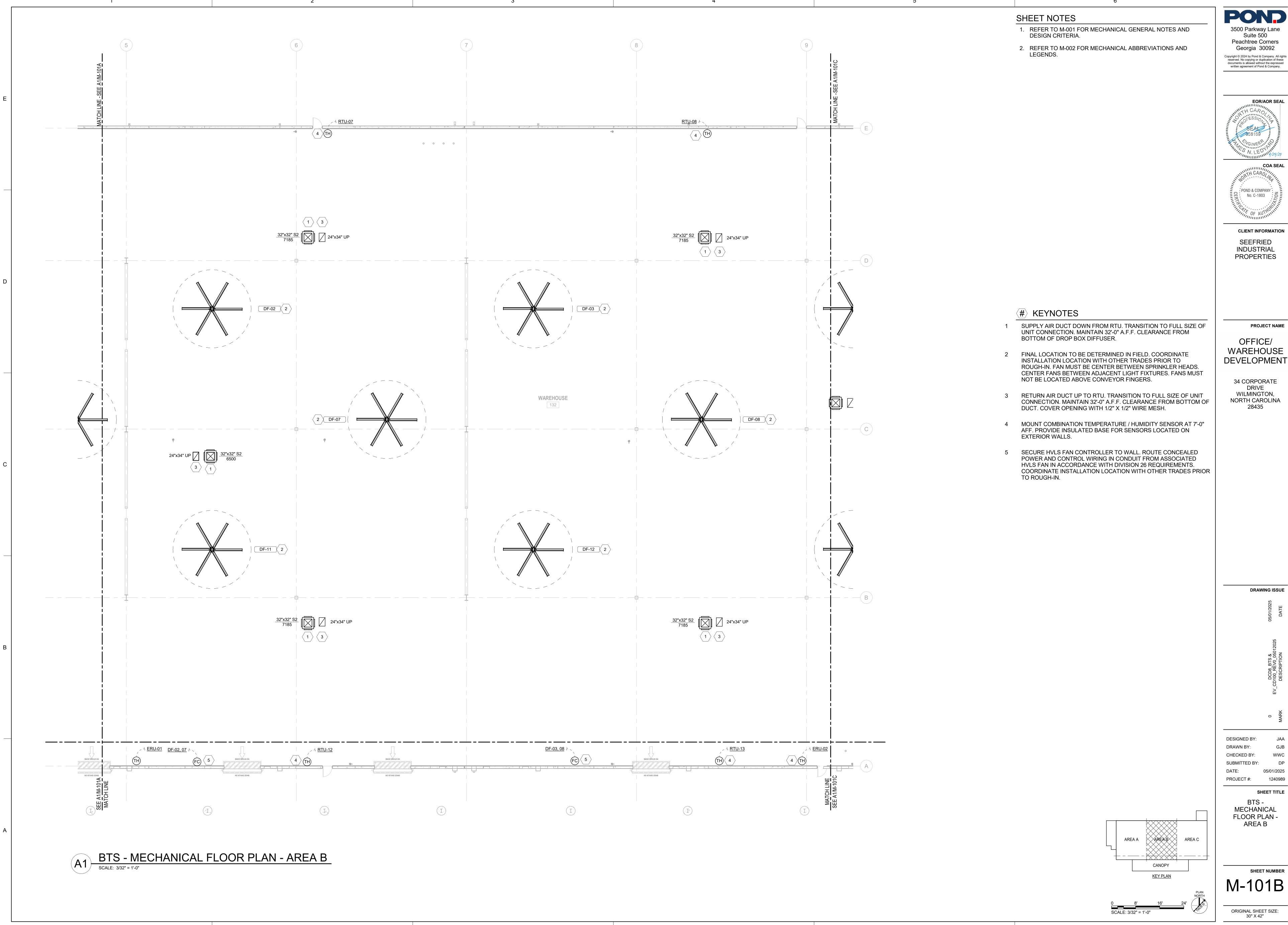
DRIVE WILMINGTON, NORTH CAROLINA 28435

DRAWING ISSUE

CHECKED BY: PROJECT #:

MECHANICAL FLOOR PLAN -AREA A

M-101A



POND 3500 Parkway Lane Suite 500

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PROJECT NAME

OFFICE/ WAREHOUSE

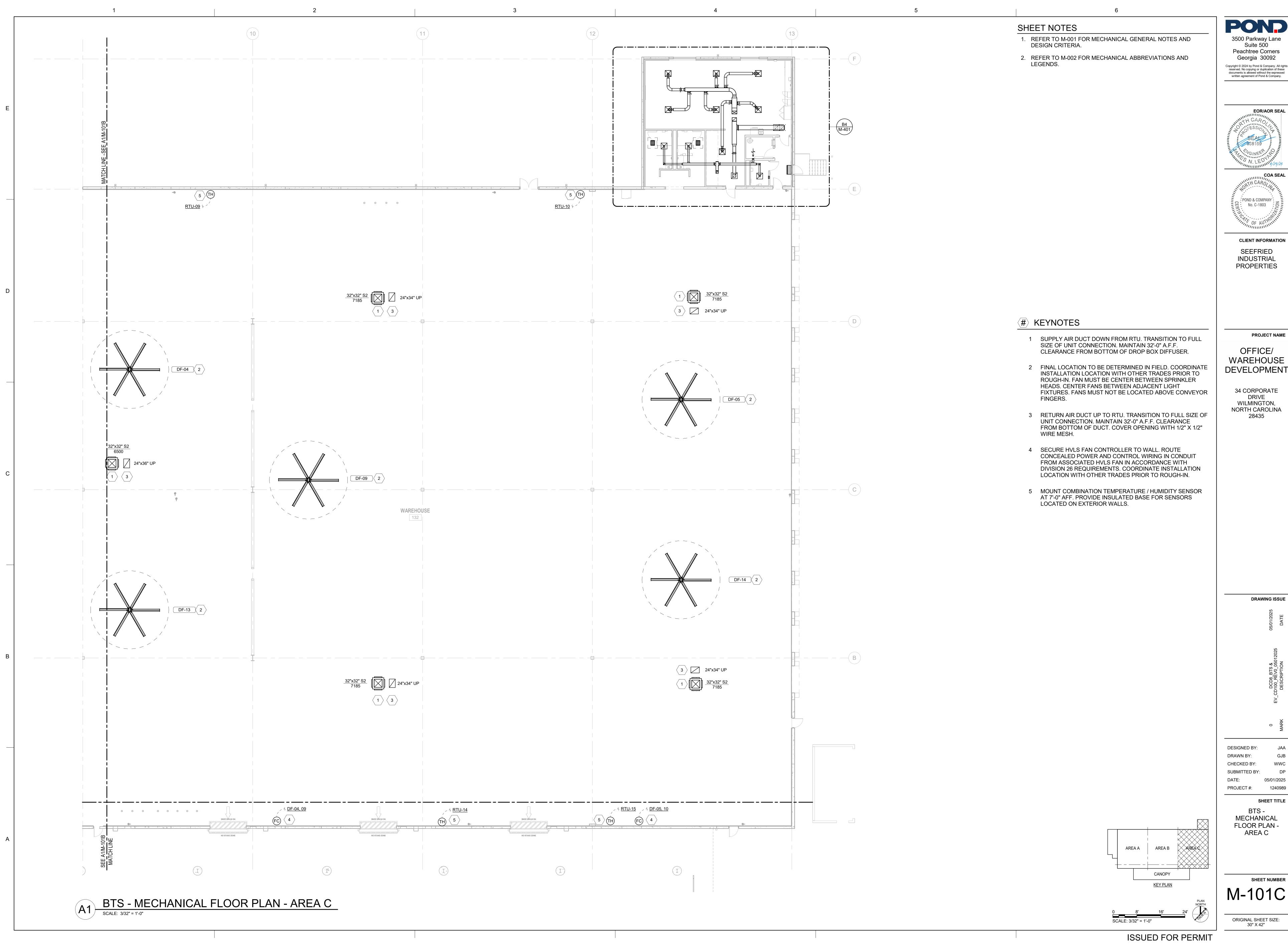
34 CORPORATE DRIVE WILMINGTON, NORTH CAROLINA 28435

DRAWING ISSUE

SHEET TITLE

MECHANICAL FLOOR PLAN -AREA B

ORIGINAL SHEET SIZE: 30" X 42"



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INDUSTRIAL **PROPERTIES**

OFFICE/ WAREHOUSE

34 CORPORATE

DRIVE WILMINGTON, NORTH CAROLINA 28435

DRAWING ISSUE

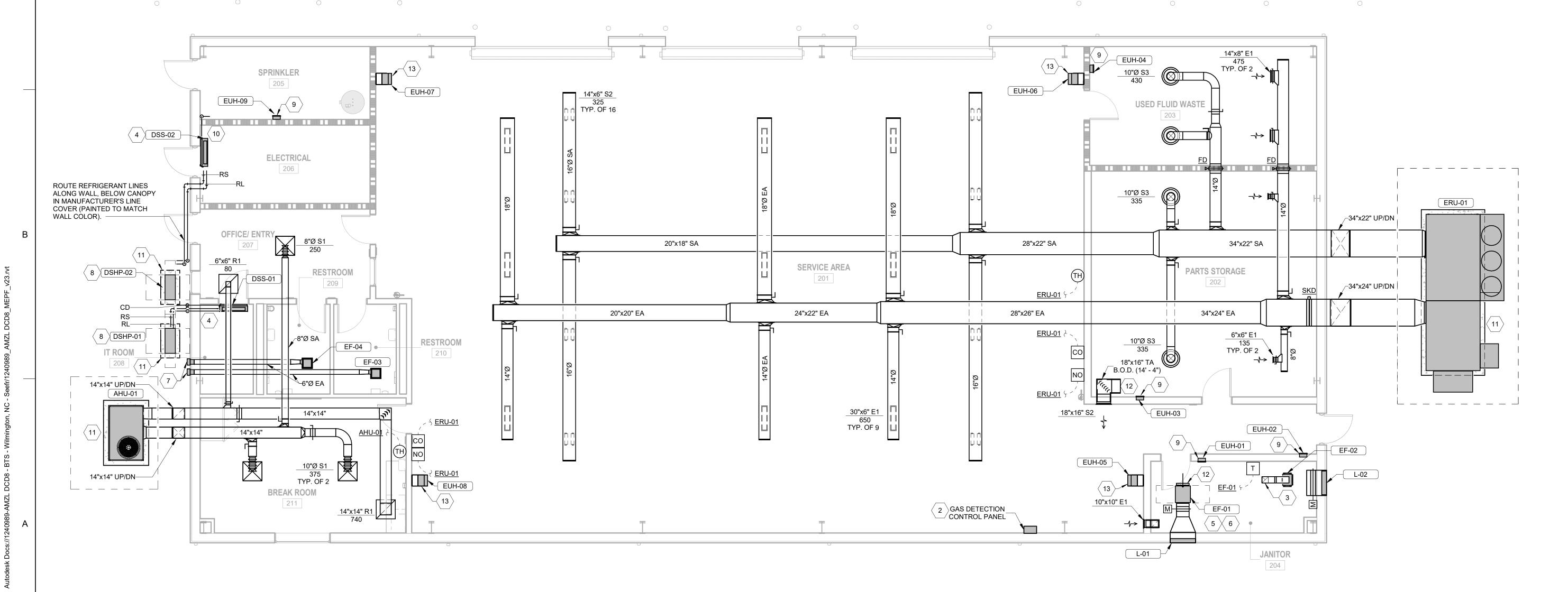
SHEET TITLE

MECHANICAL FLOOR PLAN -AREA C

M-101C

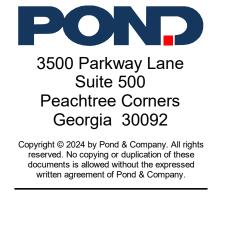
(C1) FSC - MECHANICAL ROOF PLAN - OVERALL

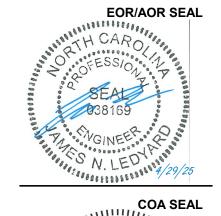
SCALE: 3/16" = 1'-0"

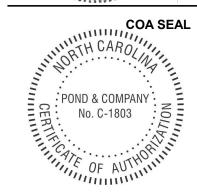


SHEET NOTES

- REFER TO M-001 FOR MECHANICAL GENERAL NOTES AND DESIGN CRITERIA.
- 2. REFER TO M-002 FOR MECHANICAL ABBREVIATIONS AND LEGENDS.
- 3. GAS DETECTION SYSTEM DESIGN IS TO BE COMPLETED DURING CONSTRUCTION PHASE BY CONTROLS CONTRACTOR. ALL SITE SPECIFIC AND LOCAL AHJ REQUIREMENTS WILL BE ADHERED TO IN GAS DETECTION DESIGN.
- 4. ANY SPECIFIC ELCTRICAL DETAILS SUCH AS WIRING, CONTROL PANELS, AUDIBLE/VISIBLE ALERTS TO BE DTERMINED DURING CONSTRUCTION.
- 5. GAS DETECTION ALARM SHALL BE INDEPENDENT OF THE FIRE ALARM AND WILL BE LOCAL TO DSC BUILDING.







CLIENT INFORMATION
SEEFRIED

INDUSTRIAL PROPERTIES

KEYNOTES

- 1 8" X 8" GOOSE NECK FROM EF-6 BELOW. SEE A1/M102.
- 2 THE GAS DETECTION SYSTEM IS TO BE INTERLOCKED WITH ERU-01,AND MONITORED VIA BMS (BUILDING MANAGEMENT SYSTEM).
- 3 EA UP, SEE C1/M-102 FOR CONTINUATION.
- 4 EXTEND CONDENSATE DRAIN LINE FULL SIZE OF CONNECTION ON UNIT (3/4" MINIMUM). DISCHARGE TO NEARBY FLOOR DRAIN WITH MINIMUM 3" AIR GAP.
- 5 EXHAUST FAN EF-01 TO BE INTERLOCKED WITH EUH-01 TO AVOID SIMULTANEOUS OPERATION. ONCE THE OUTDOOR AIR TEMPERATURE DROPS BELOW 50 F, THE EXHAUST FAN SHALL BE TURNED OFF.
- 6 MODULATING DAMPERS TO BE SET TO CLOSED IF THE EXHAUST FAN EF-01 IS NOT IN OPERATION, AND OPEN WHEN THE EXHAUST FAN EF-01 IS OPERATIONAL.
- 7 CONNECT EXHAUST DUCT TO MANUFACTURER'S ALUMINUM EXTERIOR WALL CAP. COORDINATE TERMINATION LOCATION WITH OTHER TRADES PRIOR TO ROUGH-IN.
- 8 ROUTE REFRIGERANT LINES TO CORRESPONDING CONDENSING UNIT. LINES MUST BE SIZED BY EQUIPMENT MANUFACTURER. REFRIGERANT LINES MUST BE INSULATED, REFER TO PROJECT SPECIFICATIONS. PIPING EXPOSED TO WEATHER MUST HAVE ALUMINUM JACKET.
- 9 MOUNT BOTTOM OF HEATER AT LEAST 0'-8" A.F.F.
- 10 EXTEND CONDENSATE DRAIN LINE FULL SIZE OF CONNECTION ON UNIT (3/4" MINIMUM) TO CONDENSATE PUMP. ROUTE CONDENSATE DISCHARGE TO NEARBY FLOOR DRAIN WITH MINIMUM 3" AIR GAP. REFER TO PLUMBING DRAWINGS FOR EXACT FLOOR DRAIN LOCATION.
- 11 INSTALL ON 4" HOUSEKEEPING PAD, SEE STRUCTURAL FOR DETAIL.
- 12 COVER OPENING WITH 1/2" X 1/2" WIRE MESH.
- 13 MOUNT BOTTOM OF HEATER 16'-0" A.F.F.

PROJECT NAME

OFFICE/ WAREHOUSE DEVELOPMENT

> 34 CORPORATE DRIVE WILMINGTON, NORTH CAROLINA 28435

> > DRAWING ISSUE

05/01/20 025 DATE

0 DCD8 EV_CD100_RÌ AARK DESCF

DESIGNED BY: JAA
DRAWN BY: GJB
CHECKED BY: WWC
SUBMITTED BY: DP
DATE: 05/01/2025

DATE: 05/01/2025
PROJECT #: 1240989

SHEET TITLE

FSC -MECHANICAL FLOOR PLAN -OVERALL

SHEET NUMBER

ORIGINAL SHEET SIZE: 30" X 42"

0 4' 8' 12'

POND SHEET NOTES 3500 Parkway Lane Suite 500 REFER TO M-001 FOR MECHANICAL GENERAL NOTES AND DESIGN CRITERIA. Peachtree Corners REFER TO M-002 FOR MECHANICAL ABBREVIATIONS AND LEGENDS. Georgia 30092

CANOPY

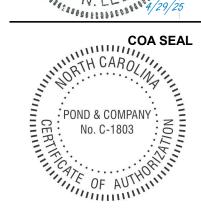
ORIGINAL SHEET SIZE: 30" X 42"

ISSUED FOR PERMIT

BTS - MECHANICAL ROOF PLAN - OVERALL

SCALE: 3/64" = 1'-0"

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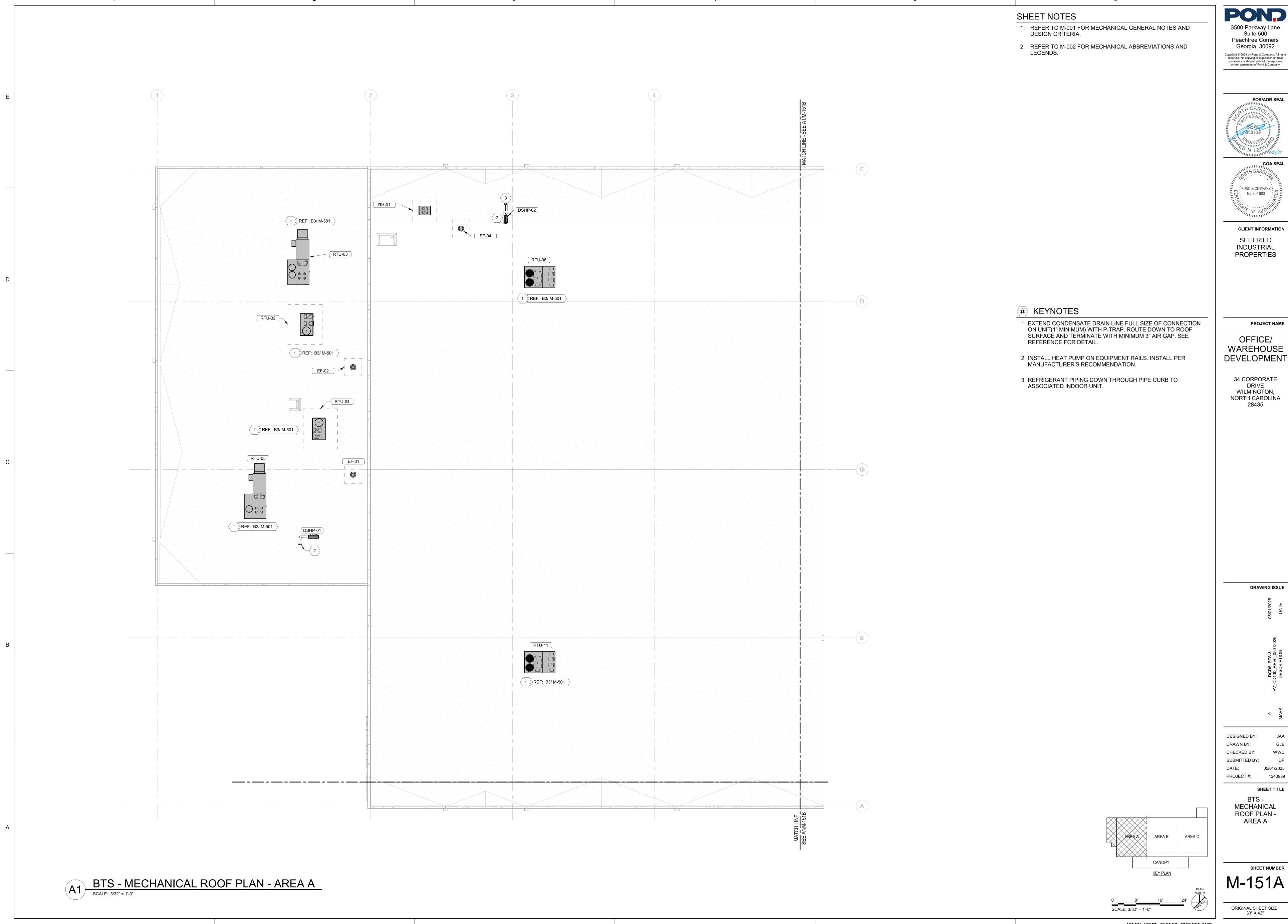
PROJECT NAME OFFICE/ WAREHOUSE

DEVELOPMENT 34 CORPORATE DRIVE WILMINGTON, NORTH CAROLINA

PROJECT #:

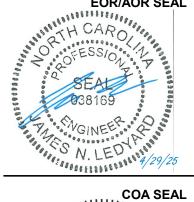
SHEET TITLE MECHANICAL ROOF PLAN -OVERALL

M-151



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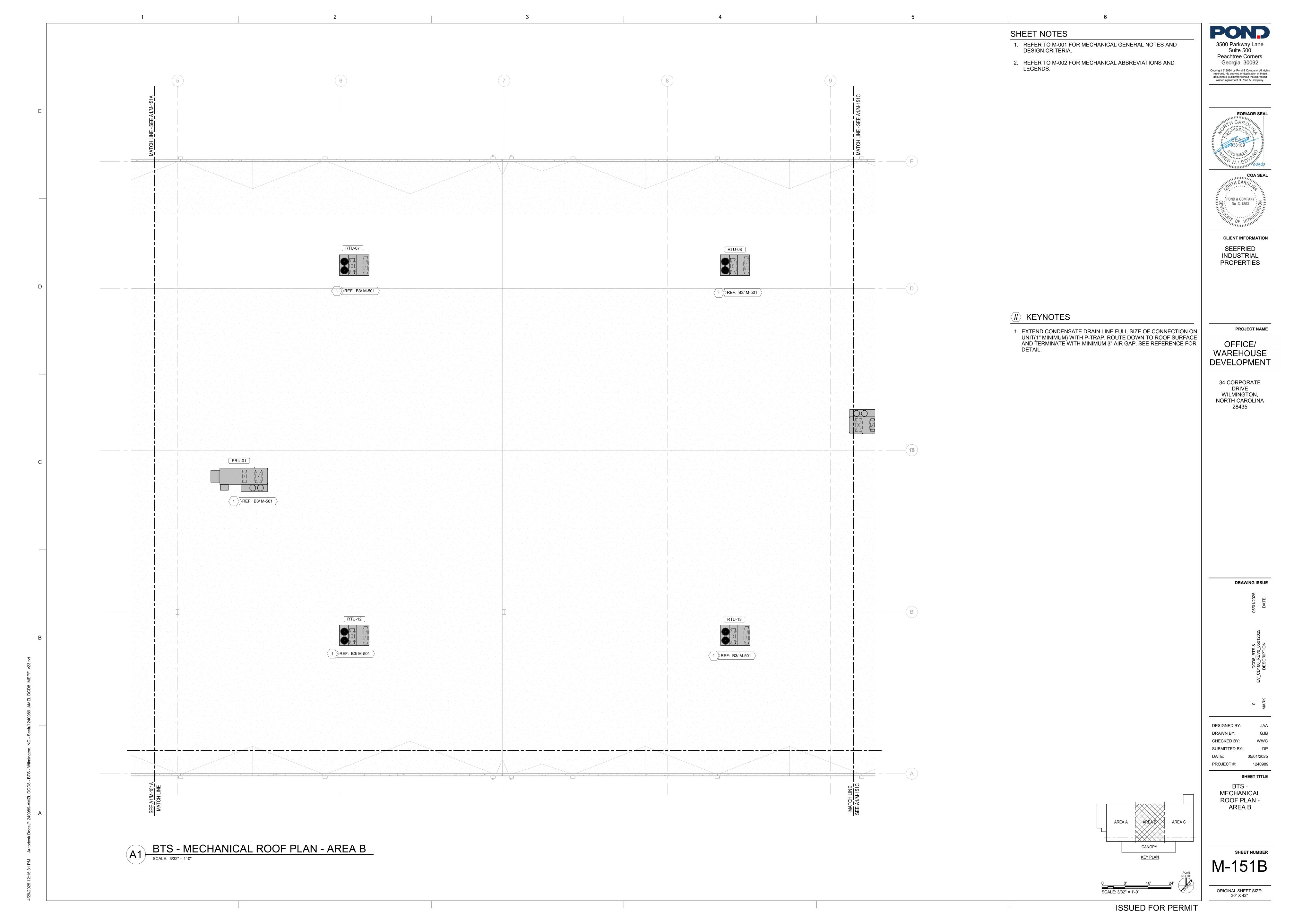
OFFICE/

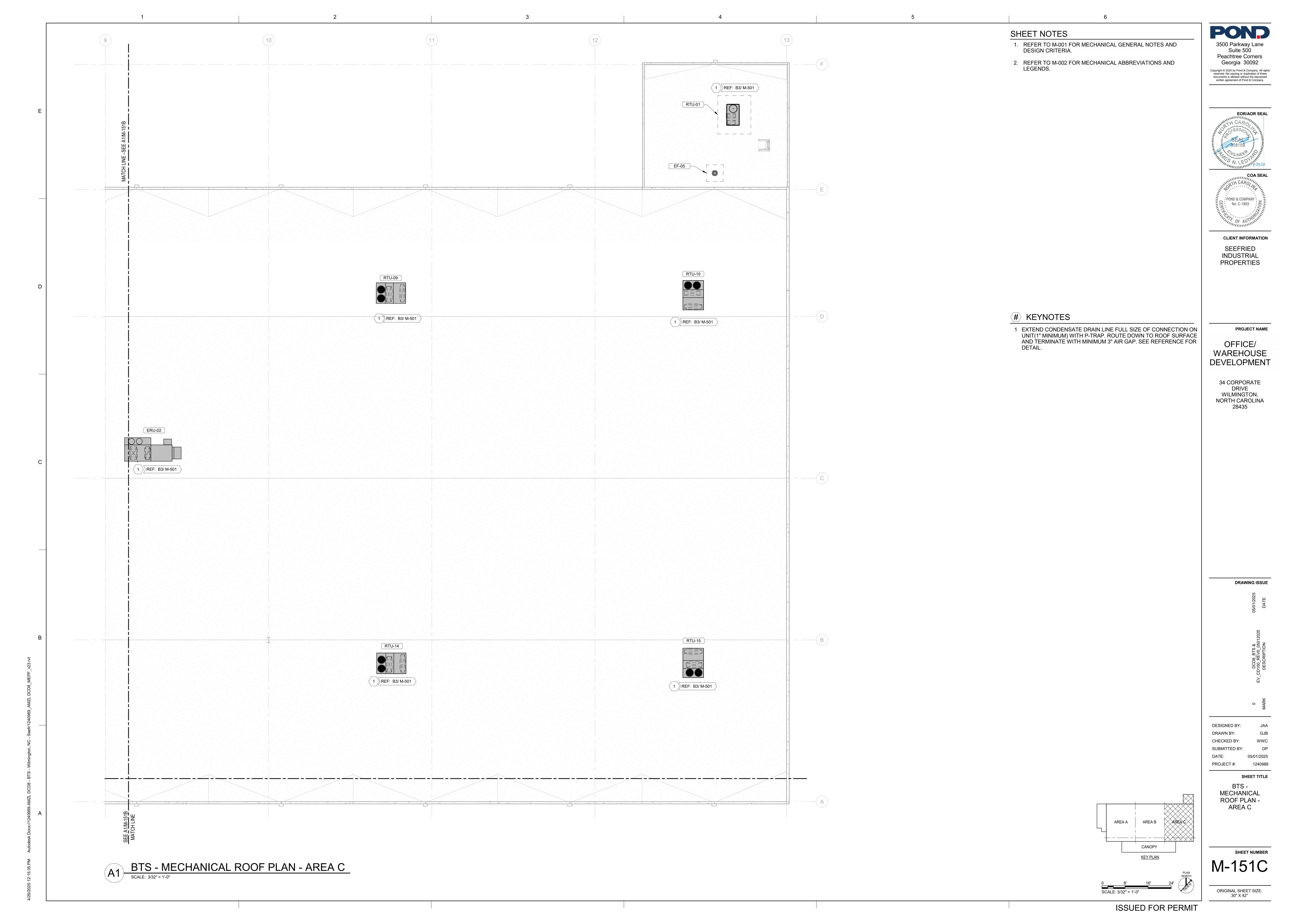
WAREHOUSE DEVELOPMENT

DRIVE WILMINGTON, NORTH CAROLINA 28435

SHEET TITLE

ORIGINAL SHEET SIZE: 30" X 42"

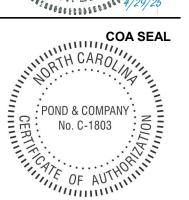




- 1. REFER TO M-001 FOR MECHANICAL GENERAL NOTES AND DESIGN CRITERIA.
- 2. REFER TO M-002 FOR MECHANICAL ABBREVIATIONS AND LEGENDS.

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CLIENT INFORMATION SEEFRIED INDUSTRIAL **PROPERTIES**

PROJECT NAME

OFFICE/ WAREHOUSE DEVELOPMENT

> 34 CORPORATE DRIVE WILMINGTON, NORTH CAROLINA 28435

EXTEND CONDENSATE DRAIN LINE FULL SIZE OF CONNECTION ON UNIT (3/4" MINIMUM). DISCHARGE TO NEARBY FLOOR DRAIN WITH MINIMUM 3" AIR GAP.

CONNECT EXHAUST DUCT TO MANUFACTURER'S ALUMINUM EXTERIOR WALL CAP. COORDINATE TERMINATION LOCATION WITH OTHER TRADES PRIOR TO ROUGH-IN.

KEYNOTES

- 1 COVER OPENING WITH 1/2" X 1/2" WIRE MESH.
- REFRIGERANT LINES UP THROUGH ROOF TO CORRESPONDING HEAT PUMP. REFRIGERANT LINES MUST BE INSULATED. PIPE OR PIPE INSULATION EXPOSED TO WEATHER MUST HAVE ALUMINUM JACKET.
- 3 EXTEND CONDENSATE DRAIN LINE FULL SIZE OF CONNECTION ON UNIT (3/4" MINIMUM). ROUTE PIPE DOWN INSIDE WALL AND THROUGH EXTERIOR WALL TO APPROXIMATELY 4" ABOVE EXTERIOR GRADE. TURN DOWN WITH 90 DEGREE ELBOW AND PROVIDE SPLASHBLOCK. PIPING INSIDE WALL MUST BE INSULATED.
- 4 TRANSITION TO FULL SIZE OF LOUVER.

- EXTEND CONDENSATE DRAIN LINE FULL SIZE OF CONNECTION ON UNIT(3/4" MINIMUM) TO CONDENSATE PUMP. ROUTE CONDENSATE DISCHARGE TO NEARBY FLOOR DRAIN WITH MINIMUM 3" AIR GAP. REFER TO PLUMBING DRAWINGS FOR EXACT FLOOR DRAIN LOCATION.
- 8 MOUNT BOTTOM OF HEATER AT LEAST 0'-8" A.F.F.

DRAWING ISSUE

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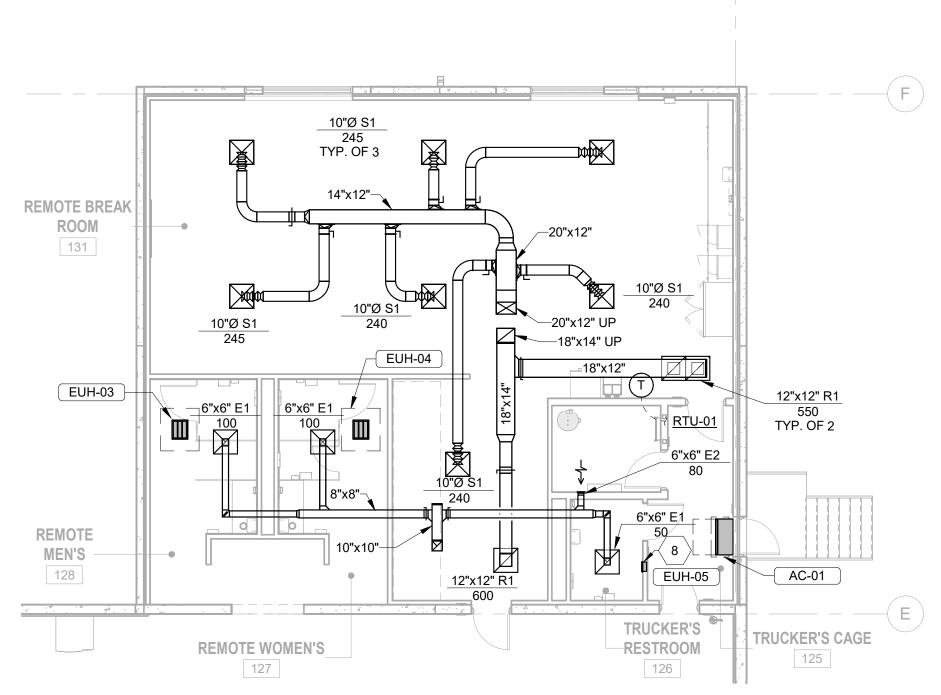
DESIGNED BY: DRAWN BY: CHECKED BY: SUBMITTED BY: DATE: PROJECT #:

SHEET TITLE

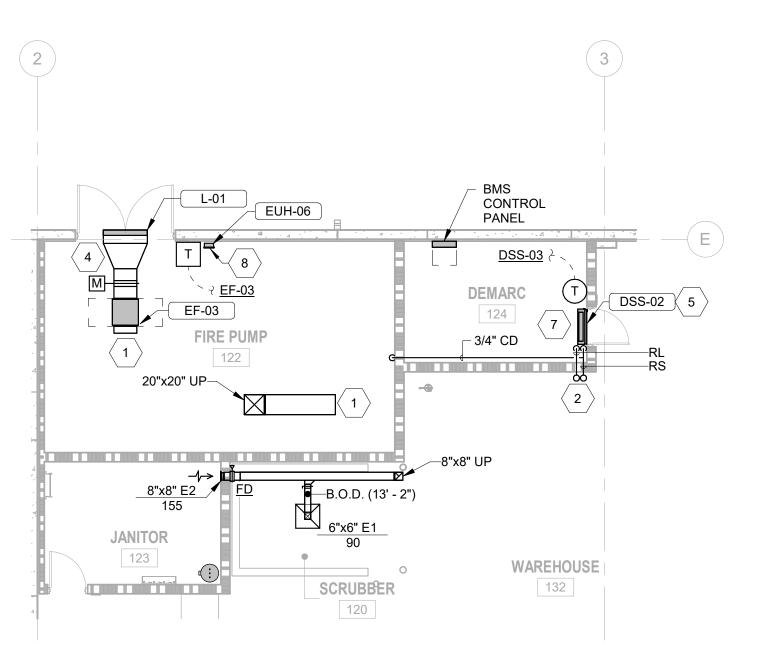
MECHANICAL ENLARGED PLANS

M-401

ORIGINAL SHEET SIZE: 30" X 42"



BTS - ENLARGED MECHANICAL PLAN - REMOTE OFFICE SCALE: 1/8" = 1'-0"



BTS - ENLARGED MECHANICAL PLAN - AREA A - UTILITIES

SCALE: 1/8" = 1'-0"

BTS - ENLARGED MECHANICAL PLAN - MAIN OFFICE AREA

SCALE: 1/8" = 1'-0"

MULTIFAITH

6"Ø S4

10"x10" UP 6"Ø S1

[—]12"x10" UP=

TYP. OF 2

MULTIFAITH

LOBBY

MULTIFAITH ABLUTION

MULTIFAITH - ABLUTION

10"x8" EA

10"x8" EA

6"x6" R1

ASSO CARE RM

LACTATION

ROOM

OFFICE A 114

OFFICE B

MEN'S RESTROOM

EUH-02

10"Ø S1

10"Ø S1

10"Ø S1 365

Man de la constant de

AMAZONE

WARM WELCOME

ASSOCIATE

ENTRY 101

TRAINING ROOM 118

10"x10" R1

10"Ø S1 265

20"x20"---

BREAKROOM

ASSOCIATE STORAGE JANITOR RM

26"x16"

12"Ø S1 415

6

20"x16"

CIRCULATION

WOMEN'S RESTROOM

TYP. OF 2

6"x6" E1

ELECTRICAL

ROUTE REFRIGERANT

LINES ALONG ROOF DECK

104

14"x14" R1 835 TYP. OF 2

12"Ø S1 420

12"Ø S1 415

12"Ø S1

24"x16"

32"x20"

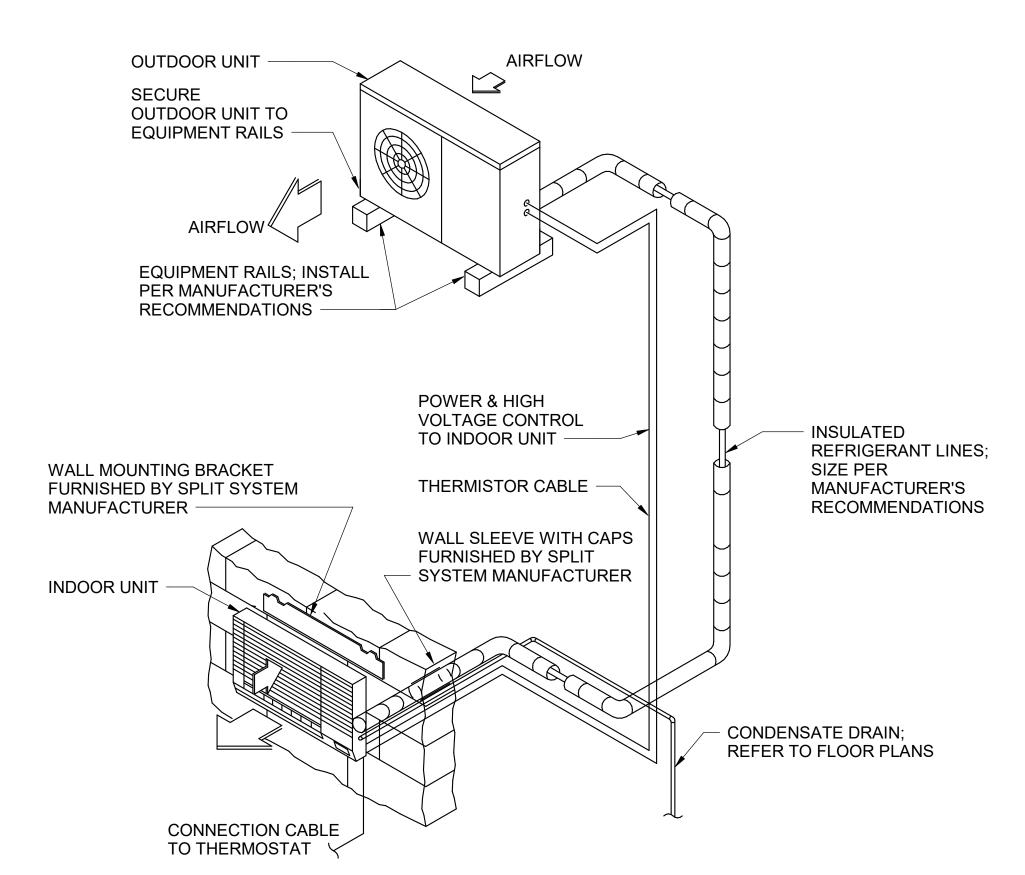
32"x20" UP---

10"x10" SA-/ 10"x8" RA-

8"x8" RA-

10"x8" SA⊸ ****

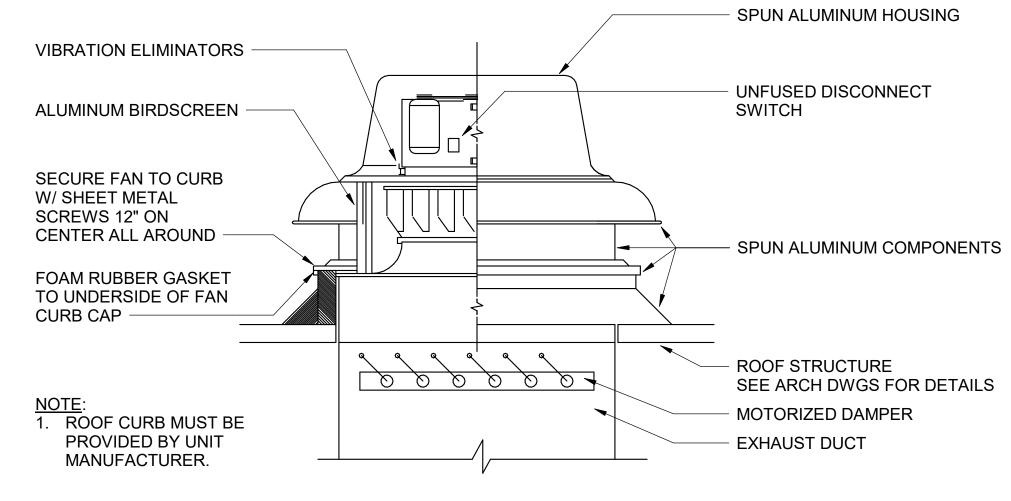
6"x6" EA



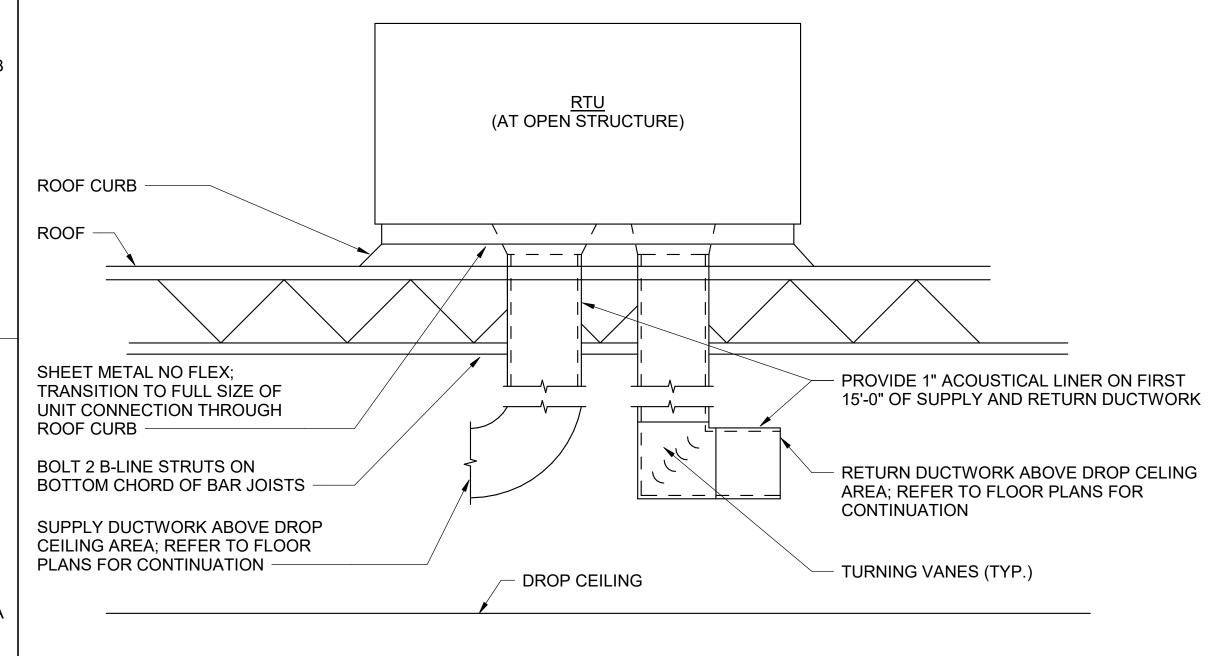
NOTE:

1. MOUNT UNIT AS SHOWN ON THE FLOOR PLANS. MAINTAIN MINIMUM CLEARANCES TO ADJACENT OBJECTS IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

D1 DUCTLESS SPLIT SYSTEM DETAIL SCALE: NOT TO SCALE



ROOF EXHAUST FAN DOWNBLAST DETAIL

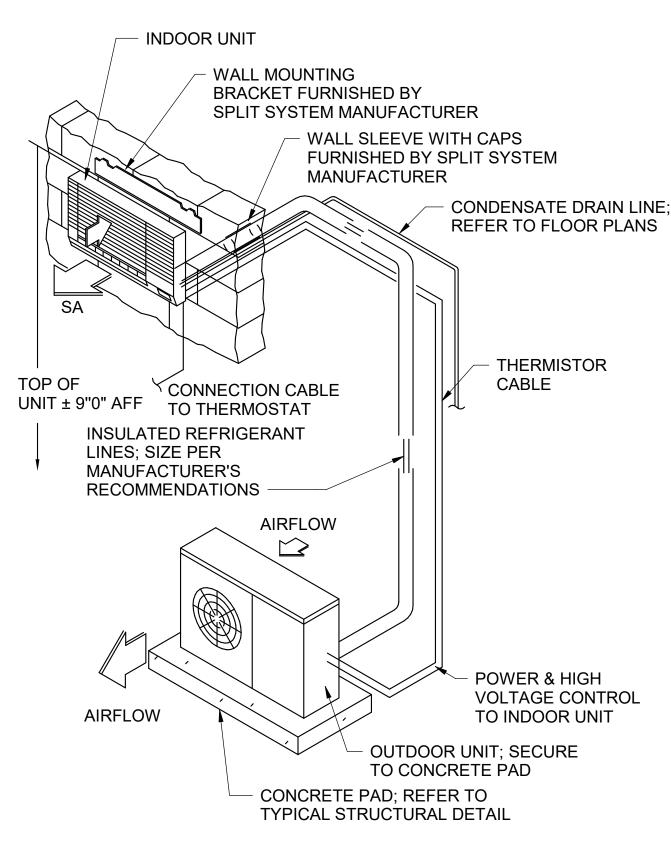


NOTES:

1. ROOF CURB MUST BE PROVIDED BY UNIT MANUFACTURER. INSTALL TOP OF CURB LEVEL. SET UNIT PLUMB AND LEVEL.

2. TRANSITION FROM FULL SIZE OF UNIT OPENING TO FULL SIZE OF DROP BOX INTAKE. INSTALL SUCH THAT DROP BOX IS CENTERED BETWEEN THE BAR JOISTS.

ROOF TOP UNIT, DROP CEILING DETAIL

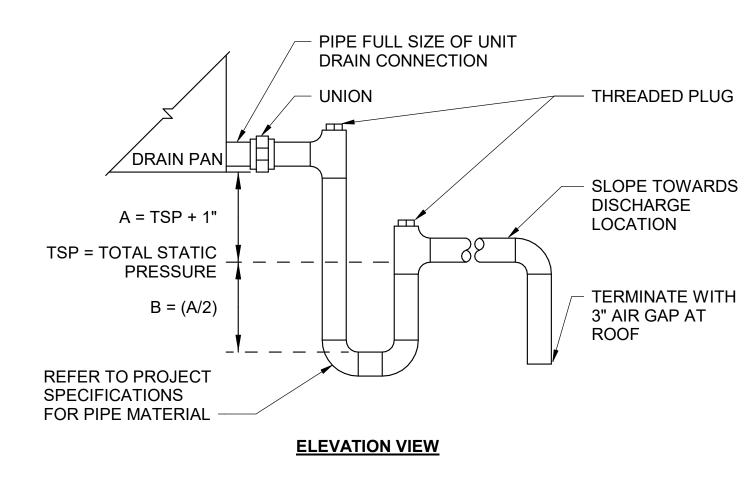


NOTES:
1. COORDINATE INDOOR UNIT LOCATION ON WALL WITH OTHER TRADES

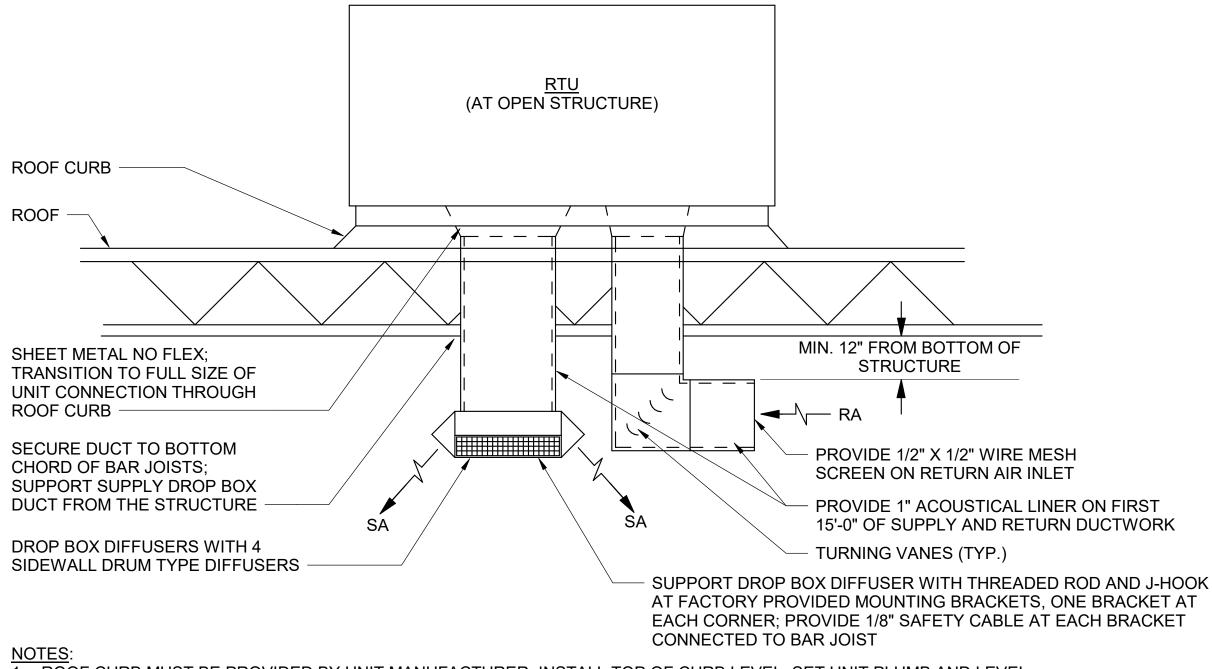
PRIOR TO INSTALLATION.

2. MAINTAIN MINIMUM REQUIRED SERVICE CLEARANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

(D3) WALL-MOUNTED DUCTLESS SPLIT SYSTEM DETAIL



CONDENSATE DRAIN (DRAW-THROUGH FAN) DETAIL



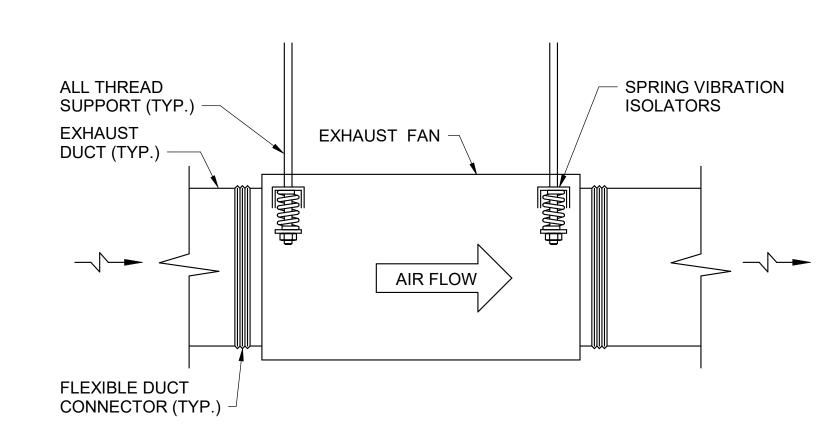
NOTES:

1. ROOF CURB MUST BE PROVIDED BY UNIT MANUFACTURER. INSTALL TOP OF CURB LEVEL. SET UNIT PLUMB AND LEVEL.

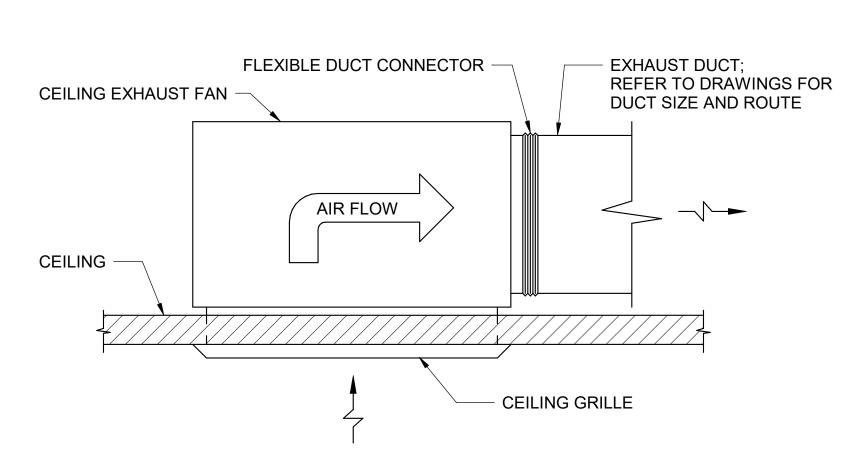
2. PROVIDE SMOKE DETECTOR WIRED TO SHUTDOWN UNIT WHEN ACTIVATED.

3. TRANSITION FROM FULL SIZE OF UNIT OPENING TO FULL SIZE OF DROP BOX INTAKE. INSTALL SUCH THAT DROP BOX IS CENTERED BETWEEN THE BAR JOISTS.

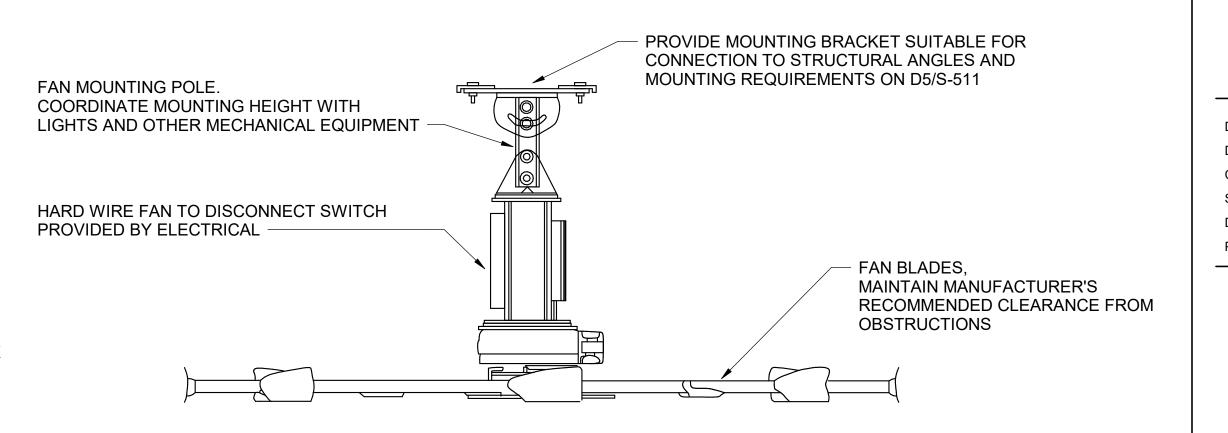
ROOF TOP UNIT, DROP BOX DIFFUSER OPEN STRUCTURE DETAIL NOT TO SCALE



C5 INLINE EXHAUST FAN DETAIL



CEILING EXHAUST FAN DETAIL



NOTES:

1. INSTALL PER MANUFACTURER'S INSTRUCTIONS.

2. MAINTAIN MINIMUM CLEARANCE FROM OBSTRUCTIONS IN ACCORDANCE V

2. MAINTAIN MINIMUM CLEARANCE FROM OBSTRUCTIONS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
3. COORDINATE FAN MOUNTING HEIGHT WITH LIGHTS, EQUIPMENT, AND OTHER SUSPENDED APPURTENANCES.

HIGH-VOLUME, LOW SPEED FAN DETAIL SCALE: N.T.S.

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CLIENT INFORMATION
SEEFRIED
INDUSTRIAL
PROPERTIES

PROJECT NAME

OFFICE/ WAREHOUSE DEVELOPMENT

34 CORPORATE DRIVE WILMINGTON, NORTH CAROLINA 28435

DRAWING ISSUE

FS & 05/01/20; 0_05012025 TION DATE

DCD8_BTS & EV_CD100_REV0_0501 DESCRIPTION

DESIGNED BY: JAA

DRAWN BY: GJB

CHECKED BY: WWC

SUBMITTED BY: DP

DATE: 05/01/2025

PROJECT #: 1240989

SHEET TITLE

MECHANICAL

DETAILS

DETAILS

SHEET NUMBER

M-501

HANGER ROD

PIPE; REFER TO

PIPE SADDLE

- INSULATION

END VIEW

STEEL TUBING

HANGER ROD

12" INTEGRAL WALL SLEEVE BY FIRE

ON 3 SIDES BETWEEN SLEEVE AND

DAMPER MANUFACTURER. SLEEVE MUST BE

STRUCTURE, SEAL EXPANSION CRACK WITH

FIRE RETARDANT NON-HARDENING MASTIC

WALL SLEEVE

WALL (THICKNESS,

CONSTRUCTION VARIES

SEE ARCHITECTURAL)

INSULATED

ACCESS DOOR

h.....5

FIRE DAMPER DETAIL

18 GA MIN. WITH 3/16" EXPANSION CRACK

DRAWINGS FOR SIZE

NOTE: FOR TRAPEZE HANGER, USE SPACING OF SMALLEST PIPE ON TRAPEZE.

TYPICAL PIPE SUPPORT DETAIL

HANGER ROD

PROVIDE

INSULATION SHIELD

BANDS FOR PIPING -

& INSERT WITHIN

MAXIMUM PIPE/TUBING SUPPORT SPACING (FEET)

NOMINAL PIPE/TUBE SIZE (IN.)

 \equiv

1. VERIFY FIRE PROTECTION RATING OF WALL IN WHICH FIRE DAMPER IS TO BE INSTALLED. COMPLY

WITH FIRE PROTECTION RATING OF FIRE DAMPER AS LISTED IN IMC 607.3.2.1

UP TO 3/4" 1" |1-1/4" |1-1/2" 2" |2-1/2" 3" | 4" | 5" | 6" | 8" | 10" |12" |14" |16" |18" | 20" | 24"

3/8" 3/8" 3/8" 3/8" 3/8" 1/2" 1/2" 5/8" 3/4" 3/4" 3/4" 7/8" 1" 1" 1" 1" 1-1/4" 1-1/4"

BAND (TYP.)

- 1-5/8" 12 GAGE

STRUT CHANNEL

OR 2" X 2" X 1/4"

RETAINING ANGLES

ALL FOUR (4) SIDES,

RETAINING ANGLES

CURTAIN TYPE OUT-OF-

THE-AIRSTREAM FIRE

DAMPER, UL 555

BREAKAWAY

JOINT (TYP)

EXTERNAL DUCT

INSULATION (TYP)

BY FIRE DAMPER

MANUFACTURER

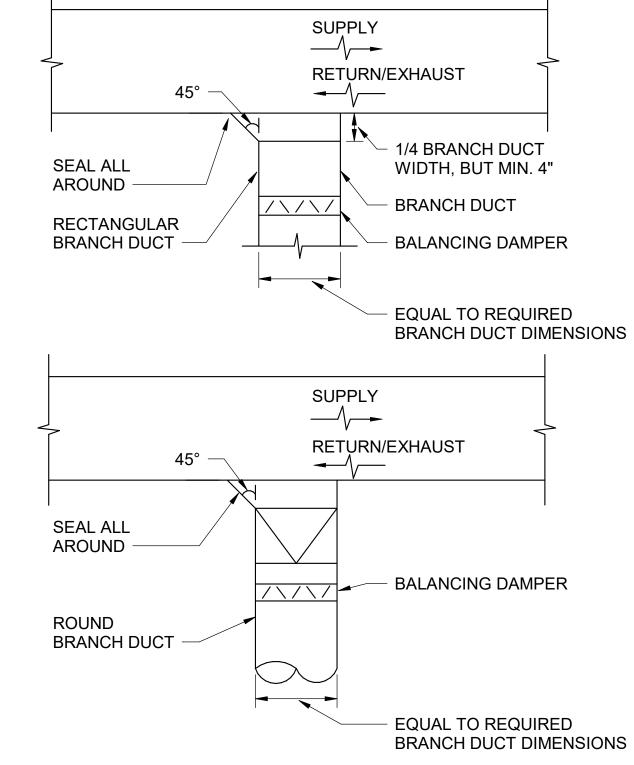
ANGLE

SIDE VIEW

LENGTH: 16" MIN. FURNISH AND INSTALL 16 GA. GALVINIZED BOX W/ REMOVABLE CAULK WITH SILICON AFTER LINES HAVE BEEN INSTALLED HEIGHT 16" MIN. ROOF CURB CAP; PRIME AND PAINT W/ TWO COATS ROOF CURB; FIELD VERIFY EXACT **INSTALLATION LOCATION**

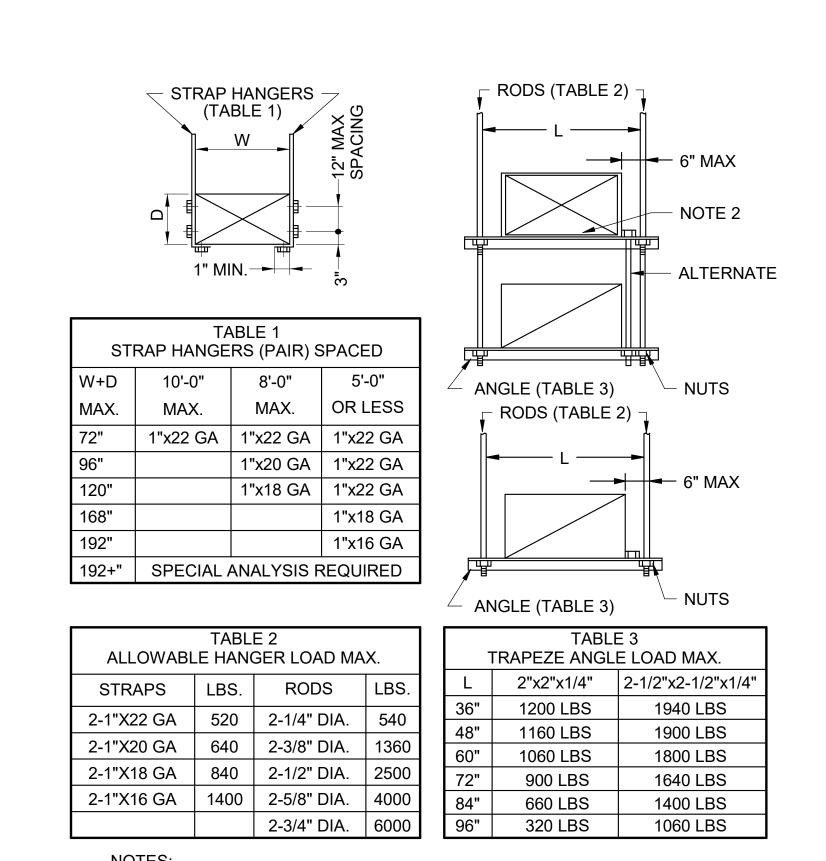
. FIELD VERIFY NUMBER OF REFRIGERANT LINE OPENINGS. 2. EXTEND BOX LENGTH AND WIDTH DIMENSIONS IN INCREMENTS OF 2" AS REQUIRED TO ACCOMMODATE THE NUMBER OF REFRIGERANT LINE OPENINGS.

REFRIGERANT PIPING CURB DETAIL SCALE: NOT TO SCALE



STANDARD BELLMOUTH FITTINGS (WITH RADIUS = DIAMETER / 5) MAY BE SUBSTITUTED FOR BRANCH FITTINGS.

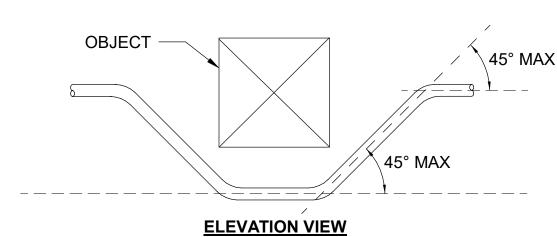
BRANCH DUCT CONNECTION DETAIL



NOTES:

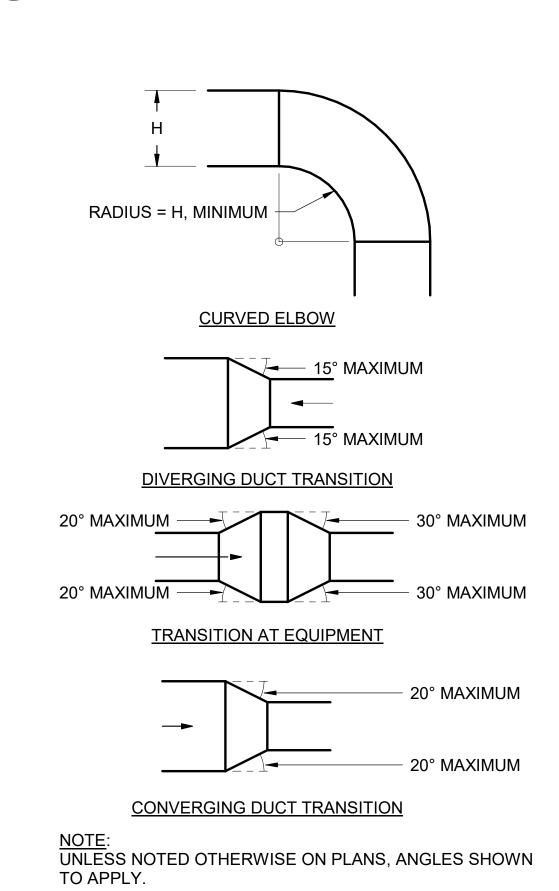
1. TABULATED DATA FROM SMACNA ALLOWS FOR DUCT REINFORCING AND INSULATION BUT NO EXTERNAL LOAD. 2. PROVIDE HIGH DENSITY INSERT AT TRAPEZE FOR INSULATED DUCTS.

RECTANGULAR DUCT HANGER DETAIL

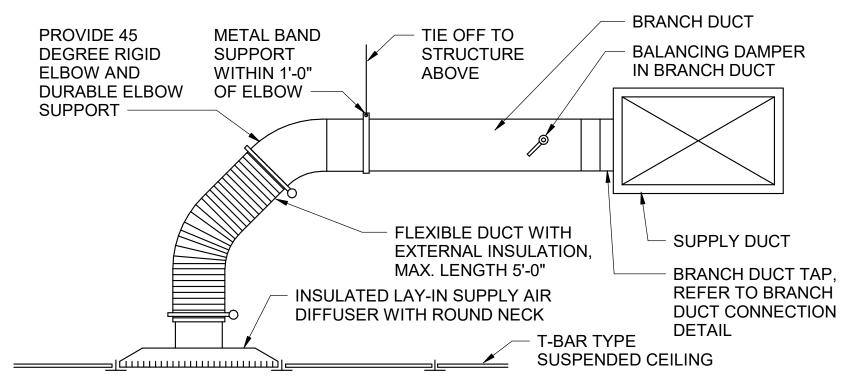


NOTE:
IN CASES WHERE PIPING/TUBING NEEDS TO DROP BELOW OBJECTS (BEAMS, DUCTS, CONDUITS, PIPES, ETC.), PIPING MUST HAVE LARGE RADIUS TURNS (NO MORE THAN 45 DEGREES PER FITTING) TO PREVENT TRAPPING OF LIQUID. THIS CASE MUST NOT BE USED FOR DRAINAGE SYSTEMS INCLUDING (BUT NOT LIMITED TO) CONDENSATE PIPING.

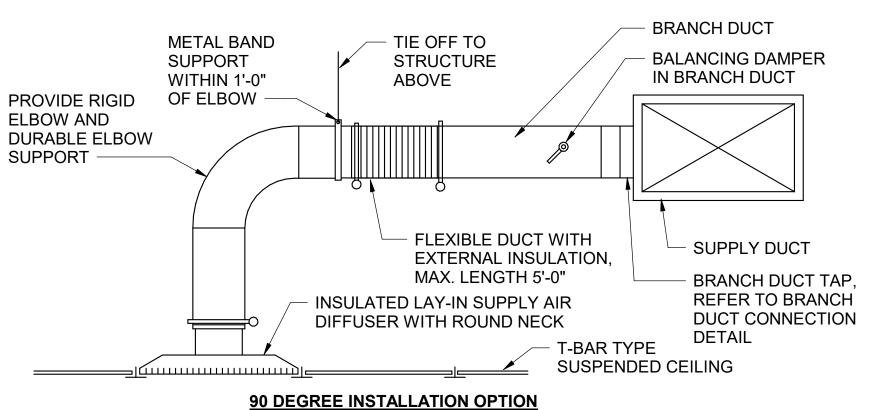
PIPING OFFSET BELOW OBJECT DETAIL SCALE: NOT TO SCALE



TYPICAL DUCT TRANSITION DETAIL



45 DEGREE INSTALLATION OPTION

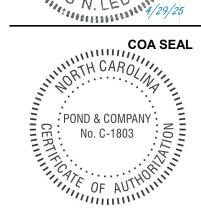


NECK SIZE OF DIFFUSER TO MATCH FLEXIBLE DUCT SIZE UNLESS NOTED OTHERWISE ON PLANS. COORDINATE DIFFUSER FRAME TYPE WITH CEILING. 3. FLEXIBLE RUN-OUT DUCT TO NOT EXCEED 5'-0" IN LENGTH AND ANGLE OF OFFSET TO NOT EXCEED 45 DEGREES.

FLEXIBLE DUCT CONNECTION DETAIL

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CLIENT INFORMATION SEEFRIED INDUSTRIAL **PROPERTIES**

PROJECT NAME

OFFICE/ WAREHOUSE **DEVELOPMEN**

34 CORPORATE DRIVE WILMINGTON, **NORTH CAROLINA** 28435

DRAWING ISSUE

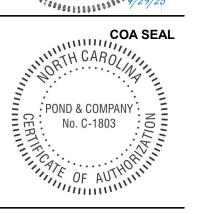
DESIGNED BY: DRAWN BY: CHECKED BY: SUBMITTED BY DATE: PROJECT #:

> **MECHANICAL DETAILS**

SHEET TITLE

SHEET NUMBER M-502





CLIENT INFORMATION SEEFRIED INDUSTRIAL **PROPERTIES**

PROJECT NAME

WAREHOUSE DEVELOPMENT

34 CORPORATE DRIVE WILMINGTON, NORTH CAROLINA 28435

DRAWING ISSUE

DESIGNED BY: DRAWN BY: CHECKED BY: SUBMITTED BY:

DATE: PROJECT #: 1240989 SHEET TITLE

MECHANICAL **DETAILS**

SHEET NUMBER M-503

ORIGINAL SHEET SIZE: 30" X 42"

FASTENER* 25 LB 24, 22, 20 35 LB 50 LB **FASTENER** * WELD, BOLT, OR NO. 8 SCREW (MIN.) DEVIATION PERMITTED BY OTHER ANALYSIS. X=1", Y=2"; ADD OTHER TO ACCOMMODATE LOAD. MINIMUM OF 3 ON 24" WIDTH AND UP. ADD ALONG SIDES NEAREST ANCHORS. SUPPLEMENTAL ANCHORS -FASTENER LOCATIONS -FIGURE A - ANCHORS SEE KNEE BRACKET TABLES IN THE SMACNA ROUND INDUSTRIAL STANDARDS. FIG. B - SUGGESTED SIZING <u>DUCT SIZE</u> 30" x 12" <u>ANGLE</u> 1" x 1" x 1/8"

FIG. A - SUGGESTED SIZING

<u>BAND</u> 1 -1/2" x 16" GA

ALLOWABLE LOAD PER

1" x 1" x 1/8"

1-1/4" x 1-1/4" x 1/8"

1" x 1/8"

<u>DUCT SIZE</u> 18" x 12"

24" x 20"

36" x 18"

42" x 24"

INTEGRAL WALL SLEEVE BY FIRE DAMPER - RETAINING ANGLES ALL MANUFACTURER, SLEEVE FOUR SIDES; RETAINING MUST BE 18 GA MIN. WITH 3/16" ANGLES BY FIRE DAMPER **EXPANSION CRACK ON THREE** MANUFACTURER SIDES BETWEEN SLEEVE AND STRUCTURE; SEAL EXPANSION FIRE DAMPER, CURTAIN JOINT WITH FIRE RETARDANT TYPE OUT OF THE AIR NON-HARDENING MASTIC -STREAM REMOVABLE — DUCT WALL GRILLE BREAKAWAY JOINT (TYP)

NOTES:
1. REFER TO PROJECT SPECIFICATIONS FOR F-RATING, T-RATING, AND L-RATING OF FIRE-RATED PACKING MATERIAL.

- 2. WHERE PIPE THROUGH-PENETRATION ENTERS A FINISHED SPACE, PROVIDE AN
- ESCUTCHEON COVERING THE ENTIRETY OF THE APPLIED FIRE CAULK. 3. INSULATION MUST MEET FIRESTOPPING REQUIREMENTS IN ACCORDANCE WITH PROJECT
- SPECIFICATIONS. WHERE INSULATION DOES NOT MEET FIRESTOPPING REQUIREMENTS, REPLACE INSULATION WITH A MATERIAL HAVING EQUAL THERMAL INSULATING AND

FIRE DAMPER AT WALL GRILLE DETAIL

NOTES:

1. FIRE DAMPER RATING TO MEET OR EXCEED THE FIRE-RATING OF THE BARRIER IN WHICH IT

RECTANGULAR DUCT SUPPORT FROM WALL DETAIL

A. TENSILE LOAD = 3/8 x DUCT WEIGHT; SAFETY FACTOR 4.

B. SHEAR LOAD x 1/2 x DUCT WEIGHT; SAFETY FACTOR 4.

ANCHORS —

1. BRACKETS ARE SIZED FOR 12 FEET OF DUCT MAXIMUM.

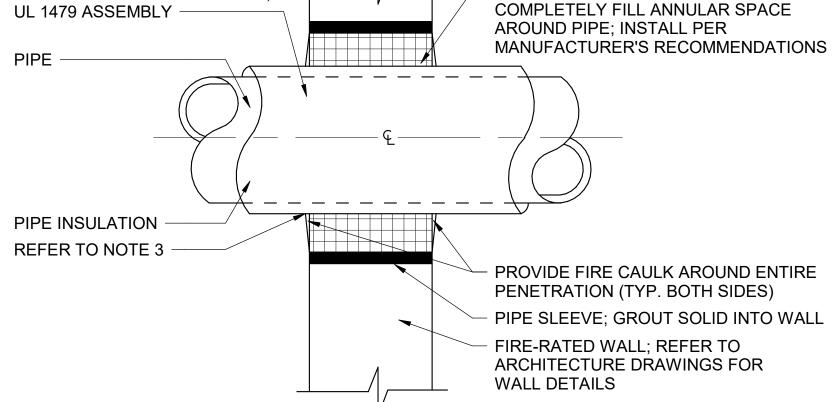
2. LOCATE DUCTS AGAINST WALL OR MAXIMUM OF 2" AWAY FROM WALL.

FIGURE B

3. EACH WALL ANCHOR TO SATISFY THE FOLLOWING CRITERIA UNLESS OTHER ANALYSIS IS MADE:

(DETAIL FROM SMACNA HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE, 3RD EDITION)

ISSUED FOR PERMIT



FIRE-RATED PACKING MUST

PIPE THROUGH-PENETRATION;

SCALE: NOT TO SCALE

FIRESTOPPING CHARACTERISTICS. PIPE WITH INSULATION THROUGH FIRE-RATED ASSEMBLY DETAIL

SUPPLEMENTAL

FASTENER LOCATIONS -

NOTES:

2. ACCESS TO FIRE DAMPER FOR INSPECTION AND MAINTENANCE MUST BE THROUGH THE

WALL GRILLE.

BTS - ENERGY RECOVERY	UNIT D	X COOLING AND EL	ECTRIC.	HEA	TINO	G SCH	IEDULE	(PAR	T 2)

																			`								
		Г	DX COOI	ING CO	II DATA			Н	EAT PUMP	DATA				HOT GAS	REHEAT DATA	COIL	SUPPLEM	ENTAL ELEC COIL DA	CTRIC HEATING		ERS	TOT EFFECTIV			ELECTRICA	AL DATA	
		PACITY					FACE	TOTAL	DESIGN					TOTAL				DESIGN		OUTSIDE	RETURN			UNIT			
	TOTAL	SENSIBLE	EAT	EAT	LAT							REFRIGERANT		CAPACITY		LAT			TEMPERATURE			SUMMER	WINTER			NO. OF	
ID	(BIUH)	(BTUH)	(db °F)	(wb °F)	(db °F)	(wb °F)	(FPM)	(BTUH)	(CFM)	(db °F)	(db °F)	TYPE	(@ AHRI)	(BTUH)	(db °F)	(db °F)	(KW)	(CFM)	RISE (db °F)	(MERV)	(MERV)	(%)	(%)	(LBS)	VOLTAGE	POLES	REMARKS
ERU-01	301600	144200	85.6	76.1	63.4	63.3	288	152500	6500	54.6	70.9	R-454B	6.9	172200	65	85	50.0	6500	24.0	8	8	55.9	65.45	5477	480	3	ALL
ERU-02	301600	144200	85.6	76.1	63.4	63.3	288	152500	6500	54.6	70.9	R-454B	6.9	172200	65	85	50.0	6500	24.0	8	8	55.9	65.45	5477	480	3	ALL

PROVIDE MANUFACTURER'S MOTOR CONTROLLERS: SUPPLY FAN, EXHAUST FAN. PROVIDE SUPPLY FAN AND EXHAUST FAN VFD FACTORY-MOUNTED TO UNIT

- PROVIDE MANUFACTURER'S DISCONNECT. SINGLE POINT POWER.
- PROVIDE NEMA PREMIUM EFFICIENCY MOTORS.
- PROVIDE MODULATING SILICON-CONTROLLED RECTIFIER (SCR).
- PROVIDE VIBRATION ISOLATION FOR FAN SECTIONS. PROVIDE INTEGRAL BASE RAIL FRAME, MINIMUM 4 INCH HEIGHT.
- PROVIDE STAINLESS STEEL COIL DRAIN PAN IN COMPLIANCE WITH ASHRAE 62.1
- 9. PROVIDE DUCT CONNECTION AND SERVICE ACCESS AS SHOWN ON THE FLOOR PLANS.
- 10. UNIT CASING MUST BE DOUBLE WALL WITH INTERNAL INSULATION AND SOLID INNER WALL. 11. PROVIDE BUILDING MANAGEMENT SYSTEM (BMS) INTERFACE: MONITORING AND CONTROLS. REFER TO M-701 FOR ASSOCIATED PROJECT SPECIFICATIONS.
- 12. PROVIDE FACTORY-APPLIED ANTI-CORROSION COATING ON EVAPORATOR, HOT-GAS REHEAT, AND CONDENSER COILS FOR SEACOAST ENVIRONMENT.
- 13. PROVIDE MANUFACTURER'S 24 INCH ROOF CURB.
- 14. UNIT MUST BE HIGH-WIND RATED. 15. PROVIDE CONVENIENCE OUTLET WIRED AHEAD OF DISCONNECT.

																MODULAT	TING HOT GA	AS REHEA	AT COIL						SUPPLEM	MENTAL ELEC	CTRIC HEATING					
		BASIS C	F DESIGN		SUPF	PLY AIR		OUTSIDE AIR	2	DX C	OOLING	COIL DATA					DATA	١			H	IEAT PUMF	DATA			COIL DA	TA	FILTER		ELECTRIC	AL DATA	
				MAX AIRFLOW	MIN AIRFLOW	1	SP POWER	l		PACITY SENSIBLE	E EAT	EAT LA	LAT	REFRIGERANT	Γ EER (@	TOTAL CAPACITY	MOISTURE REMOVAL		LAT	COP (@	TOTAL CAPACITY	DESIGN AIRFLOW		LAT	CAPACITY	DESIGN AIRFLOW	TEMPERATURE	EFF	UNIT WEIGHT	-	NO. OF	:
ID	SERVES	MANUFACTURER	MODEL NO.	(CFM)	(CFM)	FANS W		(CFM)	(BTUH)	(BTUH)	(db °F)		F) (wb °F		AHRI)	(BTUH)	(GPH)	(db °F)	(db °F)	47°F)	(BTUH)	(CFM)	(db °F)	(db °F)	(KW)	(CFM)	RISE (db °F)	(MERV)	(LBS)	VOLTAGE		
RTU-01	REMOTE BREAK ROOM	TRANE	WHK060	1700	900	1 0.	50 3	355	59680	43530	80.0	67.2 55.5	5 55.4	R-454B	13.5	45530	2.45	73.0	51.4	3.8	56360	1700	51.3	87.0	6	1700	10.9	13	995	480	3	1,3-19
RTU-02	OFFICES	TRANE	WHK036	900	410	1 0.	50 3	155	34930	24230	80.0	67.2 54.	54.0	R-454B	13.5	26360	1.55	73.0	49.7	3.8	34490	900	52.1	93.4	6	900	20.6	13	990	480	3	1,3-14,16-
RTU-04	ENTRYWAY	TRANE	WHK036	1145	630	1 0.	50 3	160	35870	27760	79.0	66.3 55.8	3 55.7	R-454B	13.5	28310	1.46	73.0	52.5	3.8	33750	1145	57.6	89.4	6	1145	16.3	13	990	480	3	2-14,16-1
RTU-06	WAREHOUSE	TRANE	WHK210	7185	2155	2 0.	75 3	0	236690	148780	85.0	74.0 65.0	64.7	R-454B	11.3	87640	8.12	73.0	64.3	3.6	201170	7185	50.1	80.2	36	7185	15.9	8	2323	480	3	2-14,16-18
RTU-07	WAREHOUSE	TRANE	WHK210	7185	2155	2 0.	75 3	0	236690	148780	85.0	74.0 65.0	64.7	R-454B	11.3	87640	8.12	73.0	64.3	3.6	201170	7185	50.1	80.2	36	7185	15.9	8	2323	480	3	2-14,16-18
RTU-08	WAREHOUSE	TRANE	WHK210	7185	2155	2 0.	75 3	0	236690	148780	85.0	74.0 65.0	64.7	R-454B	11.3	87640	8.12	73.0	64.3	3.6	201170	7185	50.1	80.2	36	7185	15.9	8	2323	480	3	2-14,16-18
RTU-09	WAREHOUSE	TRANE	WHK210	7185	2155	2 0.	75 3	0	236690	148780	85.0	74.0 65.0	64.7	R-454B	11.3	87640	8.12	73.0	64.3	3.6	201170	7185	50.1	80.2	36	7185	15.9	8	2323	480	3	2-14,16-18
RTU-10	WAREHOUSE	TRANE	WHK210	7185	2155	2 0.	75 3	0	236690	148780	85.0	74.0 65.0	64.7	R-454B	11.3	87640	8.12	73.0	64.3	3.6	201170	7185	50.1	80.2	36	7185	15.9	8	2323	480	3	2-14,16-18
RTU-11	WAREHOUSE	TRANE	WHK210	7185	2155	2 0.	75 3	0	236690	148780	85.0	74.0 65.0	64.7	R-454B	11.3	87640	8.12	73.0	64.3	3.6	201170	7185	50.1	80.2	36	7185	15.9	8	2323	480	3	2-14,16-18
RTU-12	WAREHOUSE	TRANE	WHK210	7185	2155	2 0.	75 3	0	236690	148780	85.0	74.0 65.0	64.7	R-454B	11.3	87640	8.12	73.0	64.3	3.6	201170	7185	50.1	80.2	36	7185	15.9	8	2323	480	3	2-14,16-18
RTU-13	WAREHOUSE	TRANE	WHK210	7185	2155	2 0.	75 3	0	236690	148780	85.0	74.0 65.0	64.7	R-454B	11.3	87640	8.12	73.0	64.3	3.6	201170	7185	50.1	80.2	36	7185	15.9	8	2323	480	3	2-14,16-18
RTU-14	WAREHOUSE	TRANE	WHK210	7185	2155	2 0.	75 3	0	236690	148780	85.0	74.0 65.0	64.7	R-454B	11.3	87640	8.12	73.0	64.3	3.6	201170	7185	50.1	80.2	36	7185	15.9	8	2323	480	3	2-14,16-18
RTU-15	WAREHOUSE	TRANE	WHK210	7185	2155	2 0	75 3	0	236690	148780	85.0	74.0 65.0	64.7	R-454B	11.3	87640	8.12	73.0	64.3	3.6	201170	7185	50.1	80.2	36	7185	15.9	8	2323	480	3	2-14.16-18

- PROVIDE SUPPLY FAN VFD FACTORY-MOUNTED TO UNIT. PROVIDE MANUFACTURER'S MOTOR CONTROLLER WITH STAGED FAN MOTORS.
- PROVIDE MANUFACTURER'S DISCONNECT AND UNPOWERED CONVENIENCE OUTLET
- . SINGLE POINT POWER.
- SINGLE ZONE, VARIABLE AIR VOLUME CONFIGURATION. . PROVIDE VIBRATION ISOLATION FOR FAN SECTION.
- PROVIDE 24 V WALL-MOUNTED COMBINATION TEMPERATURE HUMIDITY SENSOR. REFER TO FLOOR PLANS FOR INSTALLATION LOCATION. PROVIDE INTEGRAL BASE RAIL FRAME, MINIMUM 4 INCH HEIGHT.
- 9. PROVIDE STAINLESS STEEL COIL DRAIN PAN IN COMPLIANCE WITH ASHRAE 62.1.
- 10. PROVIDE DUCT CONNECTIONS AND SERVICE ACCESS AS SHOWN ON THE FLOOR PLANS.
- 11. UNIT CASING MUST BE SINGLE WALL WITH INTERNAL INSULATION AND SOLID INNER WALL 12. PROVIDE BUILDING MANAGEMENT SYSTEM (BMS) INTERFACE: MONITORING AND CONTROLS. REFER TO M-701 FOR ASSOCIATED PROJECT SPECIFICATIONS.
- 13. PROVIDE FACTORY-APPLIED ANTI-CORROSION COATING ON EVAPORATOR, CONDENSER, AND HOT GAS REHEAT COILS FOR SEACOAST ENVIRONMENT. 14. PROVIDE MIXING BOX SECTION WITH INTEGRAL RETURN AIR AND OUTSIDE AIR DAMPERS.
- 15. PROVIDE AIRSIDE ECONOMIZER SECTION (AND INTEGRAL RETURN AIR AND OUTSIDE AIR DAMPERS) WITH BAROMETRIC RELIEF AIR DAMPER AND DIFFERENTIAL ENTHALPY CONTROLS WITH FIXED DRY BULB. 16. PROVIDE MINIMUM 2 STAGE ELECTRIC HEATER CONTROL.
- 17. PROVIDE 24 INCH ROOF CURB.
- 18. PROVIDE AIRFLOW MEASURING STATION ON OUTSIDE AIR INLET. 19. UNIT MUST BE HIGH-WIND RATED.

BTS - ROOFTOP ENERGY RECOVERY UNIT DX COOLING AND HEAT PUMP HEATING SCHEDULE (PART 1)

	SERVES	BASIS	OF DESIGN						SUPPLY FA	AN				EXHAUST F	AN		SUN	MMER DESIGN RECOVER		WINTER DESIGNATION RECOV		
					HEAT	MAX	MIN	RETURN	UPPER MINIMUM	LOWER MINIMUM	ESP	POWER	EXHAUST	EXHAUST	F	SP POWE	R OUT	SIDE AIR (°F)	EXHAUST (°F)	OUTSIDE AIR (°I	EXHAUS (°F)	T
10	NANAT	NO MANUEACTURED	MODELNO	TVDE		AIRFLOW	AIRFLOW	/ AIRFLOW		OUTSIDE	# OF (IN.	EACH	AIRFLOW	AIRFLOW	# OF (N. EAC	H EAT	EAT LAT LAT		EAT EAT LAT L	AT EAT EA	
RTU-0	NAME 3 ROOF	NO. MANUFACTURER N/A VALENT	MODEL NO. VXC-112-PL-15A-1-G2	TYPE ROOFTOP	ENERGY CORE	(CFM) 5500	(CFM) 2750	(CFM) 4405	1095	235	1 0.75	\ /	MINIMUM (CFM) 235	(CFM) 1095	FANS W	()	(4.5)	, , , , ,	` ' ' '	(db) (wb) (db) (v 15.0 11.8 54.0 4	wb) (db) (wb 2.6 65.0 50.	
RTU-0	5 ROOF	N/A VALENT	VXC-112-PL-7A-1-G2	ROOFTOP	ENERGY CORE	2500	1250	1250	1250	625	1 0.75	1.50	625	1250	1 0	25 1.00	86.9	78.9 81.5 71.3	80.0 66.5	15.0 11.8 53.3 4	2.2 65.0 50.	4

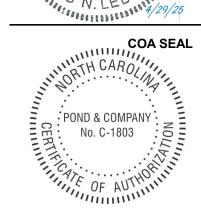
BTS - ROOFTOP ENERGY RECOVERY UNIT DX COOLING AND HEAT PUMP SCHEDULE (PART 2)

														HOT GAS	REHEAT (COIL							TOT	AL				
			DX COOI	LING CC	OIL DATA			H	IEAT PUMP	P DATA					DATA		ELECTRI	C HEATING	G COIL [DATA	FILT	ERS	EFFECTI\	VENESS		ELECTRICA	L DATA	
	CAP	PACITY					FACE	TOTAL	DESIGN					TOTAL				DESIGN			OUTSIDE	RETURN			UNIT			
	TOTAL	SENSIBLE	EAT	EAT	LAT	LAT	VELOCITY	CAPACITY	AIRFLOW	/ EAT	LAT	REFRIGERANT		CAPACITY	EAT	LAT	CAPACITY	AIRFLOW	EAT	LAT	AIR EFF	AIR EFF	SUMMER	WINTER	WEIGHT		NO. OF	
ID	(BTUH)	(BTUH)	(db °F)	(wb °F))	(wb °F)	(FPM)	(BTUH)	(CFM)	(db °F)	(db °F)	TYPE	IEER (@ AHRI)	(BTUH)	(db °F)	(db °F)	(KW)	(CFM)	(db °F)	(db °F)	(MERV)	(MERV)	(%)	(%)	(LBS)	VOLTAGE	POLES	REMARKS
RTU-03	195100	136200	80.3	67.5	55.8	55.8	414	118700	5500	62.8	84.0	R-454B	18.3	125000	55.8	77.8	34.8	5500	84.0	92.6	13	8	65.544	75.22	3999	480	3	ALL
RTII_05	92400	50/100	80.7	60.0	57.2	57.2	202	50500	2500	50.2	70 N	R-454B	20	60600	58.5	80 S	15.0	2500	70 N	08 N	13	ρ	64 235	73 08	3806	480	3	ΔΙΙ

- 1. PROVIDE MANUFACTURER'S MOTOR CONTROLLERS: SUPPLY FAN, EXHAUST FAN. PROVIDE SUPPLY FAN AND EXHAUST FAN VFD FACTORY-MOUNTED TO UNIT.
- PROVIDE MANUFACTURER'S DISCONNECT.
- 3. SINGLE POINT POWER. 4. SINGLE ZONE, VARIABLE AIR VOLUME CONFIGURATION.
- PROVIDE NEMA PREMIUM EFFICIENCY MOTORS.
- 6. PROVIDE MODULATING SILICON-CONTROLLED RECTIFIER (SCR). 7. PROVIDE VIBRATION ISOLATION FOR FAN SECTIONS.
- 8. PROVIDE INTEGRAL BASE RAIL FRAME, MINIMUM 4 INCH HEIGHT. 9. PROVIDE STAINLESS STEEL COIL DRAIN PAN IN COMPLIANCE WITH ASHRAE 62.1.
- 10. PROVIDE DUCT CONNECTION AND SERVICE ACCESS AS SHOWN ON THE FLOOR PLANS.
- 11. UNIT CASING MUST BE DOUBLE WALL WITH INTERNAL INSULATION AND SOLID INNER WALL.
- 12. PROVIDE BUILDING MANAGEMENT SYSTEM (BMS) INTERFACE: MONITORING AND CONTROLS. REFER TO M-701 FOR ASSOCIATED PROJECT SPECIFICATIONS. 13. PROVIDE FACTORY-APPLIED ANTI-CORROSION COATING ON EVAPORATOR, HOT-GAS REHEAT, AND CONDENSER COILS FOR SEACOAST ENVIRONMENT.
- 14. PROVIDE MANUFACTURER'S 22 INCH ROOF CURB.
- 15. UNIT MUST BE HIGH-WIND RATED.
- 16. PROVIDE CONVENIENCE OUTLET WIRED AHEAD OF DISCONNECT.
- 17. PROVIDE MANUFACTURER'S ENERGY RECOVERY DEVICE BYPASS DAMPER SECTION.
- 18. PROVIDE DEMAND CONTROL VENTILATION. PROVIDE WALL-MOUNTED CO2 SENSOR AS INDICATED ON FLOOR PLANS. PROVIDE FACTORY-MOUNTED CO2 SENSOR ON OUTSIDE AIR INLET.
- 19. PROVIDE AIRFLOW MEASURING STATION ON OUTSIDE AIR INLET.

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CLIENT INFORMATION SEEFRIED **INDUSTRIAL PROPERTIES**

PROJECT NAME WAREHOUSE **DEVELOPMEN**

> 34 CORPORATE DRIVE WILMINGTON, NORTH CAROLINA

DRAWING ISSUE

DESIGNED BY: CHECKED BY:

PROJECT #: SHEET TITLE

MECHANICAL SCHEDULES

SHEET NUMBER M-601

						סום	- DUC	, I LLOC	OI LII		Olvii SC		OLL									
	LOCATION		BASIS	OF DESIGN		INDOOR UNIT DAT	ГА					OUTDO	OOR UN	IIT DATA						ELECTRICA	AL DATA	
								FAN			COOLING D	ATA		HEA	ATING DATA		UNIT			1		
				MODEL NO. (INDOOR/	MOUNTING	REFRIGERANT	MAX	POWER		NOMINAL	MINIMUM	EAT	EAT	NOMINAL	MINIMUM	EAT	WEIGHT	EER2 (@	COP (@		NO. OF	
D	NAME	NO.	MANUFACTURER	OUTDOOR)	TYPE	TYPE	CFM	(W)	ID	(BTUH)	(BTUH)	(db °F)	(wb °F)	(BTUH)	(BTUH)	(db °F)	(LBS)	AHRI)	47°F)	VOLTAGE	POLES	REMARKS
S-01	ELECTRICAL	119	MITSUBISHI	PKA-AK36NL / PUZ-AK36NL	WALL MOUNTED	R454B	920	69.0	DSHP-01	36000	13200	95.0	75.0	40000	13200	82.0	224	12	4.1	208	2	ALL
S-02	DEMARC	125	MITSUBISHI	PKA-AL18NA / PUZ-AK18NL	WALL MOUNTED	R454B	450	30.0	DSHP-02	18000	4300	95.0	75.0	23600	4200	82.0	99	11	3.1	208	2	ALL

BTS - ELECTRIC UNIT HEATER SCHEDULE

TYPE

CEILING MOUNTED

CEILING MOUNTED

CEILING MOUNTED

CEILING MOUNTED

BTS - AIR TERMINALS SCHEDULE

CEILING

SURFACE

CEILING

CEILING

CEILING

CEILING

DUCT

LOCATION

MEN'S RESTROOM

WOMEN'S RESTROOM

REMOTE WOMEN'S

REMOTE MEN'S

BASIS OF DESIGN

TAG MANUFACTURER MODEL

PRICE

PRICE

PRICE

PRICE

PRICE

PRICE

PRICE

PRICE

SYSTEM

OUTSIDE AIR

AHU - VAV RETURN

AHU - VAV

SUPPLY **EXHAUST DUCT**

PROVIDE INTEGRAL, TAMPER-PROOF THERMOSTAT.

PROVIDE MANUFACTURER'S CEILING MOUNTING KIT. PROVIDE MANUFACTURER'S WALL MOUNTING KIT.

610Z

80

80

SPD

DBH-30T

610

SPD

INTEGRAL THERMAL CUTOUT MUST BE MANUAL RESET TYPE.

PROVIDE MANUFACTURER'S STANDARD RECESSED MOUNTING FRAME. PROVIDE MANUFACTURER'S STANDARD SURFACE MOUNTING FRAME.

ID

EUH-03

EUH-04

E2

E3

R1

R2

S2

REMARKS

BASIS OF DESIGN

QFF1500

| 122 | MARLEY | CWH35043F | WALL MOUNTED - SURFACE

DESCRIPTION

EGGCRATE GRILLE

SIDEWALL GRILLE

EGGCRATE GRILLE

EGGCRATE GRILLE

EGGCRATE GRILLE

PLAQUE

DROP BOX WITH HCD

DRUM DIFFUSERS SIDEWALL GRILLE

PLAQUE

FSC - DUCTWORK CONSTRUCTION AND LEAKAGE TESTING TABLE

WHERE COLOR LISTED IN AIR TERMINAL SCHEDULE CONFLICTS WITH COLOR LISTED IN INTERIOR DESIGN OR ARCHITECTURAL SHEETS,

MANUFAC

116 MARLEY

NO. TURER MODEL NO.

117 MARLEY QFF1500

128 MARLEY QFF48483

127 MARLEY QFF1500

EUH-05 TRUCKER'S RESTROOM | 126 | MARLEY | CWH1101 | WALL MOUNTED - RECESSED |

PROVIDE MANUFACTURER'S DOUBLE POLE, SINGLE ON/OFF SWITCH (DISCONNECT).

SYSTEM

EXHAUST

EXHAUST

EXHAUST

RETURN

RETURN

SUPPLY

SUPPLY

SUPPLY

SUPPLY

SPECIFICATION FROM INTERIOR DESIGNER OR ARCHITECT MUST TAKE PRECEDENCE.

PROVIDE MOUNTING HARDWARE/FRAME FOR DIFFUSERS AND GRILLES TO MATCH CEILING TYPE.

DUCT PRESSURE CLASS (IN. W.C.)

TEST IN ACCORDANCE WITH THE PROCEDURES IN SMACNA HVAC AIR DUCT LEAKAGE TEST MANUAL.

PROVIDE WITH OPPOSED BLADE DAMPER ADJUSTABLE FROM FACE OF AIR DEVICE.

HEATING UNIT ELECTRICAL DATA

23

NO. OF

| FINISH | DESIGN |

WHITE

WHITE

WHITE

WHITE

LAY-IN WHITE 25

COLOR NC REMARKS

30

25

1,3

ALL

1,3

ALL

1,3

1.3

1-4

1-4

1-4

1-4

1-3,5,6

1-3,5,7

(LBS) | VOLTAGE | POLES | REMARKS

120

120

480

480

120

BORDER

SURFACE

N/A

SURFACE

AIRFLOW CAPACITY WEIGHT

1.5

1.5

4.8

1.5

1.0

4.8

ALUMINUM

ALUMINUM

ALUMINUM

ALUMINUM

ALUMINUM

12" X 12" | ALUMINUM

30" X 12" ALUMINUM

DUCT DUCT DUCT TEST

LEAK PRESSURE

(kW)

150

150

150

65

100

MOUNTING FACE SIZE MATERIAL

24" X 24"

VARIES

24" X 24"

12" X 12"

24" X 24"

VARIES

DUCT SHAPE

ROUND / OVAL RECTANGULAR

SEAL

- A 3 A 6 4 1

DUCT DUCT

-2 - - - A 6 2 1

SUPPLY RETURN EXHAUST AIR CLASS CLASS CLASS (IN. W.C.) REMARKS

OUTSIDE | SEAL | LEAK

CEILING 12" X 12" ALUMINUM

PROVIDE MANUFACTURER'S DISCONNECT FOR INDOOR UNIT.

SINGLE POINT POWER FROM OUTDOOR UNIT. INDOOR UNIT MUST BE INTERLOCKED WITH ASSOCIATED OUTDOOR UNIT.

PROVIDE PROGRAMMABLE THERMOSTAT WITH MANUFACTURER'S BACNET CONTROLS INTERFACE.

PROVIDE LOW AMBIENT CONTROLS DOWN TO AT LEAST 0 °F.

PROVIDE MANUFACTURER'S HAIL GUARD. PROVIDE WIND BAFFLES FOR OUTDOOR UNIT.

					0011501								
		В	IS - EXHA	AUST FAN	SCHEDU	JLE							
	SERVES	BASIS OF D	ESIGN			FA	N DATA				ELECTRIC	AL DATA	
								MOT	OR	UNIT			
					AIRFLOW	\ \ \	DRIVE	POWER	1	WEIGHT		NO. OF	
ID	NAME	MANUFACTURER	MODEL NO.	TYPE	(CFM)	WG.)	TYPE	(HP)	RPM	(LBS)	VOLTAGE	POLES	REMARKS
EF-01	WOMENS & MENS RR	GREENHECK	G-090-VG	ROOF	500	0.50	DIRECT	0.1	1587	41	120	1	1-3,5-7
EF-02	MULTIFAITH ABLUTION, LACTATION ROOM, & JAN	GREENHECK	G-080-VG	ROOF	320	0.50	DIRECT	0.167	1376	40	120	1	1-3,5-7,9
EF-03	FIRE PUMP	GREENHECK	SQ-160-VG	INLINE	2660	0.30	DIRECT	0.75	1034	105	480	3	1-5
EF-04	SCRUBBER & JAN	GREENHECK	G-080-VG	ROOF	245	0.50	DIRECT	0.1	1562	40	120	1	1-3,5-7
EF-05	TRUCKERS RR, MEN RR, WOMENS RR, JAN & REMOTE BREAKROOM	GREENHECK	G-080-VG	ROOF	330	0.50	DIRECT	0.1	1721	40	120	1	1-3,5-7
EF-06	ELECTRICAL	GREENHECK	CSP-A390	CEILING MOUNTED	150	0.10	DIRECT	0.02	808	24	120	1	1,2,5,7

PROVIDE MANUFACTURER'S MOTOR CONTROLLER.

PROVIDE MANUFACTURER'S DISCONNECT. PROVIDE ELECTRONICALLY-COMMUTATED (EC) MOTOR WITH SPEED CONTROLLER.

4. PROVIDE VIBRATION ISOLATION.

5. PROVIDE EQUIPMENT REQUIRED TO INTERFACE WITH THE DDC SYSTEM. REFER TO SPECIFICATIONS FOR CONTROLS SYSTEM TYPE.

6. PROVIDE MANUFACTURER'S 24 INCH ROOF CURB.

PROVIDE INTEGRAL BACKDRAFT DAMPER. 8. UNIT MUST BE HIGH-WIND RATED.

9. PROVIDE TEMPERATURE SENSOR WITH BACNET CONTROLS INTERFACE.

					וט	3 - LOU v			ı						
	LOCATION		BASIS OF D	ESIGN				DESIGN	FREE	FREE AREA	MAX	DIMEN	ISIONS	UNIT	
								AIRFLOW	AREA	VELOCITY	PRESSURE			WEIGHT	
ID	NAME	NO.	MANUFACTURER	MODEL NO.	SERVES	SYSTEM	MATERIAL	(CFM)	(SF)	(FPM)	DROP (IN. WG.)	WIDTH	HEIGHT	(LBS)	REMARKS
L-01	FIRE PUMP	122	GREENHECK	EVH-501D	EF-03	EXHAUST	ALUMINUM	2660	3.8	706	0.08	3' - 8"	2' - 2"	45	ALL

. HURRICANE-RATED TYPE. .. AMCA 500-L LICENSED FOR AIR PERFORMANCE, WATER PENETRATION, AND WIND DRIVEN RAIN.

PROVIDE INTEGRAL GRAVITY BACKDRAFT DAMPER

AMCA 540 LICENSED FOR WIND-BORNE DEBRIS IMPACT RESISTANCE

4. HIGH-WIND RATED ASSEMBLY.

4. AMCA 550 LICENSED FOR HIGH-VELOCITY WIND-DRIVEN RAIN RESISTANCE.

5.	FINISH COLOR SHALL MATCH ADJACENT EXTERIOR PANEL.	

	BASIS OF D	ESIGN			THROAT	THROAT	MAX			DIMEN	ISIONS		UNIT	
				AIRFLOW			PD (IN.	DAMPER	THR	OAT	CU	RB	WEIGHT	
ID	MANUFACTURER	MODEL NO.	TYPE	(CFM)	(FPM)	(SF)	WĠ.)	TYPE	LENGTH	WIDTH	LENGTH	WIDTH	(LBS)	REMARKS
RH-01	GREENHECK	FGI	GRAVITY HOOD	2660	665	4.0	0.08	N/A	2' - 0"	2' - 0"	2' - 6"	2' - 6"	111	ALL

				BTS -	HVLS FA	N SCH	EDUL	Ξ				
	LOCATION		BASIS OF D	ESIGN	F	AN DATA			UNIT	ELECTRICA	AL DATA	
					DIAMETER	DRIVE	POWER	AFF	WEIGHT		NO. OF	
ID	NAME	NO.	MANUFACTURER	MODEL NO.	(FT.)	TYPE	(HP)	ELEVATION	(LBS)	VOLTAGE	POLES	
DF-01	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	
DF-02	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	
DF-03	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	
DF-04	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	Γ

ID	NAME	NO.	MANUFACTURER	MODEL NO.	(FT.)	TYPE	(HP)	ELEVATION	(LBS)	VOLTAGE	POLES	REMARKS
DF-01	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	ALL
DF-02	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	ALL
DF-03	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	ALL
DF-04	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	ALL
DF-05	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	ALL
DF-06	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	ALL
DF-07	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	ALL
DF-08	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	ALL
DF-09	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	ALL
DF-10	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	ALL
DF-11	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	ALL
DF-12	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	ALL
DF-13	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	ALL
DF-14	WAREHOUSE	132	GREENHECK	DS-6-20	24	DIRECT	1.5	32' - 0"	225	480	3	ALL

1. PROVIDE MANUFACTURER'S FAN VFD, MOUNTED TO FAN DOWNROD.

DISCONNECT PROVIDED BY ELECTRICAL

PROVIDE MANUFACTURER'S EXTENSION TUBE AND MOUNTING BRACKET.

PROVIDE MANUFACTURER'S STANDARD CONTROLLER WITH POWER AND SIGNAL FROM FAN MOTOR: ON / OFF AND VARIABLE SPEED CONTROL CAPABILITY.

PROVIDE WITH STANDARD, POWER-ON SHUTDOWN FIRE RELAY THAT MUST INTERLOCK WITH THE FIRE ALARM CONTROL PANEL. FAN MUST BE SUPPORTED FOR BACNET IP CONNECTION.

				ВТ	S - AIR CURT	AIN SCI	HEDUL	.E					
	LOCATION		BASI	S OF DESIGN		FAN D	ATA	DIME	NSIONS		ELECTRIC	AL DATA	
							MOTOR			UNIT			
			MANUFAC			AIRFLOW	POWER	NOMINAL	AFF	WEIGHT		NO. OF	
ID	NAME	NO.	TURER	MODEL NO.	TYPE	(CFM)	(HP)	LENGTH	ELEVATION	(LBS)	VOLTAGE	POLES	REMARKS
AC 01	TDI ICKEDIS CAGE	125	MADS AID	STD236 1EHN OR	WALL MOUNTED	1040	0.50	3' N"	7' /''	00	480	3	۸۱۱

2. PROVIDE MANUFACTURER'S DISCONNECT. . PROVIDE MANUFACTURER'S ADJUSTABLE MOUNTING BRACKETS.

. MOUNT BOTTOM 1" ABOVE DOORWAY.

	LOCATION		BASIS	S OF DESIGN		FAN D	ATA	DIME	NSIONS		ELECTRIC	AL DATA	
							MOTOR			UNIT			
			MANUFAC			AIRFLOW	POWER	NOMINAL	AFF	WEIGHT		NO. OF	
ID	NAME	NO.	TURER	MODEL NO.	TYPE	(CFM)	(HP)	LENGTH	ELEVATION	(LBS)	VOLTAGE	POLES	REMARKS
AC-01	TRUCKER'S CAGE	125	MARS AIR	STD236-1EHN-OB	WALL MOUNTED	1040	0.50	3' - 0"	7' - 4"	90	480	3	ALL

I. PROVIDE MANUFACTURER'S MOTOR CONTROLLER.

I. PROVIDE INTERLOCKED MAGNETIC DOOR SWITCH FOR ON / OFF OPERATION.

. ADD FAN START DELAY ACCESSORY PER AMAZON STANDARDS.

SHEET NUMBER

MECHANICAL

SCHEDULES

SHEET TITLE

DESIGNED BY:

DRAWN BY:

DATE:

CHECKED BY:

PROJECT #:

SUBMITTED BY:

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EOR/AOR SEAL

COA SEAL

POND & COMPANY No. C-1803

CLIENT INFORMATION

PROJECT NAME

OFFICE/

WAREHOUSE

DEVELOPMEN

34 CORPORATE

DRIVE WILMINGTON,

NORTH CAROLINA

28435

DRAWING ISSUE

SEEFRIED **INDUSTRIAL PROPERTIES**

ORIGINAL SHEET SIZE: 30" X 42"

M-602

95.0

80.0 67.2 55.5 55.4 R-454B

REMARKS:

PROVIDE SUPPLY FAN VFD FACTORY-MOUNTED TO UNIT.

AHU-01 BREAKROOM AND OFFICE / ENTRY 207 / 211

- PROVIDE MANUFACTURER'S MOTOR CONTROLLER WITH STAGED FAN MOTORS. . PROVIDE MANUFACTURER'S DISCONNECT AND UNPOWERED CONVENIENCE OUTLET
- 4. SINGLE POINT POWER.
- 5. SINGLE ZONE, VARIABLE AIR VOLUME CONFIGURATION.
- PROVIDE VIBRATION ISOLATION FOR FAN SECTION.
- PROVIDE 24 V WALL-MOUNTED COMBINATION TEMPERATURE HUMIDITY SENSOR. REFER TO FLOOR PLANS FOR INSTALLATION LOCATION. PROVIDE INTEGRAL BASE RAIL FRAME, MINIMUM 4 INCH HEIGHT.
- 9. PROVIDE STAINLESS STEEL COIL DRAIN PAN IN COMPLIANCE WITH ASHRAE 62.1.
- 10. PROVIDE DUCT CONNECTIONS AND SERVICE ACCESS AS SHOWN ON THE FLOOR PLANS. 11. UNIT CASING MUST BE SINGLE WALL WITH INTERNAL INSULATION AND SOLID INNER WALL
- 12. PROVIDE BUILDING MANAGEMENT SYSTEM (BMS) INTERFACE: MONITORING AND CONTROLS. REFER TO M-701 FOR ASSOCIATED PROJECT SPECIFICATIONS.

WHK060A4S0B

TRANE

- 13. PROVIDE FACTORY-APPLIED ANTI-CORROSION COATING ON EVAPORATOR, CONDENSER, AND HOT GAS REHEAT COILS FOR SEACOAST ENVIRONMENT.
- 14. PROVIDE MIXING BOX SECTION WITH INTEGRAL RETURN AIR AND OUTSIDE AIR DAMPERS.
- 15. PROVIDE AIRSIDE ECONOMIZER SECTION (AND INTEGRAL RETURN AIR AND OUTSIDE AIR DAMPERS) WITH BAROMETRIC RELIEF AIR DAMPER AND DIFFERENTIAL ENTHALPY CONTROLS WITH FIXED DRY BULB.
- 16. PROVIDE MINIMUM 2 STAGE ELECTRIC HEATER CONTROL.

17. PROVIDE AIRFLOW MEASURING STATION ON OUTSIDE AIR INLET.

				FSC - ENER	RGY RECOVE	RY UNIT I	OX COOLI	NG AND E	ELECTRIC	HEA	TING	SCHE	EDUI	LE (P	ART 1)							
	SERVES	BASIS (OF DESIGN			OUTSI	DE AIR	EXHAL	JST AIR	OUT	ΓSIDE A	IR	EXH	HAUST A	AIR	SUMI	IER DES RECO		NERGY		WINTE	R DESIGN	N ENERGY RY
																			EXHAUS	ST			EXHAUST
					HEAT	LOW SPEED	HIGH SPEED	LOW SPEED	HIGH SPEED		ESP PC	OWER		ESP PO	OWER	OUTSI	E AIR (°I	=)	(°F)		OUTSIE	E AIR (°F)	(°F)
					EXCHANGER	AIRFLOW	AIRFLOW	AIRFLOW	AIRFLOW	# OF	(IN. E	ACH #	# OF	(IN. E	EACH	EAT EAT	LAT	LAT	EAT E	AT E	AT EA	T LAT L	AT EAT EAT
ID	NAME	MANUFACTURER	MODEL NO.	TYPE	TYPE	(CFM)	(CFM)	(CFM)	(CFM)	FANS V	VG.) ((HP) F	FANS \	WG.)	(HP)	(db) (wb	(db)	(wb)	(db) (v	/b) (d	lw) (db	o) (db) (wb) (db) (wb)

								FSC - E	NERGY	RECOVI	ERY UNIT D	X COOL	ING ANI	D ELE	CTRIC	C HEATI	NG SCI	HEDULE (I	PART 2)							
													HOT GAS	REHEA	T COIL						TOT	AL				
		I	DX COOL	LING CO	IL DATA	4		Н	EAT PUMP	DATA			I	DATA		ELECTRI	C HEATING	G COIL DATA	FILT	ERS	EFFECTI	VENESS		ELECTRICA	AL DATA	
	CAF	PACITY					FACE	TOTAL	DESIGN				TOTAL				DESIGN		OUTSIDE	RETURN			UNIT			
	TOTAL	SENSIBLE	EAT	EAT	LAT	LAT	VELOCITY	CAPACITY	AIRFLOW	EAT LA	Γ REFRIGERAN ⁻	ISMRE	CAPACITY	EAT	LAT	CAPACITY	AIRFLOW	EAT LAT	AIR EFF	AIR EFF	SUMMER	WINTER	WEIGHT		NO. OF	
ID	(BTU)	(BTU)	(db °F)	(wb °F)	(db °F)	(wb °F)	(FPM)	(BTUH)	(CFM)	(db °F) (db °	F) TYPE	(@ AHRI)	(MBH)	(db °F)	(db °F)	(KW)	(CFM)	(db °F) (db °F)	(MERV)	(MERV)	(%)	(%)	(LBS)	VOLTAGE	POLES	REMARKS
ERU-01	315300	195800	81.0	68.0	52.2	52.1	298	181100	6730	54.6 80.	7 R-454B	5.7	257.9	55	89.3	35.0	6730	80.7 97.2	8	8	64.4	63.3	5565	480	3	ALL

ERU-01

. PROVIDE MANUFACTURER'S MOTOR CONTROLLERS: SUPPLY FAN, EXHAUST FAN. PROVIDE SUPPLY FAN AND EXHAUST FAN VFD FACTORY-MOUNTED TO UNIT.

VXE-212-58D-30A-1-D2 | PAD MOUNTED | ENERGY WHEEL | 3365 | 6730 | 3530

PROVIDE MANUFACTURER'S DISCONNECT.

1000 | 300 | 1 | 0.50 | 3

- . SINGLE POINT POWER.
- PROVIDE NEMA PREMIUM EFFICIENCY MOTORS. PROVIDE VIBRATION ISOLATION FOR FAN SECTIONS.
- 6. PROVIDE INTEGRAL BASE RAIL FRAME, MINIMUM 4 INCH HEIGHT
- PROVIDE STAINLESS STEEL COIL DRAIN PAN IN COMPLIANCE WITH ASHRAE 62.1.
- . PROVIDE DUCT CONNECTION AND SERVICE ACCESS AS SHOWN ON THE FLOOR PLANS.

300

59680 43530

- 9. UNIT CASING MUST BE DOUBLE WALL WITH INTERNAL INSULATION AND SOLID INNER WALL.
- 10. PROVIDE BUILDING MANAGEMENT SYSTEM (BMS) INTERFACE: MONITORING AND CONTROLS. REFER TO M-701 FOR ASSOCIATED PROJECT SPECIFICATIONS.
- 11. PROVIDE FACTORY-APPLIED ANTI-CORROSION COATING ON EVAPORATOR, HOT-GAS REHEAT, AND CONDENSER COILS FOR SEACOAST ENVIRONMENT.
- 12. PROVIDE CONVENIENCE OUTLET WIRED AHEAD OF DISCONNECT.
- 13. PROVIDE EXHAUST DUCT SMOKE DETECTORS.

FSC -	DUCTW	ORK CO	NSTRUC	CTION A	ND LE	AKAGE	TESTI	NG TAI	BLE	
	DUCT	F PRESSURE	E CLASS (IN.	W.C.)		DUCT	SHAPE			
					ROUNI	O / OVAL	RECTA	NGULAR		
				OUTSIDE	DUCT SEAL	DUCT LEAK	DUCT SEAL	DUCT LEAK	DUCT TEST PRESSURE	
SYSTEM	SUPPLY	RETURN	EXHAUST	AIR	CLASS	CLASS	CLASS	CLASS	(IN. W.C.)	REMARKS
AHU - VAV OUTSIDE AIR	-	-	-	1	-	-	Α	6	1	1
AHU - VAV RETURN	-	-2	-	-	-	-	Α	6	2	1
AHU - VAV SUPPLY	4	-	-	-	Α	3	Α	6	4	1
EXHAUST DUCT	-	-	-1	-	-	-	А	6	1	1

1. TEST IN ACCORDANCE WITH THE PROCEDURES IN SMACNA HVAC AIR DUCT LEAKAGE TEST MANUAL.

						FSC - DI	JCTLE	ESS SF	PLIT HE	AT PUM	P SCHE	DULE									
	LOCATION		BASIS	OF DESIGN		INDOOR UNIT DAT	A				OU	TDOOR	UNIT DATA						ELECTRICA	AL DATA	
								FAN		CO	OLING DATA		HE	ATING DATA		UNIT					
			1	MODEL NO. (INDOOR/	MOUNTING	REFRIGERANT	MAX	POWER		NOMINAL	MINIMUM	EAT	NOMINAL	MINIMUM	EAT	WEIGHT	EER (@	COP (@		NO. OF	
ID	NAME	NO.	MANUFACTURER	OUTDOOR)	TYPE	TYPE	CFM	(W)	ID	(BTUH)	(BTUH)	(db °F)	(BTUH)	(BTUH)	(db °F)	(LBS)	AHRI)	47°F)	VOLTAGE	POLES	REMARKS
DSS-01	IT ROOM	208	MITSUBISHI	PKA-AL18NL / PUZ-AK18NL	WALL MOUNTED	R454B	450	30.0	DSHP-01	18000	4300	95.0	22000	4200	17.0	112	11	3.1	208	2	ALL
DSS-02	ELECTRICAL	206	MITSUBISHI	PKA-AL12NL / PUZ-AK12NL	WALL MOUNTED	R454B	385	30.0	DSHP-02	12000	4300	95.0	18000	4200	17.0	112	14.8	3.1	208	2	ALL

- PROVIDE MANUFACTURER'S DISCONNECT FOR INDOOR UNIT. 2. SINGLE POINT POWER FROM OUTDOOR UNIT. INDOOR UNIT MUST BE INTERLOCKED WITH ASSOCIATED OUTDOOR UNIT.
- 3. PROVIDE PROGRAMMABLE THERMOSTAT WITH MANUFACTURER'S BACNET CONTROLS INTERFACE. 4. PROVIDE LOW AMBIENT CONTROLS DOWN TO AT LEAST 0 °F.
- 5. PROVIDE MANUFACTURER'S HAIL GUARD.
- 6. PROVIDE WIND BAFFLES FOR OUTDOOR UNIT. 7. PROVIDE REFRIGERANT LINE COVER.

	FSC - ELECTRIC UNIT HEATER SCHEDULE													
	LOCATION BASIS OF DESIGN HEATING UNIT ELECTRICAL DAT													
			MANUFAC			AIRFLOW	CAPACITY	WEIGHT		NO. OF				
ID	NAME	NO.	TURER	MODEL NO.	TYPE	(CFM)	(kW)	(LBS)	VOLTAGE	POLES	REMARKS			
EUH-01	JANITOR	200	MARLEY	CWH3407F	WALL MOUNTED - RECESSED	100	3.00	22	208	2	1-3,5,6			
EUH-02	MAIN SERVICE AREA	204	MARLEY	CWH1151DSF	WALL MOUNTED - RECESSED	100	1.50	11	120	1	1-3,5,6			
EUH-03	PARTS STORAGE	202	MARLEY	CWH3407F	WALL MOUNTED - RECESSED	100	3.00	22	208	2	1-3,5,6			
EUH-04	HAZARDOUS WASTE	203	MARLEY	CWH3407F	WALL MOUNTED - RECESSED	100	3.00	22	208	2	1-3,5,6			
EUH-05	MAIN SERVICE AREA	204	MARLEY	MWUH7504	WALL MOUNTED	270	3.75	27	208	2	1-3,5			
EUH-06	MAIN SERVICE AREA	204	MARLEY	MWUH7504	WALL MOUNTED	270	3.75	27	208	2	1-3,5			
EUH-07	MAIN SERVICE AREA	204	MARLEY	MWUH7504	WALL MOUNTED	270	3.75	27	208	2	1-3,5			
EUH-08	MAIN SERVICE AREA	204	MARLEY	MWUH7504	WALL MOUNTED	270	3.75	27	208	2	1-3,5			
EUH-09	SPRINKLER	205	MARLEY	CWH3504F	WALL MOUNTED - SURFACE	100	4.80	22	120	1	1-3,5,7			

- 1. PROVIDE MANUFACTURER'S DOUBLE POLE, SINGLE ON/OFF SWITCH (DISCONNECT).
- 2. PROVIDE INTEGRAL, TAMPER-PROOF THERMOSTAT. 3. INTEGRAL THERMAL CUTOUT MUST BE MANUAL RESET TYPE.
- 4. PROVIDE MANUFACTURER'S CEILING MOUNTING KIT.

6.	PROVIDE MANUFACTURER'S WALL MOUNTING KI PROVIDE MANUFACTURER'S STANDARD RECESS PROVIDE MANUFACTURER'S STANDARD SURFAC	SED MOUNTING FRAME.					
		FSC - AIR TERMINALS SC	HEDULE				
	BASIS OF DESIGN			BORDER	FINISH	DESIGN	

	FSC - AIR TERMINALS SCHEDULE													
	BASIS OF DES	SIGN						BORDER	FINISH	DESIGN				
TAG	MANUFACTURER	MODEL	SYSTEM	DESCRIPTION	MOUNTING	FACE SIZE	MATERIAL	TYPE	COLOR	NC	REMARKS			
E1	PRICE	610Z	EXHAUST	SIDEWALL GRILLE	SURFACE	VARIES	ALUMINUM	SURFACE	WHITE	25	ALL			
R1	PRICE	80	RETURN	EGGCRATE GRILLE	CEILING	24" X 24"	ALUMINUM	LAY-IN	WHITE	25	ALL			
S1	PRICE	SPD	SUPPLY	PLAQUE	CEILING	24" X 24"	ALUMINUM	LAY-IN	WHITE	25	ALL			
S2	PRICE	610	SUPPLY	SIDEWALL GRILLE	SURFACE	VARIES	ALUMINUM	SURFACE	WHITE	25	ALL			
S3	PRICE	ARCD	SUPPLY	ROUND CONE DIFFUSER	DUCT	10"	ALUMINUM	SURFACE	WHITE	25	ALL			

- WHERE COLOR LISTED IN AIR TERMINAL SCHEDULE CONFLICTS WITH COLOR LISTED IN INTERIOR DESIGN OR ARCHITECTURAL SHEETS,
- SPECIFICATION FROM INTERIOR DESIGNER OR ARCHITECT MUST TAKE PRECEDENCE. 2. PROVIDE MOUNTING HARDWARE/FRAME FOR DIFFUSERS AND GRILLES TO MATCH CEILING TYPE.

				F	SC - E	XHAUS	 Γ FAN SC	HEDUL	 _E						
	LOCATION	١	BASIS OF D	ESIGN		FAN	IDATA		FAN DA	TA			ELECTRICA	AL DATA	
						HIGH)		MOTOR		UNIT			I
						AIRFLOW	AIRFLOW	ESP (IN.	DRIVE	POWER		WEIGHT		NO. OF	I
ID	NAME	NO.	MANUFACTURER	MODEL NO.	TYPE	(CFM)	(CFM)	WG.)	TYPE	(HP)	RPM	(LBS)	VOLTAGE	POLES	REMARKS
EF-01	JANITOR	204	GREENHECK	SQ-120-VG	INLINE	820	1640	0.50	DIRECT	1	1684	61	480	3	1-5,7
EF-02	JANITOR	204	GREENHECK	CSP-A200	INLINE	135	N/A	0.50	DIRECT	0.07	825	23	120	1	1,2,5,6
EF-03	RESTROOM	210	GREENHECK	SP-LP0511-1	CEILING	50	N/A	0.50	DIRECT	0.01	685	8	120	1	1,2,5,6

EF-04 RESTROOM 209 GREENHECK SP-LP0511-1 CEILING 50 N/A 0.50 DIRECT 0.01 685 8 120 1 1,2,5,6

13.5 | 45530 | 2.45 | 51.4 | 76.6 | 3.8 | 56360 | 1000 | 51.3 | 87.0 | 8 | 1121 | 480 | 3 | ALL

7060 | 1 | 0.50 | 7.50 | 1 | 0.50 | 7.50 | 93.8 | 77.2 | 81.0 | 68.0 | 75.0 | 62.7 | 20.7 | 16.8 | 54.6 | 44.5 | 72.0 | 56.0

- 1. PROVIDE MANUFACTURER'S MOTOR CONTROLLER. 2. PROVIDE MANUFACTURER'S DISCONNECT.
- 3. PROVIDE ELECTRONICALLY-COMMUTATED (EC) MOTOR WITH SPEED CONTROLLER. 4. PROVIDE VIBRATION ISOLATION.
- 5. PROVIDE EQUIPMENT REQUIRED TO INTERFACE WITH THE DDC SYSTEM. REFER TO SPECIFICATIONS FOR CONTROLS SYSTEM TYPE. 6 PROVIDE INTEGRAL BACKDRAFT DAMPER.

- 1	_	PROVIDE TEMPERATURE SENSOR WITH BACNET CONTROLS INTERFACE.
	1.	PROVIDE TEMPERATURE SENSOR WITH BACNET CONTROLS INTERPACE.

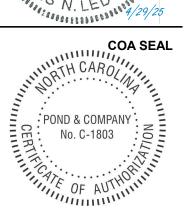
	FSC - LOUVER SCHEDULE														
	LOCATION BASIS OF DESIGN						DESIGN	FREE	FREE AREA	MAX	DIMEN	ISIONS	UNIT		
								AIRFLOW	AREA	VELOCITY	PRESSURE			WEIGHT	
ID	NAME	NO.	MANUFACTURER	MODEL NO.	SERVES	SYSTEM	MATERIAL	(CFM)	(SF)	(FPM)	DROP (IN. WG.)	WIDTH	HEIGHT	(LBS)	REMARKS
L-01	JANITOR	204	GREENHECK	EVH-501D	EF-01	EXHAUST	ALUMINUM	1640	2.4	698	0.08	2' - 8"	2' - 0"	30	ALL
L-02	JANITOR	204	GREENHECK	EVH-501D	EF-01	INTAKE	ALUMINUM	1640	3.4	485	0.04	2' - 8"	2' - 8"	40	ALL

HURRICANE-RATED TYPE.

- 2. AMCA 500-L LICENSED FOR AIR PERFORMANCE, WATER PENETRATION, AND WIND DRIVEN RAIN.
- 3. AMCA 540 LICENSED FOR WIND-BORNE DEBRIS IMPACT RESISTANCE.
- 4. AMCA 550 LICENSED FOR HIGH-VELOCITY WIND-DRIVEN RAIN RESISTANCE. 5. FINISH COLOR SHALL MATCH ADJACENT EXTERIOR PANEL.

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EOR/AOR SEAL



CLIENT INFORMATION SEEFRIED **INDUSTRIAL PROPERTIES**

PROJECT NAME WAREHOUSE

34 CORPORATE DRIVE WILMINGTON, **NORTH CAROLINA**

DEVELOPMEN^T

DRAWING ISSUE

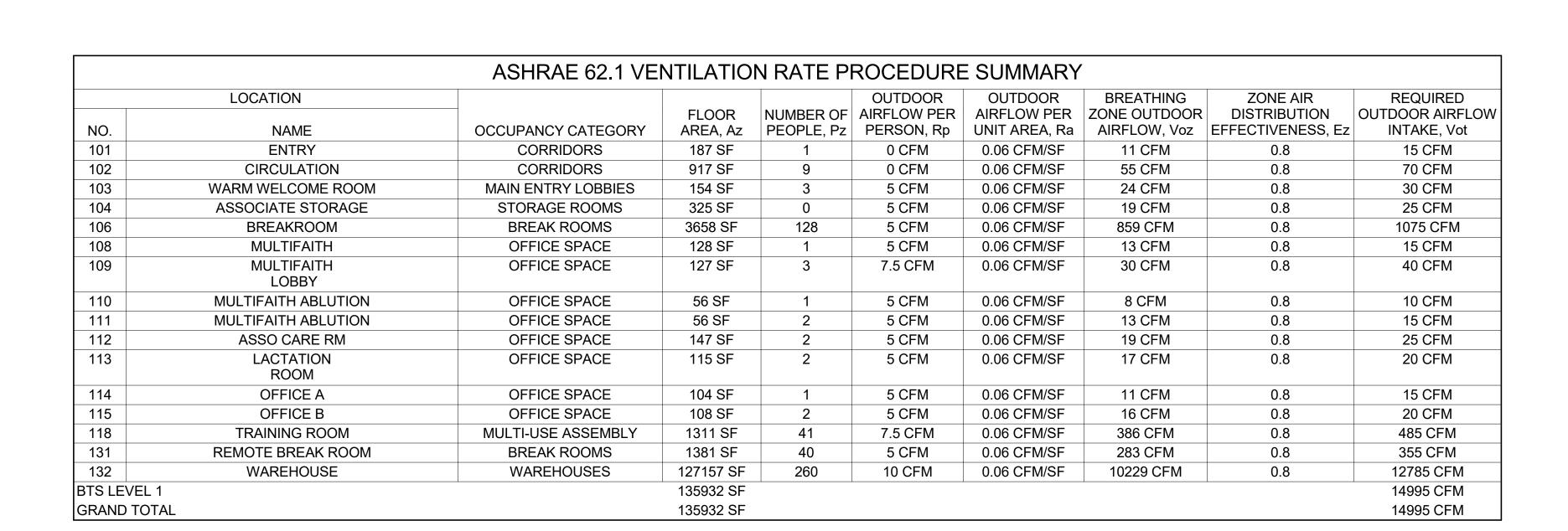
DESIGNED BY: DRAWN BY: CHECKED BY:

SUBMITTED BY: PROJECT #: SHEET TITLE FSC -

> **MECHANCIAL** SCHEDULES

M-603

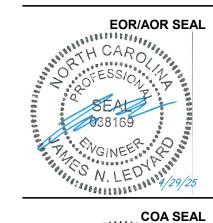
SHEET NUMBER

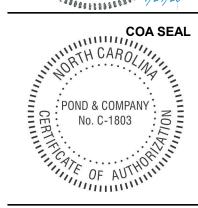


		ASHRAE 62.1 VE	NTILATIO	N RATE P	ROCEDURE	SUMMARY	,		
	LOCATION		5 1.00 5		OUTDOOR	OUTDOOR	BREATHING	ZONE AIR	REQUIRED
NO.	NAME	OCCUPANCY CATEGORY	FLOOR AREA, Az	NUMBER OF PEOPLE, Pz	AIRFLOW PER PERSON, Rp	AIRFLOW PER UNIT AREA, Ra	ZONE OUTDOOR AIRFLOW, Voz	DISTRIBUTION EFFECTIVENESS, Ez	OUTDOOR AIRFLOW INTAKE, Vot
201	SERVICE AREA	WAREHOUSES	3889 SF	5	10 CFM	0.06 CFM/SF	283 CFM	0.8	355 CFM
202	PARTS STORAGE	STORAGE ROOMS	561 SF	2	5 CFM	0.06 CFM/SF	44 CFM	0.8	55 CFM
203	USED FLUID WASTE	OCCUPIABLE STORAGE ROOMS FOR DRY MATERIALS	298 SF	2	5 CFM	0.06 CFM/SF	28 CFM	0.8	35 CFM
207	OFFICE/ ENTRY	MAIN ENTRY LOBBIES	168 SF	2	5 CFM	0.06 CFM/SF	20 CFM	0.8	25 CFM
211	BREAK ROOM	BREAK ROOMS	305 SF	6	5 CFM	0.06 CFM/SF	48 CFM	0.8	60 CFM
BTS LEVEL 1			5220 SF						530 CFM
GRAND TOTAL			5220 SF						530 CFM

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Peachtree Corners
Georgia 30092

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SEEFRIED INDUSTRIAL

PROPERTIES

PROJECT NAME

OFFICE/ WAREHOUSE DEVELOPMENT

34 CORPORATE DRIVE WILMINGTON, NORTH CAROLINA 28435

DRAWING ISSUE

:D8_BTS & __REV0_05012025

0 EV MARK

DESIGNED BY: JAA

DRAWN BY: GJB

CHECKED BY: WWC

SUBMITTED BY: DP

DATE: 05/01/2025

PROJECT #: 1240989

SHEET TITLE
MECHANCIAL
VENTILATION
SCHEDULES

SHEET NUMBER
M-604

FOLLOWING CODES: 1. NORTH CAROLINA BUILDING CODE - 2018 2. NORTH CAROLINA MECHANICAL CODE - 2018

3. NORTH CAROLINA PLUMBING CODE - 2018 4. NATIONAL ELECTRIC CODE - 2017 B. THE MECHANICAL EQUIPMENT AND INSTALLATION SHALL CONFORM TO THE

FOLLOWING STANDARDS: 1. DESIGN CRITERIA FOR BUILD-TO-SUIT (BTS) DELIVERY STATION V6.0 (09 AUGUST

2. ASSOCIATE AIR BALANCE COUNCIL (AABC): NATIONAL STANDARD FOR TOTAL SYSTEM BALANCE

3. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION

(SMACNA): HVAC DUCT CONSTRUCTION STANDARDS 4. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION

(SMACNA): HVAC AIR DUCT LEAKAGE TEST MANUAL. 5. ASHRAE 90.1 - 2016 6. ASHRAE 62.1 - 2016

C. PUBLICATION DATES: WHERE THE DATE OF ISSUE OF A REFERENCE STANDARD IS NOT SPECIFIED, COMPLY WITH THE STANDARD THAT IS EFFECTIVE AS OF DATE OF CONTRACT DOCUMENT

D. PERMITS: OBTAIN ALL PERMITS AND INSPECTIONS FOR THE INSTALLATION OF THIS WORK AND PAY ALL CHARGES INCIDENT THERETO. DELIVER TO THE OWNER ALL CERTIFICATES OF SAID INSPECTION ISSUED BY AUTHORITIES HAVING JURISDICTION. E. WORKMANSHIP AND MATERIALS COVERED BY THESE SPECIFICATIONS SHALL CONFORM TO ALL ORDINANCES AND REGULATIONS OF THE CITY, COUNTY, AND/OR

OTHER AUTHORITIES HAVING JURISDICTION F. OPERATIONS AND MAINTENANCE MANUALS FOR ALL SCHEDULED EQUIPMENT SHALL BE PROVIDED TO OWNER AS PART OF FINAL ACCEPTANCE

GUARANTEE

A. THE COMPONENTS OF THE MECHANICAL SYSTEM FURNISHED UNDER THIS DIVISION OF THE SPECIFICATIONS SHALL BE GUARANTEED FOR A PERIOD OF TWO YEARS FROM THE DATE OF ACCEPTANCE THEREOF, EITHER FOR BENEFICIAL USE OR FINAL ACCEPTANCE, WHICHEVER IS EARLIER, AGAINST DEFECTIVE MATERIAL, DESIGN, AND WORKMANSHIP.

ELECTRICAL WORK

A. ALL ELECTRICAL EQUIPMENT FURNISHED UNDER THIS DIVISION OF THESE SPECIFICATIONS SHALL COMPLY THE ELECTRICAL SYSTEM CHARACTERISTICS

INDICATED ON THE ELECTRICAL DRAWINGS B. MOTOR CONTROL COMPONENTS FURNISHED AS AN INTEGRAL PART OF MECHANICAL EQUIPMENT SHALL CONFORM TO REQUIREMENTS OF ELECTRICAL DRAWINGS.

C. POWER WIRING SHALL BE PROVIDED BY ELECTRICAL D. WIRING AND CONDUIT BETWEEN VFD AND MOTOR SHALL BE UNDER THIS DIVISION UNLESS IT IS INDICATED ON THE ELECTRICAL DRAWINGS. WIRING AND CONDUIT SHALL BE PER NEC AND ELECTRICAL SPECIFICATIONS.

IDENTIFICATION FOR HVAC EQUIPMENT

A. PROVIDE NAMEPLATES FOR ALL SCHEDULED EQUIPMENT B. NAMEPLATES SHALL BE PLASTIC MATERIAL WITH 1.5 INCH TALL LETTERING, RIVETED

TO EQUIPMENT CASING. C. PROVIDE LABELS FOR EACH SPACE THERMOSTAT OR CONTROL SENSOR BY NOTING WHICH EQUIPMENT IT IS ASSOCIATED WITH

PAINTING

A. FACTORY PAINTED EQUIPMENT THAT HAS BEEN SCRATCHED OR MARRED SHALL BE REPAINTED TO MATCH ORIGINAL COLOR.

B. STEEL EQUIPMENT HANGERS, SUPPORTS, AND UNINSULATED BLACK STEEL PIPE EXPOSED TO SIGHT INSIDE THE BUILDING WHICH ARE NOT PROVIDED WITH A FACTORY APPLIED PRIME COAT SHALL BE CLEANED OF RUST, GREASE, AND SCALE. AFTER CLEANING HANGERS, SUPPORTS AND PIPE, A FIELD-APPLIED PRIME COAT SHALL BE PROVIDED. IN ADDITION, SUCH ITEMS IN FINISHED SPACES SHALL BE PROVIDED WITH TWO COATS OF FINISH PAINT IN A COLOR TO MATCH ADJACENT SURFACES.

CLEANING AND ADJUSTING

A. ALL EQUIPMENT, PIPE, VALVES, AND FITTINGS SHALL BE CLEANED OF GREASE, OIL, PAINT SPOTS, METAL CUTTINGS, SLUDGE, AND CONSTRUCTION DEBRIS B. DUCTS, PLENUMS, AND CASINGS SHALL BE CLEANED OF ALL DEBRIS AND BLOWN

FREE OF ALL PARTICLES OF RUBBISH AND DUST BEFORE INSTALLING OUTLET FACES. C. BEARINGS SHALL BE LUBRICATED AS RECOMMENDED BY THE EQUIPMENT MANUFACTURER.

D. TEMPORARY FILTERS SHALL BE PROVIDED FOR FANS THAT ARE USED DURING CONSTRUCTION. AT THE TIME OF STARTING THE BALANCING OF THE AIR DISTRIBUTION SYSTEM, NEW FILTERS SHALL BE INSTALLED.

DRAWINGS AND MANUALS

A. AS-BUILT DRAWINGS OF THE ACTUAL INSTALLATION SHALL BE PROVIDED TO THE BUILDING OWNER OR THE BUILDING OWNER'S DESIGNATED REPRESENTATIVE WITHIN 90 DAYS OF SYSTEM ACCEPTANCE. AS-BUILT DRAWINGS SHALL INCLUDE (AS A MINIMUM) LOCATION AND PERFORMANCE DATA ON EACH PIECE OF EQUIPMENT, GENERAL CONFIGURATION OF THE DUCT AND PIPE DISTRIBUTION SYSTEM INCLUDING SIZES, AND TERMINAL AIR FLOW RATES.

B. INSTALLATION, OPERATION, AND MAINTENANCE (IOM) MANUALS SHALL BE PROVIDED TO THE BUILDING OWNER OR THE BUILDING OWNER'S DESIGNATED REPRESENTATIVE WITHIN 90 DAYS OF SYSTEM ACCEPTANCE. IOM MANUALS SHALL BE IN ACCORDANCE WITH INDUSTRY-ACCEPTED STANDARDS; REFER TO ASHRAE 90.1 INFORMATIVE APPENDIX E.

TEST AND BALANCE:

A. INSTRUMENTS USED FOR BALANCING SHALL HAVE BEEN CALIBRATED WITHIN 6 MONTHS PRIOR TO THE BALANCING OF THE SYSTEMS

B. ALL INSTRUMENTS REQUIRED TO BALANCE THE SYSTEM SHALL BE PROVIDED AT THE A. UNOCCUPIED MODE: CONTRACTOR'S EXPENSE.

GENERAL BALANCING

1. ADJUST AND BALANCE AIR SYSTEMS INDICATED HEREIN TO OBTAIN DESIGN FLOW RATES FOR SYSTEMS AS A WHOLE AND EACH INLET AND OUTLET, ±10%. USE BALANCING DAMPERS AND/OR FLOW SETTING DEVICES FOR INLET, OUTLET AND BRANCH ADJUSTMENTS. USE FAN SPEED ADJUSTMENT FOR BELT DRIVE FANS.

2. PITOT TUBE TRAVERSES SHALL BE PERFORMED IN ACCORDANCE WITH ASHRAE FUNDAMENTALS.

A. TEST AND BALANCE AND ASSOCIATED REPORT SHALL BE COMPLETED BY AN

INDEPENDENT AABC OR NEBB CERTIFIED AGENCY

B. THE REPORT OF PERFORMANCE TESTING AND BALANCING SHALL INCLUDE DATA

1. NAME AND ADDRESS OF PROJECT, NAME AND ADDRESS OF CONTRACTOR, DATES OF ALL TESTS, NAME AND TELEPHONE NUMBER OF THE TEST ENGINEER.

2. GRILLES, REGISTERS AND DIFFUSERS:

A. FAN SYSTEM AND/OR ZONE NUMBER **B. ROOM NUMBER**

C. SIZE OF INLET OR OUTLET D. MANUFACTURER'S EFFECTIVE DATA

E. REQUIRED, INITIAL, AND FINAL FLOW AND VELOCITY

3. FANS: A. SYSTEM AND/OR FAN NUMBER

B. FAN MANUFACTURER, SERIAL NUMBER, AND MODEL NUMBER C. MOTOR MANUFACTURER, HORSEPOWER, VOLTAGE, PHASE, RPM, TYPE AND

SERVICE FACTOR, AMPERAGE NAMEPLATE RATING. D. SCHEDULED DATA ON DRAWINGS OR IN SPECIFICATIONS

E. FINAL AIRFLOW, RPM, TOTAL AND SUCTION STATIC PRESSURE, MOTOR AMPERAGE, AND BRAKE HORSEPOWER.

C. ANY DEVIATIONS FROM DESIGN DATA SHALL BE EXPLAINED IN THE REPORT INCLUDING POSSIBLE REASONS FOR AND SOLUTIONS TO ISSUES. D. REPORT SHALL BE SIGNED AND DATED BY BALANCE ENGINEER. PROVIDE TO ENGINEER OF RECORD FOR REVIEW AND COMMENT. DEFICIENCIES NOTED IN ENGINEER OF RECORD REVIEW SHALL BE CORRECTED PRIOR TO FINAL TEST AND BALANCE REPORT BEING SUBMITTED TO THE DEVELOPER AND TENANT CONTRACT

MANAGER, AS REQUIRED IN THE CLOSE-OUT PHASE OF THE PROJECT. E. TEST AND BALANCE SHALL NOT BE PERFORMED UNTIL SYSTEM INSTALLATION IS COMPLETE.

SEQUENCES OF OPERATION:

ROOFTOP UNITS

A. GENERAL 1. RTU'S TO BE INTEGRATED INTO AND CONTROLLED BY THE LOCAL BMS. 2. THE RTU'S SHALL BE PACKAGED WITH BACNET CONTROLLER BY THE

3. RTU'S SHALL OPERATE IN A SINGLE ZONE VAV OPERATION AS NOTED IN THE **EQUIPMENT SCHEDULE.**

B. SETPOINTS:

 ALL SETPOINTS SHALL BE ADJUSTABLE 2. THE RTU'S SHALL OPERATE TO MAINTAIN THE FOLLOWING ZONE SETPOINTS (RTU'S 01 THROUGH 05) 75°F DB @ 50% RH (COOLING), 70°F DB (HEATING) UNOCCUPIED: 82°F DB @ 50% RH (COOLING), 65°F DB (HEATING)

85°F DB @ 50% RH (COOLING), 60°F DB (HEATING)

90°F DB @ 50% RH (COOLING), 55°F DB (HEATING) RTU-01,02,04,06 THROUGH RTU-15

OCCUPIED:

(RTU'S 06 THROUGH 15)

A. UNOCCUPIED MODE: 1. WHEN THE RTU IS INDEXED INTO UNOCCUPIED MODE, THE SUPPLY FAN SHALL BE OFF, THE OUTSIDE AIR (OA) DAMPER SHALL BE CLOSED, AND THE RETURN

AIR (RA) DAMPER SHALL BE OPEN. 2. WHEN THE UNOCCUPIED ZONE TEMPERATURE SETPOINT IS NOT SATISFIED, THE REFRIGERATION SYSTEM AND SUPPLY FAN SHALL BE STAGED IN SEQUENCE TO MAINTAIN THE UNOCCUPIED ZONE TEMPERATURE SETPOINT VIA ITS RESPECTIVE ZONE THERMOSTAT.

3. WHEN THE UNOCCUPIED ZONE TEMPERATURE SETPOINT IS SATISFIED, THE SUPPLY FAN AND COILS SHALL BE DEENERGIZED 4. ALL SYSTEM SAFETIES SHALL REMAIN OPERATIONAL

B. MORNING WARM UP / COOL DOWN: 1. THE MODE SHALL BE INITIATED BY THE CENTRALIZED CONTROL PLATFORM THROUGH AN OPTIMAL START CALCULATION. WHEN INITIATED, THE SUPPLY FAN SHALL START, THE OA DAMPER SHALL BE CLOSED, AND THE RA DAMPER SHALL BE OPEN

2. WARM UP: A. THE HEAT PUMP AND ELECTRIC HEATING COIL (IF NECESSARY) SHALL

MODULATE TO MAINTAIN THE OCCUPIED ZONE TEMPERATURE SETPOINT VIA ITS RESPECTIVE ROOM THERMOSTAT. B. WHEN THE ZONE REACHES SETPOINT, THE SYSTEM WILL BE INDEXED TO "OCCUPIED MODE".

COOL DOWN: A. THE REFRIGERATION SYSTEM SHALL BE STAGED TO MAINTAIN THE OCCUPIED ZONE TEMPERATURE SETPOINT VIA ITS RESPECTIVE ROOM

THERMOSTAT. B. WHEN THE ZONE REACHES SETPOINT, THE SYSTEM SHALL BE INDEXED TO "OCCUPIED MODE".

C. OCCUPIED MODE: 1. WHEN THE RTU IS INDEXED TO OCCUPIED MODE, THE OA DAMPER SHALL OPEN TO ITS POSITION (AS DETERMINED DURING TEST AND BALANCE) TO ACHIEVE DESIGN OUTSIDE AIRFLOW AND THE SUPPLY FAN SHALL START AND

RUN CONTINUOUSLY 2. VARIABLE SUPPLY FAN SHALL FULLY MODULATE OR BE STAGED (RTU-06 THROUGH RTU-15) BETWEEN ITS SCHEDULED MINIMUM AND MAXIMUM SETPOINTS.

D. COOLING MODE . COOLING MODE SHALL BE ENABLED WHENEVER THE OA AMBIENT TEMPERATURE IS GREATER THAN OR EQUAL TO 60°F DB (ADJ) AND A CALL FOR 5. DEHUMIDIFICATION MODE:

COOLING EXISTS. 2. THE REFRIGERATION SYSTEM SHALL MODULATE AND SUPPLY FAN SHALL MODULATE (OR BE STAGED) TO MAINTAIN THE COOLING ZONE TEMPERATURE AND RELATIVE HUMIDITY SETPOINT IN ACCORDANCE WITH MANUFACTURER'S SINGLE ZONE VAV SEQUENCE OF OPERATIONS.

E. HEATING MODE 1. HEATING MODE SHALL BE ENABLED WHENEVER THE OUTSIDE AIR TEMPERATURE IS LESS THAN OR EQUAL TO 55°F DB (ADJ) AND A CALL FOR

HEATING EXISTS 2. THE HEAT PUMP SHALL MODULATE TO MAINTAIN THE HEATING ZONE TEMPERATURE SETPOINT IN ACCORDANCE WITH MANUFACTURER'S SINGLE ZONE VAV SEQUENCE OF OPERATIONS. . DEHUMIDIFICATION MODE:

1. EACH RTU SHALL MONITOR RELATIVE HUMIDITY IN THE ASSOCIATED ZONE VIA COMBINATION TEMPERATURE/HUMIDITY SENSORS. 2. WHEN ZONE RELATIVE HUMIDITY EXCEEDS 55% (ADJ), THE ASSOCIATED RTU

SHALL ENABLE MODULATING HOT GAS REHEAT. A. WHEN A UNIT ENTERS DEHUMIDIFICATION MODE, ITS COMPRESSOR(S) SHALL BEGIN OPERATING AT 100% CAPACITY

B. THE UNIT SHALL ACTIVATE ITS REHEAT COIL AND ASSOCIATED CONTROL TO MAINTAIN A LEAVING AIR TEMPERATURE OF NO LESS THAN 65°F (ADJ). G. ECONOMIZER MODE (ONLY APPLIES TO UNITS INDICATED ON EQUIPMENT SCHEDULES)

OUTSIDE AIR TEMPERATURE. ECONOMIZER MODE SHALL BE CONTROLLED BASED ON DIFFERENTIAL ENTHALPY WITH FIXED OUTDOOR DRY-BULB TEMPERATURE. OR WHEN THE OUTSIDE AIR TEMPERATURE IS LESS THAN 75 °F, THE

1. THE UNIT SHALL MONITOR THE RETURN AIR AND OUTSIDE AIR ENTHALPY AND

A. WHEN OUTSIDE AIR ENTHALPY IS LESS THAN THE RETURN AIR ENTHALPY SYSTEM SHALL BE ENABLE ECONOMIZER MODE. THE REFRIGERATION SYSTEM, AND THE OA AND RA DAMPERS SHALL MODULATE IN SEQUENCE TO MAINTAIN THE COOLING ZONE TEMPERATURE AND RELATIVE HUMIDITY SETPOINT.

B. THE SYSTEM SHALL DISABLE ECONOMIZER MODE WHEN THE OUTSIDE AIR ENTHALPY IS GREATER THAN THE RETURN AIR ENTHALPY OR WHEN THE OUTSIDE AIR TEMPERATURE IS GREATER THAN 75 °F OR THE ZONE RELATIVE HUMIDITY IS OUTSIDE OF SETPOINT BY 3% (ADJ) FOR MORE THAN AIR CURTAINS

5 MINUTES (ADJ)

1. WHEN THE RTU IS INDEXED INTO UNOCCUPIED MODE, THE SUPPLY FAN SHALL BE OFF, THE EXHAUST FAN SHALL BE OFF, THE OUTSIDE AIR (OA) DAMPER SHALL BE CLOSED, AND THE RECIRCULATION AIR (RA) DAMPER SHALL BE

2. WHEN THE UNOCCUPIED ZONE TEMPERATURE SETPOINT IS NOT SATISFIED, THE REFRIGERATION SYSTEM AND SUPPLY FAN SHALL BE STAGED IN SEQUENCE TO MAINTAIN THE UNOCCUPIED ZONE TEMPERATURE SETPOINT VIA ITS RESPECTIVE ZONE THERMOSTAT.

3. WHEN THE UNOCCUPIED ZONE TEMPERATURE SETPOINT IS SATISFIED, THE SUPPLY FAN AND COILS SHALL BE DEENERGIZED

4. ALL SYSTEM SAFETIES SHALL REMAIN OPERATIONAL B. MORNING WARM UP / COOL DOWN:

 THE MODE SHALL BE INITIATED BY THE CENTRALIZED CONTROL PLATFORM THROUGH AN OPTIMAL START CALCULATION. WHEN INITIATED, THE SUPPLY FAN SHALL START, THE OA DAMPER SHALL BE CLOSED, AND THE RA DAMPER SHALL BE OPEN. 2. WARM UP:

A. THE HEAT PUMP AND ELECTRIC HEATING COIL (IF NECESSARY) SHALL MODULATE TO MAINTAIN THE OCCUPIED ZONE TEMPERATURE SETPOINT VIA ITS RESPECTIVE ROOM THERMOSTAT. B. WHEN THE ZONE REACHES SETPOINT, THE SYSTEM WILL BE INDEXED TO

"OCCUPIED MODE". A. THE REFRIGERATION SYSTEM SHALL BE STAGED TO MAINTAIN THE OCCUPIED ZONE TEMPERATURE SETPOINT VIA ITS RESPECTIVE ROOM

THERMOSTAT. B. WHEN THE ZONE REACHES SETPOINT, THE SYSTEM SHALL BE INDEXED TO "OCCUPIED MODE". C. OCCUPIED MODE:

1. WHEN THE RTU IS INDEXED TO OCCUPIED MODE, THE OA AND RA DAMPER SHALL OPEN TO ITS POSITION (AS DETERMINED DURING TEST AND BALANCE) TO ACHIEVE UPPER MINIMUM DESIGN OUTSIDE AIRFLOW AND THE SUPPLY AND EXHAUST FANS SHALL START AND RUN CONTINUOUSLY. 2. VARIABLE SUPPLY FAN SHALL FULLY MODULATE BETWEEN ITS SCHEDULED

MINIMUM AND MAXIMUM SETPOINTS. THE EXHAUST FAN WILL OPERATE

CONTINOUSLY AT ITS SCHEDULED SETPOPINT. D. COOLING MODE: 1. COOLING MODE SHALL BE ENABLED WHENEVER THE OA AMBIENT

COOLING EXISTS. 2. THE REFRIGERATION SYSTEM AND SUPPLY FAN SHALL BE STAGED TO MAINTAIN THE COOLING ZONE TEMPERATURE AND RELATIVE HUMIDITY SETPOINT.

E. HEATING MODE:

1. HEATING MODE SHALL BE ENABLED WHENEVER THE OUTSIDE AIR TEMPERATURE IS LESS THAN OR EQUAL TO 55°F DB (ADJ) AND A CALL FOR

HEATING EXISTS. 2. THE HEAT PUMP SHALL MODULATE TO MAINTAIN THE HEATING ZONE

TEMPERATURE SETPOINT. 3. IF THE HEAT PUMP CANNOT MEET THE SUPPLY TEMPERATURE SETPOINT, THE SECONDARY ELECTRIC HEATING COIL WILL ACTIVATE. THE ELECTRIC HEATER MUST MODULATE TO MAINTAIN THE SUPPLY TEMPERATURE SET POINT.

F. DEHUMIDIFICATION MODE: 1. EACH RTU SHALL MONITOR RELATIVE HUMIDITY IN THE ASSOCIATED ZONE VIA COMBINATION TEMPERATURE/HUMIDITY SENSORS.

WHEN ZONE RELATIVE HUMIDITY EXCEEDS 55% (ADJ), THE ASSOCIATED RTU SHALL ENABLE MODULATING HOT GAS REHEAT. A. WHEN A UNIT ENTERS DEHUMIDIFICATION MODE, ITS COMPRESSOR(S)

SHALL BEGIN OPERATING AT 100% CAPACITY B. THE UNIT SHALL ACTIVATE ITS REHEAT COIL AND ASSOCIATED CONTROL TO

MAINTAIN A LEAVING AIR TEMPERATURE OF NO LESS THAN 65°F (ADJ). G. DEMAND CONTROL VENTILATION (DCV) (ONLY APPLIES TO UNITS INDICATED ON **EQUIPMENT SCHEDULES):**

1. THE OUTDOOR AMBIENT AIR CO2 LEVEL SHALL BE MONITORED FOR THE SPACES INDICATED ON THE DRAWINGS. THE INDOOR CO2 SETPOINT SHALL BE EQUAL TO THE OUTDOOR AIR LEVEL PLUS 350 PPM (ADJ) 2. THE CO2 SENSOR MOUNTED IN THE SPACE SHALL BE MONITORED. THE

ROOFTOP UNIT SHALL MODULATE ITS OA DAMPER POSITION AND EXHAUST FAN BASED ON A LINEAR RESET BETWEEN THE SCHEDULED LOWER MINIMUM AND UPPER MINIMUM OUTSIDE AIRFLOWS TO MAINTAIN ZONE CO2 SETPOINT 3. DCV SHALL NOT BE AVAILABLE DURING UNOCCUPIED OR MORNING WARM UP/COOLDOWN MODES.

1. UNOCCUPIED MODE: 1. WHEN THE ERU IS INDEXED INTO UNOCCUPIED MODE, THE SUPPLY AND EXHAUST FAN SHALL BE OFF, AND THE OUTSIDE AIR (OA) DAMPER SHALL BE CLOSED.

2. OCCUPIED MODE 1. WHEN THE ERU IS INDEXED TO OCCUPIED MODE, THE OA DAMPER SHALL OPEN TO ITS POSITION (AS DETERMINED DURING TEST AND BALANCE) TO ACHIEVE DESIGN OUTSIDE AIRFLOW AND THE SUPPLY AND EXHAUST FANS SHALL START AND RUN CONTINUOUSLY.

2. THE SUPPLY AND EXHAUST FANS MUST RUN ANYTIME THE UNIT IS COMMANDED TO RUN. THE FANS MUST RUN AT CONSTANT SPEED AS DETERMINED DURING TEST AND BALANCE TO ACHIEVE SCHEDULED AIRFLOWS.

3. COOLING MODE COOLING MODE SHALL BE ENABLED WHENEVER THE OA AMBIENT TEMPERATURE IS GREATER THAN OR EQUAL TO 60°F DB (ADJ) AND A CALL FOR

2. THE REFRIGERATION SYSTEM AND SUPPLY FAN SHALL BE STAGED TO MAINTAIN THE COOLING ZONE TEMPERATURE AND RELATIVE HUMIDITY SETPOINT.

4. HEATING MODE HEATING MODE SHALL BE ENABLED WHENEVER THE OUTSIDE AIR TEMPERATURE IS LESS THAN OR EQUAL TO 55°F DB (ADJ) AND A CALL FOR

HEATING EXISTS. 2. THE HEAT PUMP SHALL MODULATE TO MAINTAIN THE HEATING ZONE TEMPERATURE SETPOINT.

1. EACH ERU SHALL MONITOR RELATIVE HUMIDITY IN THE ASSOCIATED ZONE VIA COMBINATION TEMPERATURE/HUMIDITY SENSORS. 2. WHEN ZONE RELATIVE HUMIDITY EXCEEDS 60% (ADJ), THE ASSOCIATED RTU SHALL ENABLE MODULATING HOT GAS REHEAT.

A. WHEN A UNIT ENTERS DEHUMIDIFICATION MODE, ITS COMPRESSOR(S) SHALL BEGIN OPERATING AT 100% CAPACITY

3. THE UNIT SHALL ACTIVATE ITS REHEAT COIL AND ASSOCIATED CONTROL TO MAINTAIN A LEAVING AIR TEMPERATURE OF NO LESS THAN 75°F (ADJ).

A. EF-01, EF-02, EF-04, EF-05 SHALL RUN CONTINUOUSLY DURING OCCUPIED HOURS AS DEFINED BY THE LOCAL BMS SYSTEM. B. EF-03 SHALL BE THERMOSTATICALLY CONTROLLED TO MAINTAIN TEMPERATURE

SETPOINT OF 80°F (ADJ). THE OUTSIDE AIR AND EXHAUST AIR DAMPERS MUST OPEN ANYTIME THE UNIT RUNS AND MUST CLOSE ANYTIME THE UNIT STOPS. THE FAN MUST START ONLY AFTER THE DAMPER HAS PROVEN EACH DAMPER IS

DUCTLESS SPLIT HEAT PUMPS A. THE BMS MUST MONITOR THE ZONE TEMPERATURE OF THE ZONE AND THE SPLIT

B. THE LOCAL THERMOSTAT MUST MAINTAIN THE FOLLOWING TEMPERATURE SETPOINTS:

1. 75°F (ADJ) COOLING SETPOINT 2. 65°F (ADJ) HEATING SETPOINT C. BMS SHALL ALARM IF ZONE TEMPERATURE IS GREATER THAN 80°F (ADJ.) OR IF ZONE TEMPERATURE IS BELOW 55°F (ADJ.).

A. HVLS FANS SHALL RUN CONTINUOUSLY DURING OCCUPIED HOURS AS DEFINED BY THE LOCAL BMS SYSTEM B. FIRE ALARM PANEL SHALL OVERRIDE BAS COMMANDS WHEN BUILDING IS IN

A. AIR CURTAINS SHALL BE COMMANDED ON UPON DOOR OPENING VIA DOOR

SWITCH.

A. EUH-01 SHALL CYCLE ON AND OFF TO MAINTAIN SETPOINT OF 40°F (ADJ). B. EUH-02 THROUGH EUH-06 SHALL CYCLE ON AND OFF TO MAINTAIN SETPOINT OF 60°F (ADJ).

C. EF-06 MUST RUN CONTINUOUSLY

INSTRUMENTATION AND CONTROLS A. PROVIDE A LOCAL BUILDING MANAGEMENT SYSTEM (BMS), BACNET PROTOCOL, COMPATIBLE WITH TENANT'S ENTERPRISE SYSTEM PROVIDED THROUGH

NIAGARA N4 PLATFORM. B. LOCAL BMS SHALL BE CAPABLE OF INTEGRATING UNIT DDC CONTROLLERS WITHIN A WEB-BASED NETWORK INTERFACE. THE SYSTEM INTERFACE SHALL DEPICT EACH MECHANICAL SYSTEM ON THE BUILDING FLOORPLAN WITH POINT-AND-CLICK GRAPHICAL INTERFACE.

C. BUILDING MANAGEMENT SYSTEM SHALL INTERFACE WITH CLIENT'S EXISTING CENTRALIZED SQL SERVER (NIAGARA N4 PLATFORM) AND SHALL GATHER THE DATA FROM THE SITE AND DISPLAY IN AN APPROVED FORMAT. D. THE FOLLOWING EQUIPMENT SHALL BE MONITORED AND CONTROLLED: ROOFTOP PACKAGED A/C UNITS, HVLS FANS, VENTILATION FANS, AND EXHAUST

E. SPACE TEMPERATURE, SPACE RELATIVE HUMIDITY, FIRE ALARM CONTROL PANELS, AND METERS (ELECTRIC, WATER) SHALL BE MONITORED BY THE BMS F. PROVIDE SIGNAL CONVERTER AS REQUIRED TO ALLOW SIGNALS FROM FIRE

ALARM PANEL TO BE UTILIZED BY BMS. G. SYSTEM SHALL PROVIDE THE ABILITY TO CONTROL EACH PIECE OF EQUIPMENT INDIVIDUALLY USING TIME OF DAY SCHEDULING, OCCUPIED / UNOCCUPIED SCHEDULING, ENABLE / DISABLE CONTROL, MANUAL CONTROL, SET POINT CONTROL, ETC. AS DESIRED.

H. THE BMS SHALL BE WEB BASED AND SHALL HAVE THE ABILITY TO VIEW THE CURRENT OPERATING STATUS OF EACH PIECE OF EQUIPMENT, AS WELL AS THE ABILITY TO ENABLE / DISABLE OPERATION, ADJUST SET POINTS, ETC., AS WELL AS VIEW INTERNAL POINTS OF PACKAGED EQUIPMENT ON-BOARD CONTROLLERS (RTU. HVLS FAN. EF. ETC.).

I. THE SYSTEM SHALL HAVE THE ABILITY TO NOTIFY SELECT PERSONNEL (VIA

PAGER, PHONE, EMAIL, ETC.) OF ALARM OR OTHER CONDITIONS AS DESIRED BY THE TENANT. J. ALL SPACE SENSORS SHALL BE COMBINATION TEMPERATURE, RELATIVE HUMIDITY, AND CO2 LEVEL TYPE TO ALLOW MONITORING OF SPACE CONDITIONS

AND CALCULATION OF THE SPACE HEAT INDEX. TEMPERATURE IS GREATER THAN OR EQUAL TO 60°F DB (ADJ) AND A CALL FOR K. THE SYSTEM SHALL PROVIDE CONNECTION TO THE OWNER'S VIRTUAL PRIVATE NETWORK (VPN) FOR REMOTE ACCESS TO DATA. BMS INTEGRATION SHALL BE COORDINATED WITH OWNER'S SYSTEM INTEGRATOR, ENVIRONMENTAL SYSTEMS INCORPORATED (ESI).

METAL DUCTS AND ACCESSORIES

A. DUCT CONSTRUCTION, INCLUDING SHEET METAL THICKNESSES, SEAM AND JOINT CONSTRUCTION, REINFORCEMENTS, AND HANGERS AND SUPPORTS, SHALL COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS -METAL AND FLEXIBLE" AND WITH PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED HEREINAFTER COMPLY WITH REQUIREMENTS IN ASHRAE/IES 90.1, SECTION 6.4.4 - "HVAC SYSTEM CONSTRUCTION AND INSULATION.

1. CONSTRUCT DUCTS OF GALVANIZED SHEET STEEL UNLESS OTHERWISE INDICATED.

2. ELBOWS, TRANSITIONS, OFFSETS, BRANCH CONNECTIONS, AND OTHER DUCT CONSTRUCTION: SELECT TYPES AND FABRICATE IN ACCORDANCE WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," CH. 4, "FITTINGS AND OTHER CONSTRUCTION"

B. DUCT LINER SHALL COMPLY WITH ASTM C1071, NFPA 90A, OR NFPA 90B; AND WITH NAIMA AH124, "FIBROUS GLASS DUCT LINER STANDARD." ADHERE A SINGLE LAYER OF 1" THICK OF DUCT LINER WITH AT LEAST 90 PERCENT ADHESIVE COVERAGE AT LINER CONTACT SURFACE AREA. 1. PROVIDE INTERNAL DUCT LINER ON THE FIRST 15'-0" OF DUCTWORK ASSOCIATED WITH SUPPLY AND RETURN DUCTWORK FROM ROOFTOP

C. SEALANT AND GASKET REQUIREMENTS: SURFACE-BURNING CHARACTERISTICS FOR SEALANTS AND GASKETS SHALL BE A MAXIMUM FLAME-SPREAD INDEX OF 25 AND A MAXIMUM SMOKE-DEVELOPED INDEX OF 50 WHEN TESTED IN ACCORDANCE WITH UL 723; CERTIFIED BY AN NRTL

HANGERS AND SUPPORTS A. GALVANIZED-STEEL RODS AND NUTS.

B. STRAP AND ROD SIZES: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," TABLE 5-1 (TABLE 5-1M), "RECTANGULAR DUCT HANGERS MINIMUM SIZE," AND TABLE 5-2, "MINIMUM HANGER SIZES FOR ROUND DUCT."

DUCT CONSTRUCTION / INSTALLATION

A. DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF DUCT SYSTEM. INDICATED DUCT LOCATIONS, CONFIGURATIONS, AND ARRANGEMENTS WERE USED TO SIZE DUCTS AND CALCULATE FRICTION LOSS FOR AIR-HANDLING EQUIPMENT SIZING AND FOR OTHER DESIGN CONSIDERATIONS. INSTALL DUCT SYSTEMS AS INDICATED UNLESS DEVIATIONS TO LAYOUT ARE APPROVED ON SHOP DRAWINGS AND COORDINATION DRAWINGS.

B. INSTALL FACTORY- OR SHOP-FABRICATED FITTINGS FOR CHANGES IN DIRECTION, SIZE, AND SHAPE AND FOR BRANCH CONNECTIONS C. WHERE DUCTS PASS THROUGH NON-FIRE-RATED INTERIOR PARTITIONS AND EXTERIOR WALLS AND ARE EXPOSED TO VIEW, COVER THE OPENING BETWEEN THE PARTITION AND DUCT OR DUCT INSULATION WITH SHEET METAL FLANGES OF SAME METAL THICKNESS AS THE DUCT. OVERLAP OPENINGS ON FOUR SIDES BY AT LEAST 1-1/2 INCHES (38 MM).

CONSTRAINTS PROHIBIT 1.5 X RADIUS ELBOWS. FABRICATE 90-DEGREE RECTANGULAR MITERED ELBOWS TO INCLUDE TURNING VANES E. BRANCH CONNECTIONS: USE LATERAL OR CONICAL BRANCH CONNECTIONS. F. FLEXIBLE DUCTS SHALL BE UL 181, CLASS 1, TWO-PLY VINYL FILM SUPPORTED BY HELICALLY WOUND, SPRING-STEEL WIRE; FIBROUS-GLASS INSULATION; POLYETHYLENE VAPOR-BARRIER FILM. FLEXIBLE DUCTWORK SHALL NOT

D. ELBOWS: USE 1.5 X RADIUS ELBOWS. ONLY USE MITERED ELBOWS WHERE

EXCEED 5'-0" IN LENGTH. G. FABRICATE ALL DUCTS TO ACHIEVE SMACNA PRESSURE CLASS, SEAL CLASS, AND LEAKAGE CLASS OF 150% OF THE SCHEDULED FAN EXTERNAL STATIC PRESSURE OR AS INDICATED BELOW, WHICHEVER IS GREATER: 1. SUPPLY DUCTS CONNECTED TO FAN COIL UNITS, CONSTANT VOLUME AIR HANDLERS, FURNACES, HEAT PUMPS, AND TERMINAL UNITS: PRESSURE

CLASS: POSITIVE 2 INCH WG. SEAL CLASS A. 2. SUPPLY DUCTS CONNECTED TO VARIABLE-AIR-VOLUME AIR-HANDLING UNITS: PRESSURE CLASS: POSITIVE 4 INCH WG. SEAL CLASS: A.

3. RETURN AND EXHAUST DUCTS: PRESSURE CLASS NEGATIVE 1-INCH WG, SEAL CLASS A.

HANGER AND SUPPORT INSTALLATION A. COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," CHAPTER 5, "HANGERS AND SUPPORTS."

B. BUILDING ATTACHMENTS: CONCRETE INSERTS, POWDER-ACTUATED FASTENERS, OR STRUCTURAL-STEEL FASTENERS APPROPRIATE FOR CONSTRUCTION MATERIALS TO WHICH HANGERS ARE BEING ATTACHED. C. HANGER SPACING: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," TABLE 5-1 (TABLE 5-1M), "RECTANGULAR DUCT HANGERS MINIMUM SIZE," AND TABLE 5-2, "MINIMUM HANGER SIZES FOR ROUND DUCT," FOR MAXIMUM HANGER SPACING; INSTALL HANGERS AND

SUPPORTS WITHIN 24 INCHES (610 MM) OF EACH ELBOW AND WITHIN 48

INCHES (1220 MM) OF EACH BRANCH INTERSECTION.

FIELD QUALITY CONTROL A. COMPLY WITH SMACNA'S "HVAC AIR DUCT LEAKAGE TEST MANUAL."

A. DAMPERS SHALL BE SINGLE BLADE BUTTERFLY TYPE IN DUCTS UP TO AND INCLUDING 18" X 12" SINGLE; FOR DUCTS LARGE THAN 18" X 12", IN EITHER OR BOTH DIMENSIONS, THE DAMPERS SHALL BE THE MULTI-LOUVER TYPE B. SINGLE BLADE BUTTERFLY DAMPERS SHALL BE CONSTRUCTED OF NOT LESS THAN 16-GAUGE GALVANIZED STEEL BLADE MOUNTED IN A GALVANIZED STEEL FRAME. DAMPER SHALL BE PROVIDED WITH AN EXTENDED ROD TO PERMIT

INSTALLATION OF A DAMPER REGULATOR C. MULTI-LOUVER DAMPERS SHALL BE OPPOSED BLADE TYPE, CONSTRUCTED OF NOT LESS THAN 16-GAUGE GALVANIZED STEEL BLADE MOUNTED IN GALVANIZED STEEL CHANNEL FRAME. BLADE SPACING SHALL NOT EXCEED 6-INCHES AND THE TOP AND BOTTOM EDGES OF THE BLADES SHALL BE CRIMPED TO STIFFEN THE BLADES. DAMPER BLADES SHALL BE INTERCONNECTED BY RODS AND LINKAGES TO PROVIDE SIMULTANEOUS OPERATION OF ALL BLADES. DAMPER SHALL BE PROVIDED WITH AN EXTENDED ROD TO PERMIT INSTALLATION OF A DAMPER REGULATOR.

MOTOR-OPERATED DAMPERS

ROTATION.

A. DAMPER RATINGS:

 PRESSURE: UP TO 5 IN. W.G. DIFFERENTIAL 2. VELOCITY: UP TO 3000 FPM LEAKAGE

A. CLASS 1A AT 1 IN. W.G. B. CLASS 1 AT UP TO 5 IN. W.G.

4. TEMPERATURE: -40 °F TO 250°F B. DAMPER BLADES SHALL BE 16 GA. (1.5MM) GALVANIZED STEEL 3V TYPE WITH THREE LONGITUDINAL GROOVES FOR REINFORCEMENT. BLADES SHALL BE COMPLETELY SYMMETRICAL RELATIVE TO THEIR AXLE PIVOT POINT. PRESENTING IDENTICAL RESISTANCE TO AIRFLOW AND OPERATION IN EITHER

DIRECTION THROUGH THE DAMPER C. BLADE SEALS SHALL BE TPE. LINKAGE SHALL BE BLADE-TO BLADE CONCEALED IN JAMB (OUT OF THE AIRSTREAM) TO PROTECT LINKAGE AND REDUCE PRESSURE DROP AND NOISE

D. DAMPER FRAME SHALL BE 16 GA. (1.5MM) GALVANIZED STEEL FORMED INTO A

STRUCTURAL HAT CHANNEL SHAPE WITH REINFORCED CORNERS TO MEET 11 GA. (3.1MM) CRITERIA. E. BEARINGS SHALL BE CORROSION RESISTANT, PERMANENTLY LUBRICATED, SYNTHETIC (ACETAL) SLEEVE TYPE ROTATING IN EXTRUDED HOLES IN THE

DAMPER FRAME FOR MAXIMUM SERVICE. F. AXLES SHALL BE SQUARE AND POSITIVELY LOCKED INTO THE DAMPER BLADE. G. JAMB SEALS SHALL BE FLEXIBLE STAINLESS STEEL COMPRESSION TYPE TO PREVENT LEAKAGE BETWEEN BLADE END AND DAMPER FRAME H. SUBMITTAL DATA SHALL CERTIFY ALL AIR LEAKAGE AND AIR PERFORMANCE

PRESSURE DROP DATA IS LICENSED IN ACCORDANCE WITH THE AMCA

CERTIFIED RATINGS PROGRAM FOR TEST FIGURES 5.2, 5.3, AND 5.5. DAMPER

AIR PERFORMANCE DATA SHALL BE DEVELOPED IN ACCORDANCE WITH THE LATEST EDITION OF AMCA STANDARD 500-D. DAMPER ACTUATOR:

1. ACTUATOR SHALL BE ON/OFF, SPRING RETURN, CONSTANT TORQUE OPERATION. 2. ACTUATOR SHALL BE PROTECTED FROM OVERLOAD AT ALL ANGLES OF

3. ACTUATOR SIZING SHALL BE IN ACCORDANCE WITH THE MOTOR-OPERATED DAMPER MANUFACTURER'S WRITTEN INSTRUCTIONS 4. IF REQUIRED, TWO SINGLE-POLE DOUBLE-THROW (SPDT) AUXILIARY SWITCHES SHALL BE PROVIDED: AT LEAST ONE SHALL BE ADJUSTABLE 5. ACTUATOR SHALL HAVE A 5-YEAR MANUFACTURER'S WARRANTY. UNDER

ISO 9001: INTERNATIONAL QUALITY CONTROL STANDARDS.

6. ACTUATOR SHALL BE MOUNTED TO THE MOTOR-OPERATED DAMPER IN

ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.

FIRE DAMPERS

A. FIRE DAMPERS SHALL BE FUSIBLE LINK TYPE TESTED FOR CLOSURE UNDER AIR FLOW, CONFORMING TO UL 555 AND LABELED FOR INSTALLATION IN FIRE RATED WALLS AND FLOORS. DAMPERS IN FLOOR SHALL HAVE SPRING OPERATOR. DAMPERS SHALL HAVE BLADES OUT OF THE AIRSTREAM WHEN DAMPER IS IN THE OPEN POSITION. DAMPERS IN WALLS OR FLOORS RATED 2 HOURS OR LESS SHALL BE RATED FOR 1-1/2 HOURS; DAMPERS IN WALLS RATED 3 OR 4 HOURS SHALL BE RATED FOR 3

HOURS. DAMPERS SHALL BE CONSTRUCTED OF GALVANIZED STEEL. B. FIRE DAMPERS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS

DUCT AND PLENUM ACCESS DOORS A. DUCT ACCESS DOORS SHALL BE SIZED IN ACCORDANCE WITH GENERAL

B. FOR ACCESS DOORS IN DUCT PRESSURE CLASS 2", DOORS SHALL BE DOUBLE WALL CONSTRUCTION OF NOT LESS THAN 24-GAUGE GALVANIZED STEEL SHEET, WITH 1-INCH THICK NEOPRENE COATED FIBERGLASS INSULATION BETWEEN THE WALLS. DOORS SHALL HAVE A CONTINUOUS HINGE ON ONE SIDE AND SAME LATCH WITH STRIKER PLATE ON THE OTHER SIDE; DOORS WITH THE HEIGHT OVER 12-INCHES SHALL HAVE NOT LESS THAN 2 CAM LATCHES WITH STRIKER PLATES. DOOR FRAME SHALL BE CONSTRUCTED OF NOT LESS THAN 22-GUAGE GALVANIZED STEEL AND SHALL HAVE KNOCK-OVER EDGES FOR SECURING TO DUCT. THE DOOR ASSEMBLY SHALL BE DOUBLE GASKETED TO PROVIDE SEALS FROM THE DOOR TO THE FRAME AND FROM THE FRAME TO THE DUCT.

C. ACCESS DOORS IN DUCT PRESSURE CLASSES 3" AND ABOVE SHALL BE THE COMBINATION ACCESS/VACUUM RELIEF TYPE DESIGNED FOR HIGH PRESSURE SERVICE.

ROOFTOP EQUIPMENT CLEARANCES A. NO ROOFTOP EQUIPMENT OR WALK PADS SHALL BE MOUNTED OR INSTALLED WITHIN IN THE 15'-1" MINIMUM OFFSET FROM THE EDGE OF ROOF/ PARAPET. THIS MINIMUM OFFSET AREA INCLUDES (BUT IS NOT LIMITED TO) FILTER CHANGING CLEARANCES FOR ROOFTOP UNITS AS WELL AS ALL MAINTENANCE AREAS AROUND EQUIPMENT.

B. COORDINATE WITH OTHER TRADES PRIOR TO ROOFTOP EQUIPMENT

WIND LOAD PROTECTION DEVICES

IN ASCE/SEI 7

INSTALLATION.

A. DELEGATED DESIGN SUBMITTAL 1. DESIGN OF WIND-LOAD PROTECTION DEVICES AND BRACING IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE, SMACNA DUCT DESIGN GUIDELINES, AND ASCE 7-10, CHAPTERS 26 THROUGH 30. WHERE "ASCE/SEI 7" IS USED THROUGHOUT THIS SECTION, IT IS TO BE UNDERSTOOD THAT THE EDITION REFERRED TO IN THIS PARAGRAPH IS THE EDITION INTENDED AS REFERENCE THROUGHOUT THIS SECTION OF

2. INCLUDE DESIGN CALCULATIONS AND DETAILS FOR SELECTING WIND-LOAD RESTRAINTS COMPLYING WITH PERFORMANCE REQUIREMENTS. DESIGN CRITERIA, AND ANALYSIS DATA SIGNED AND SEALED BY THE QUALIFIED PROFESSIONAL ENGINEER RESPONSIBLE FOR THEIR

A. CONCRETE ANCHORS AND INSERTS: INCLUDE CALCULATIONS SHOWING ANTICIPATED WIND LOADS. B. WIND-LOAD DESIGN CALCULATIONS: SUBMIT ALL STATIC AND

DESIGN CALCULATIONS" PARAGRAPH HEREINAFTER. 3. WIND-RESTRAINT DETAIL DRAWING: A. DESIGN ANALYSIS: TO SUPPORT SELECTION AND ARRANGEMENT OF WIND RESTRAINTS. INCLUDE CALCULATIONS OF COMBINED TENSILE

DYNAMIC LOADING CALCULATIONS PREPARED UNDER "WIND-LOAD

AND SHEAR LOADS. B. DETAILS: INDICATE FABRICATION AND ARRANGEMENT. DETAIL ATTACHMENTS OF RESTRAINTS TO RESTRAINED ITEMS AND TO THE STRUCTURE. SHOW ATTACHMENT LOCATIONS, METHODS, AND SPACINGS. IDENTIFY COMPONENTS, LIST THEIR STRENGTHS, AND INDICATE DIRECTIONS AND VALUES OF FORCES TRANSMITTED TO THE STRUCTURE DURING WIND EVENTS. INDICATE ASSOCIATION

WITH VIBRATION ISOLATION DEVICES. C. COORDINATE VIBRATION ISOLATION DETAILS WITH WIND-RESTRAINT DETAILS REQUIRED FOR EQUIPMENT MOUNTED OUTDOORS, COMPLY ALSO WITH REQUIREMENTS IN OTHER SECTIONS FOR EQUIPMENT

MOUNTED OUTDOORS B. WIND-LOAD-RESTRAINT DEVICE LOAD RATINGS: DEVICES TO BE TESTED AND RATED IN ACCORDANCE WITH APPLICABLE CODE REQUIREMENTS AND AUTHORITIES HAVING JURISDICTION. DEVICES TO BE LISTED BY A NATIONALLY RECOGNIZED THIRD PARTY THAT REQUIRES PERIODIC FOLLOW-UP INSPECTIONS AND HAS A LISTING DIRECTORY AVAILABLE TO

THE PUBLIC. C. WIND-LOAD DESIGN CALCULATIONS 1. PERFORM CALCULATIONS TO OBTAIN FORCE INFORMATION NECESSARY TO PROPERLY SELECT WIND-LOAD-RESTRAINT DEVICES, FASTENERS, AND ANCHORAGE. PERFORM CALCULATIONS USING METHODS ACCEPTABLE TO APPLICABLE CODE AUTHORITIES AND AS PRESENTED

2. FACTORS INDICATED BELOW THAT ARE SPECIFIC TO INDIVIDUAL PIECES OF EQUIPMENT MUST BE OBTAINED BY CONTRACTOR AND MUST BE INCLUDED IN INDIVIDUAL COMPONENT SUBMITTAL PACKAGES COORDINATE DESIGN WIND-LOAD CALCULATIONS WITH VIBRATION ISOLATION REQUIREMENTS. COMPLY WITH REQUIREMENTS IN OTHER

SECTIONS IN ADDITION TO THOSE IN THIS SECTION FOR EQUIPMENT MOUNTED OUTDOORS. . DESIGN WIND PRESSURE "P" FOR EXTERNAL SIDEWALL-MOUNTED EQUIPMENT SUCH AS LOUVERS IS TO BE CALCULATED BY DELEGATED-DESIGN CONTRACTOR USING METHODS IN ASCE/SEI 7, CH. 30.

5. DESIGN WIND PRESSURE "P" FOR ROOFTOP EQUIPMENT IS TO BE CALCULATED BY DELEGATED-DESIGN CONTRACTOR USING METHODS IN ASCE/SEI 7, CH. 30, PART 6: BUILDING APPURTENANCES AND ROOFTOP

 RISK CATEGORY: II. h = MEAN ROOF HEIGHT: 39'-1" V = BASIC WIND SPEED: 143 MPH

Kd = WIND DIRECTIONALITY FACTOR:0.85

STRUCTURES AND EQUIPMENT.

HEIGHT H): 1.04

 EXPOSURE CATEGORY: C Kzt = TOPOGRAPHIC FACTOR: N/A Kz = VELOCITY PRESSURE EXPOSURE COEFFICIENT (EVALUATED AT HEIGHT Z): 0.85

Kh = VELOCITY PRESSURE EXPOSURE COEFFICIENT (EVALUATED AT

ASCE/SEI 7-16 SECTION 26.10.1 OR OTHER SOURCE APPROVED BY

 qz = VELOCITY PRESSURE: VALUE CALCULATED BY DELEGATED WIND-LOAD DESIGN CONTRACTOR USING METHODS DETAILED IN ASCE/SEI 7-16 SECTION 26.10.1 OR OTHER SOURCE APPROVED BY AUTHORITIES HAVING JURISDICTION qh = VELOCITY PRESSURE: VALUE CALCULATED BY DELEGATED WIND-LOAD DESIGN CONTRACTOR USING METHODS DETAILED IN

AUTHORITIES HAVING JURISDICTION • G = GUST-EFFECT FACTOR: 0.85

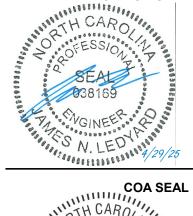
 ENCLOSURE CLASSIFICATION: ENCLOSED BUILDING GCpi = INTERNAL PRESSURE COEFFICIENT: +/- 0.18

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POND & COMPANY No. C-1803

CLIENT INFORMATION

SEEFRIED

INDUSTRIAL

PROPERTIES

PROJECT NAME

DRIVE WILMINGTON, **NORTH CAROLINA** 28435

WAREHOUSE

DEVELOPMEN

DRAWING ISSUE

PROJECT #: SHEET TITLE

CHECKED BY:

SUBMITTED BY:

SHEET NUMBER M-701

30" X 42"

DESIGNED BY: DRAWN BY

BTS -**MECHANICAL SPECIFICATIONS**

ISSUED FOR PERMIT

ORIGINAL SHEET SIZE:

2. RESTRAINED ISOLATION ROOF-CURB RAILS A. DESCRIPTION: FACTORY-ASSEMBLED, FULLY ENCLOSED, INSULATED, AIR-AND WATERTIGHT CURB RAIL DESIGNED TO RESILIENTLY SUPPORT

MINIMUM OF TWO CLAMPING BOLTS FOR CABLE ENGAGEMENT.

EQUIPMENT AND TO WITHSTAND WIND FORCES B. UPPER FRAME: TO PROVIDE CONTINUOUS SUPPORT FOR EQUIPMENT AND

TO BE CAPTIVE TO RESILIENTLY RESIST WIND FORCES C. LOWER SUPPORT ASSEMBLY: TO BE FORMED SHEET METAL SECTION CONTAINING ADJUSTABLE AND REMOVABLE STEEL SPRINGS THAT SUPPORT THE UPPER FRAME. LOWER SUPPORT ASSEMBLY TO HAVE A MEANS FOR ATTACHING TO BUILDING STRUCTURE AND A WOOD NAILER FOR ATTACHING ROOF MATERIALS, AND TO BE INSULATED WITH A MINIMUM OF 2 INCHES OF RIGID, GLASS-FIBER INSULATION ON INSIDE OF ASSEMBLY. MOUNT ADJUSTABLE, RESTRAINED-SPRING ISOLATORS ON ELASTOMERIC VIBRATION ISOLATION PADS AND PROVIDE ACCESS PORTS, FOR LEVEL ADJUSTMENT, WITH REMOVABLE WATERPROOF COVERS AT ALL ISOLATOR LOCATIONS. LOCATE ISOLATORS SO THEY ARE ACCESSIBLE FOR ADJUSTMENT AT ANY TIME DURING THE LIFE OF THE INSTALLATION

WITHOUT INTERFERING WITH INTEGRITY OF ROOF D. SNUBBER BUSHINGS: ALL-DIRECTIONAL, ELASTOMERIC SNUBBER

BUSHINGS AT LEAST 1/4 INCH THICK. E. WATER SEAL: GALVANIZED SHEET METAL WITH EPDM SEALS AT CORNERS, ATTACHED TO UPPER SUPPORT FRAME. EXTENDING DOWN PAST WOOD NAILER OF LOWER SUPPORT ASSEMBLY, AND COUNTERFLASHED OVER ROOF MATERIALS.

E. INSTALLATION: 1. PROVIDE WIND-LOAD CONTROL DEVICES FOR SYSTEMS AND EQUIPMENT WHERE INDICATED IN EQUIPMENT SCHEDULES, WHERE INDICATED ON DRAWINGS, OR AS DETERMINED BY DELEGATED DESIGN OR WHERE SPECIFICATIONS INDICATE THEY ARE TO BE INSTALLED ON SPECIFIC

EQUIPMENT AND SYSTEMS, AND WHERE REQUIRED BY APPLICABLE CODES 2. INSTALLATION OF WIND-LOAD RESTRAINTS, MUST NOT CAUSE ANY CHANGE OF POSITION OF EQUIPMENT, PIPING, OR DUCTWORK RESULTING IN STRESSES OR MISALIGNMENT.

3. INSTALL WIND LOAD RESTRAINT DEVICES USING METHODS APPROVED BY AN AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION THAT PROVIDES REQUIRED SUBMITTALS FOR COMPONENT

MECHANICAL SYSTEMS INSULATION:

FIBERGLASS BLANKET INSULATION FOR DUCTWORK A. BLANKET TYPE FIBERGLASS INSULATION WITH AVERAGE THERMAI CONDUCTIVITY NOT EXCEEDING 0.29 BTU-IN. PER SQUARE FEET PER °F PER

HOUR AT MEAN TEMPERATURE OF 75 °F. 1. MINIMUM DENSITY 1 LB./CU. FT, 2" THICK MINIMUM.

2. ACCEPTABLE PRODUCTS: MANVILLE MICROLITE FSK FACED WRAP 1 LB./ 3 FT. OWENS-CORNING FIBERGLASS FACED DUCT WRAP

COMMERCIAL GRADE. CERTAINTEED STANDARD DUCT WRAP KNAUF DUCT WRAP

B. FIRE RETARDATION ADHESIVE SHALL BE FOSTER 85-20, VIMASCO 733, OR CHILDERS CP-82.

C. WHITE VAPOR BARRIER SHALL BE FOSTER 30-35, VIMASCO 740, CHILDERS CP-30, OR EPOLUX CADALER 650.

D. FOIL REINFORCED KRAFT TAPE. (3" WIDE) SHALL BE ARNO C-430, EASSON 0822,

INSTALLATION, GENERAL

A. DO NOT USE STAPLES FOR SECURING ANY INSULATION. B. APPLY INSULATION ONLY ON CLEAN, DRY SURFACES.

C. CONTINUE INSULATION THROUGH WALL AND CEILING OPENINGS AND SLEEVES, EXCEPT TERMINATE DUCT INSULATION AT FIRE DAMPERS AND AT FLEXIBLE DUCT CONNECTIONS AT AIR HANDLING UNITS

D. PROVIDE CONTINUOUS UNBROKEN VAPOR SEAL INSULATION ON ALL COLD SURFACES WHERE VAPOR JACKETS ARE SEALED.

E. INSULATE AND VAPOR SEAL SUPPORTS THAT ARE SECURED TO COLD SURFACES TO PREVENT CONDENSATION.

F. DO NOT INSULATE UNIONS.

G. FILL PIPE INSULATION PROTECTIVE SADDLES ON HOT PIPES WITH SAME INSULATION AS ADJOINING PIPE INSULATION.

H. COLD PIPE LINES CONSIST OF PIPES OPERATING AT 60 DEGREES F AND BELOW.

HOT PIPE LINES CONSIST OF ALL OTHER PIPES

INSTALLATION, FIBERGLASS BLANKET INSULATION FOR DUCTWORK

A. INSULATE THE FOLLOWING

 ALL GALVANIZED STEEL SUPPLY AND RETURN DUCTWORK WHICH IS NOT LOCATED IN MECHANICAL ROOMS OR INTERNALLY LINED 2. THE LAST 10'-0" OF EXHAUST DUCTWORK BEFORE EXITING THE BUILDING.

THE PORTION OF CEILING DIFFUSERS WHICH ARE EXPOSED ABOVE CEILINGS. B. PROVIDE DUCT LINER ON THE FIRST 15'-0" OF DUCTWORK ASSOCIATED WITH SUPPLY AND RETURN DUCTWORK FROM ROOFTOP UNITS. DUCTWORK

DOWNSTREAM OF DUCT LINER SHALL HAVE EXTERNAL DUCT INSULATION. C. WRAP INSULATION AROUND DUCTS. BUTT ALL CIRCUMFERENTIAL JOINTS. OVERLAP LONGITUDINAL JOINTS 2" MINIMUM. SECURE INSULATION WITH 18-GAUGE SOFT ANNEALED WIRE SPIRALLY WRAPPED AT 12" O.C. WELD TO DUCT.

D. FOR DUCTS OVER 24" WIDE, IN ADDITION TO ADHESIVE, IMPALE INSULATION ON THE BOTTOM OF DUCTS ON METAL PINS MAXIMUM 18" O.C. WELD TO DUCT. SECURE INSULATION ON PINS WITH SPEED WASHERS AND SEAL WITH BARRIER COATING.

E. SEAL CIRCUMFERENTIAL JOINTS AT FIRE DAMPERS, FLEXIBLE CONNECTIONS, AND ENDS OF DUCTS WITH 3" WIDE FOIL REINFORCED KRAFT TAPE. F. TAPE LONGITUDINAL JOINTS WITH 3" WIDE FOIL REINFORCED KRAFT TAPE

TAPE AND APPLY VAPOR BARRIER COATING. H. WRAP PORTIONS OF CEILING DIFFUSERS DESCRIBED ABOVE WITH INSULATION. OVERLAP ENDS OF INSULATION 2" MINIMUM.

G. SEAL PENETRATIONS AND PUNCTURES WITH 3" WIDE FOIL REINFORCED KRAFT

AIR DISTRIBUTION DEVICES:

<u>GENERAL</u> A. FINISH

 ALUMINUM GRILLES, REGISTERS, AND DIFFUSERS WHICH ARE CEILING MOUNTED SHALL BE PROVIDED WITH A FACTORY APPLIED WHITE BAKED ENAMEL FINISH UNLESS INDICATED OTHERWISE, HEREIN OR ON THE

2. ALUMINUM GRILLES AND REGISTERS WHICH ARE WALL-MOUNTED SHALL BE FACTORY ETCHED TO A SATIN FINISH AND COATED WITH A CLEAR LACQUER. B. MOUNTING

. MODEL NUMBERS INDICATED ON DRAWINGS ARE FOR SURFACE MOUNTING IN EXPOSED TEE-BAR GRIDS OR FOR INTEGRAL MOUNTING IN EXPOSED TEE-BAR

2. WHERE GRILLES, REGISTERS OR DIFFUSERS ARE TO BE INSTALLED IN CONCEALED SPINE CEILINGS OR PLASTER CEILINGS, THE MOUNTING FRAME SHALL BE ADJUSTED TO MATCH THE CEILING REQUIREMENTS 3. IN PLASTER CEILINGS, PROVIDE PLASTER FRAMES.

A. SQUARE PLAQUE SUPPLY CEILING DIFFUSERS SHALL BE ALUMINUM MATERIAL DIFFUSERS MUST BE CONSIST OF A SEAMLESS, ONE-PIECE, PRECISION FORMED BACKPAN THAT INCORPORATES A ROUND INLET COLLAR. 2. AN INNER PLAQUE ASSEMBLY MUST BE INCORPORATED AND MUST DROP NO MORE THAN 1/4 INCH BELOW THE CELING PLANE TO ENSURE PROPER AIR DISTRIBUTION PERFORMANCE.

3. FACE PANEL SHALL FIT 24" X 24" LAY-IN TEE-BAR CEILING GRID OR 12" X 12" HARD CEILING MOUNT WHERE INDICATED IN THE AIR TERMINALS SCHEDULE. 4. THROW PATTERN SHALL BE AS INDICATED ON THE DRAWINGS.

B. EGGCRATE TYPE CEILING GRILLES SHALL BE ALUMINUM MATERIAL. GRILLES MUST PROVIDE A FREE AREA OF AT LEAST 90%.

2. 1" X 1" X 1" GRID TYPE. 3. OUTER BORDERS SHALL BE CONSTRUCTED OF HEAVY EXTRUDED ALUMINUM WITH A THICKNESS OF 0.040-0.050" AND SHALL HAVE COUNTERSUNK SCREW HOLES. BORDER WIDTH SHALL BE 1-1/4" ON ALL SIDES AND SHALL BE INTERLOCKED AT THE FOUR CORNERS AND MECHANICALLY STAKED TO FORM A RIGID FRAME

4. OPPOSED-BLADE VOLUME DAMPER SHALL BE CONSTRUCTED OF HEAVY GAUGE STEEL OR ALUMINUM. DAMPER MUST BE OPERABLE FROM THE FACE OF THE GRILLE WHERE NOT PROVIDED IN ACCESSIBLE BRANCH DUCT.

C. SIDEWALL GRILLES SHALL BE ALUMINUM MATERIAL, SINGLE DEFLECTION TYPE WITH 3/4" BLADE SPACING.

1. DEFLECTION ANGLE SHALL BE 35 DEGREES. 2. OPPOSED BLADE VOLUME DAMPER SHALL BE CONSTRUCTED OF HEAVY GAUGE STEEL OR ALUMINUM. DAMPER MUST BE OPERABLE FROM THE FACE OF THE GRILLE WHERE NOT PROVIDED IN ACCESSIBLE BRANCH

D. DROP BOX PLENUM SHALL BE STEEL MATERIAL WITH FOUR-SIDED, FOUR-WAY AIR DISCHARGE

1. HOUSING SHALL BE SINGLE WALL CONSTRUCTION AND PROVIDED WITH MILL FINISH. HOUSING SEAMS SHALL BE STITCH WELDED AND CAULKED. 2. GRILLES SHALL BE SINGLE DEFLECTION, 35 DEGREE ANGLE, ALUMINUM REGISTERS WITH MILL FINISH. GRILLES SHALL BE REMOVABLE WITH ADJUSTABLE OPPOSED BLADE DAMPER AT EACH GRILLE. 3. DUCT CONNECTION SHALL BE DUCT OVER COLLAR.

A. INSTALL IN ACCORDANCE WITH MANUFACTURER'S WRITTEN

DOCUMENTATION. B. GRILLES, REGISTERS, AND DIFFUSERS SHALL BE INSTALLED VOID OF DEFECTS, DAMAGES, AND SCUFF MARKS.

C. GRILLES AND REGISTERS MOUNTED IN WALLS SHALL BE SECURED TO DUCTWORK WITH SHEET METAL SCREWS.

D. GRILLES, REGISTERS, AND DIFFUSERS NOT SIZED TO FIT CEILING GRID

SYSTEMS SHALL BE SECURED TO DUCTWORK WITH SHEET METAL SCREWS. WHERE DIFFUSER IS ATTACHED TO DUCT SYSTEM WITH FLEXIBLE DUCT, DIFFUSERS SHALL BE SUPPORTED FROM STRUCTURES WITH FOUR GALVANIZED STEEL WIRE HANGERS

E. GRILLES. REGISTERS. AND CEILING DIFFUSERS SIZED TO FIT CEILING GRID SYSTEM SHALL BE SUPPORTED FROM GRID SYSTEM.

F. SECURE DROP BOX DIFFUSERS TO STRUCTURE ABOVE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND DETAIL A3/M-501. ATTACH DROP BOX DIFFUSER TO ASSOCIATED SUPPLY DUCTWORK WITH RIGID DUCT CONNECTION.

G. COORDINATE LOCATION OF AIR DISTRIBUTION DEVICES WITH OTHER TRADES PRIOR TO SECURE ATTACHMENT.

A. TOTALLY ENCLOSED MOTOR WITH SEALED LIFETIME PRE-LUBRICATED BALL BEARINGS, MOTOR STARTER AND THERMAL OVERLOAD PROTECTION.

B. SINGLE SPEED, FORWARD CURVED CENTRIFUGAL FAN. C. PROVIDE VIBRATION ISOLATION ON FAN AND MOTOR ASSEMBLY.

D. PROVIDE WITH DOOR ACTIVATED LIMIT SWITCH. E. FACTORY PROVIDED WALL BRACKET.

A. TESTING AND RATINGS

1. FANS SHALL BE TESTED AND RATED IN ACCORDANCE WITH AMCA 210.

B. BALANCING 1. CENTRIFUGAL FAN WHEELS SHALL BE STATICALLY AND DYNAMICALLY BALANCED

C. DISCONNECTS 1. SAFETY DISCONNECT SWITCHES SHALL CONFORM TO REQUIREMENTS OF ELECTRICAL.

A. FANS SHALL BE CENTRIFUGAL, DOWNBLAST ROOF EXHAUSTERS WITH WATERPROOF DESIGN SO THAT WATER CANNOT ENTER THE BUILDING THROUGH FAN HOUSING WHETHER OR NOT THE FAN IS OPERATING. FAN SHALL BE EQUIPPED WITH A BACKDRAFT DAMPER ON INLET AND A

BIRDSCREEN ON OUTLET. B. FAN SHALL HAVE ONE-PIECE ALUMINUM HOUSING ENCLOSING THE MOTOR AND DRIVE, AN ALUMINUM SHROUD ENCLOSING THE FAN WHEEL, AND AN ALUMINUM CURB CAP. CURB CAP SHALL HAVE A 1" WIDE BY1/4" THICK FOAM RUBBER GASKET FACTORY APPLIED TO UNDERSIDE PERIMETER OF CURB CAP. AN INTERNAL POWER WIRING POST SHALL EXTEND FROM MOTOR COMPARTMENT THROUGH CURB CAP. WHERE WIRING POST PENETRATES HOUSING AND CURB CAP, PENETRATION SHALL BE SEALED. A1/4" DIAMETER STATIC PRESSURE TUBE SHALL BE FACTORY INSTALLED THROUGH FAN HOUSING AT THE INLET SIDE OF THE FAN WHEEL. EXPOSED END OF TUBE SHALL HAVE A PLASTIC CAP.

C. FAN WHEEL SHALL BE BACKWARD INCLINED CENTRIFUGAL TYPE WITH ALUMINUM CONSTRUCTION. ON BELT DRIVE UNITS, SHAFT BEARINGS SHALL BE SELF-ALIGNING. PILLOW BLOCK TYPE. BEARINGS NOT PERMANENTLY

SEALED AND LUBRICATED SHALL HAVE GREASE FITTINGS. D. FAN MOTOR SHALL BE MANUFACTURER'S STANDARD. MOTOR AND DRIVE SHALL BE LOCATED IN A VENTILATED COMPARTMENT OUTSIDE OF THE AIR STREAM. FAN SHALL HAVE FACTORY INSTALLED DISCONNECT SWITCH PRE-WIRED TO MOTOR AND MOUNTED WITHIN MOTOR COMPARTMENT. MOTOR AND DRIVE SHALL BE MOUNTED ON VIBRATION ISOLATORS

. PROVIDE MANUFACTURER'S STANDARD ROOF CURB F. FAN SHALL BE MOUNTED ON ROOF CURB. FAN CURB CAP SHALL BE SECURED TO ROOF CURB WITH CADMIUM PLATED SCREWS A MAXIMUM OF

12" ON CENTER. G. FAN CURBS SHALL BE FLASHED AND COUNTER FLASHED AS INDICATED ON ARCHITECTURAL DRAWINGS.

A. FANS SHALL BE IN-LINE CABINET TYPE WITH SQUARE OR RECTANGULAR HOUSING AND BACK DRAFT DAMPER. FAN SHALL BE DESIGNED FOR HORIZONTAL MOUNTING

B. FAN HOUSING SHALL BE STEEL WITH FACTORY APPLIED BAKED ENAMEL PAINT ONE EXTERIOR. HOUSING SHALL BE INTERNALLY INSULATED WITH1/2" THICK (MINIMUM) COATED FIBERGLAS INSULATION. INSULATION SHALL COMPLY WITH ASTM E84 AND NFPA 255 FOR MAXIMUM RATINGS OF FLAME 25 AND SMOKE 50, HOUSING SHALL HAVE MOUNTING BRACKETS AT EACH

C. FAN WHEEL SHALL BE BACKWARD INCLINED CENTRIFUGAL TYPE WITH ALUMINUM CONSTRUCTION. ON BELT DRIVEN UNITS, SHAFT BEARINGS SHALL BE SELF-ALIGNING, PILLOW BLOCK BALL TYPE. BEARINGS NOT

PERMANENTLY SEALED AND LUBRICATED SHALL HAVE GREASE FITTINGS. D. MOTOR AND DRIVE SHALL BE MOUNTED ON VIBRATION ISOLATORS. FAN SHALL HAVE A FACTORY INSTALLED DISCONNECT SWITCH MOUNTED ON EXTERIOR OF HOUSING AND PRE-WIRED TO FAN MOTOR.

E. DIRECT DRIVEN FANS SHALL BE PROVIDED WITH AN ELECTRONIC SPEED CONTROLLER F. IN-LINE CABINET FANS SHALL BE SUSPENDED FROM STRUCTURE WITH HANGER RODS AT EACH CORNER.

A. FANS SHALL BE CEILING CENTRIFUGAL TYPE WITH INSULATED METAL HOUSING. BACKDRAFT DAMPER. AND INTEGRAL EXHAUST GRILLE. B. HOUSING SHALL BE GALVANIZED STEEL WITH 1/2" THICK (MINIMUM) COATED

FIBERGLASS INSULATION. INSULATION SHALL COMPLY WITH ASTM E84 AND NFPA 255 FOR MAXIMUM RATINGS OF FLAME - 25 AND SMOKE - 50. C. FAN WHEEL SHALL BE FORWARD CURVED CENTRIFUGAL TYPE WITH DIRECT

DRIVE. D. MOTOR AND DRIVE SHALL BE MOUNTED ON VIBRATION ISOLATORS. E. ROUTE VENT TO EXTERIOR WALL AND TERMINATE THROUGH WALL WITH

MANUFACTURER'S WALL CAP. COORDINATE WALL TERMINATION WITH OTHER TRADES PRIOR TO ROUGH-IN.

HIGH-VOLUME LOW-SPEED FANS:

A. HIGH-VOLUME LOW-SPEED (HVLS) FANS SHALL COMPLY WITH UL-507 AND CSA 22.2, NO. 113. B. PROVIDE MINIMUM (6) AIRFOIL BLADES WITH MILL FINISH AND MANUFACTURER'S STANDARD WINGLETS ON EACH BLADE

C. PROVIDE MANUFACTURER'S STANDARD SAFETY CABLE SYSTEM AND ALL APPURTENANCES FOR SECURE ATTACHMENT TO STRUCTURE D. VERIFY MANUFACTURER'S EXTENSION TUBE LENGTH AND MOUNTING BRACKET PRIOR TO EQUIPMENT RELEASE IN ORDER TO ACHIEVE INSTALLED C. INSULATE LINES WITH SEAMLESS CLOSED CELL, ELASTOMERIC FOAM. ELEVATION ABOVE FINISHED FLOOR AND MAINTAIN CLEARANCES TO ADJACENT OBJECTS.

A. INCLUDE PLANS, ELEVATIONS, AND MOUNTING DETAILS.

B. INCLUDE EQUIPMENT ASSEMBLY DETAILS INCLUDING DIMENSIONS. WEIGHT. CLEARANCES, METHOD OF ASSEMBLY, COMPONENTS AND FIELD CONNECTIONS.

C. INCLUDE DIAGRAMS FOR POWER, SIGNAL, AND CONTROL WIRING.

A. COORDINATE FAN LOCATION WITH SPRINKLER LAYOUT IN ACCORDANCE

WITH NFPA. B. COORDINATE FAN LOCATION WITH LIGHTING LAYOUT, EQUIPMENT, AND APPURTENANCES PROVIDED IN THE SPACE IN ACCORDANCE WITH MANUFACTURER'S WRITTEN DOCUMENTATION.

A. MANUFACTURER TO PROVIDE BACNET INTERFACE FOR FULL FAN CONTROL

B. INTERLOCK HVLS FANS WITH FIRE ALARM CONTROL PANEL FOR SHUTDOWN UPON FIRE ALARM ACTIVATION.

LOUVERS:

STATIONARY LOUVERS A. LOUVERS SHALL BE WIND DRIVEN, HURRICANE RATED TYPE, CONSTRUCTED OF EXTRUDED ALUMINUM (6063-T5 ALLOY) WITH ALL JOINTS WELDED AND PROVIDED WITH 3/4" EXPANDED ALUMINUM MESH BIRDSCREEN ON THE REAR FACE OF THE LOUVER.

B. LOUVER PERFORMANCE SHALL BE AMCA CERTIFIED AND UNIT SHALL BEAR THE AMCA SEAL: 1. AMCA 500-L

2. AMCA 540 - BASIC (MISSILE LEVEL D)

3. AMCA 550 C. LOUVER BLADES SHALL BE NOT LESS THAN 0.094" THICK, HEAD/SILL 0.094" THICK, AND JAMBS 0.102" THICK. EXCEPT AS OTHERWISE SPECIFICALLY INDICATED HEREIN, BLADE ANGLE SHALL BE 35 DEGREES AND CENTERLINE SPACING OF BLADES SHALL NOT EXCEED 3-1/2"

D. LOUVER BLADES OVER 48" LONG SHALL BE PROVIDED WITH INTERMEDIATE ALUMINUM BRACES ON THE REAR FACE OF THE LOUVER. PROVIDE WITH 12 GA. (2.75MM) EXTRUDED ALUMINUM RAIN SILL

E. LOUVER SHALL BE PROVIDED WITH A COLOR ANODIZED FINISH. COLOR SHALL BE SELECTED BY THE ARCHITECT.

A. INSTALL LOUVERS AND VENTS IN ACCORDANCE WITH MANUFACTURER'S

B. CAULK ALL AROUND LOUVER FRAME TO MAKE INSTALLATION WATERTIGHT.

SPLIT SYSTEM UNITS - UP TO 5 TONS:

A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND OTHER DIVISION 1

SPECIFICATION SECTIONS, APPLY TO THIS SECTION. B. ALL SUBMITTALS SHALL COMPLY WITH THE REQUIREMENTS OF DIVISION 1 DATA SHALL BE SUBMITTED ON THE FOLLOWING ITEMS: 1. INDOOR UNITS

2. OUTDOOR UNITS C. OPERATION AND MAINTENANCE DATA: DATA SHALL BE PROVIDED ON THE FOLLOWING ITEMS:

1. INDOOR UNITS 2. OUTDOOR UNITS

1. AIR MOVEMENT AND CONTROL ASSOCIATION (AMCA)

A. STANDARD 210, LABORATORY METHOD OF TESTING FANS FOR RATING 2. AIR CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE. (AHRI) A. STANDARD 210/240, PERFORMANCE RATING OF UNITARY AIR-

CONDITIONING & AIR-SOURCE HEAT PUMP EQUIPMENT B. STANDARD 410, FORCED CIRCULATION AIR COOLING AND AIR HEATING ROOF CURBS

3. UNDERWRITERS' LABORATORIES (UL):

A. STANDARD 900.

DELIVERY, STORAGE, AND HANDLING A. SPLIT SYSTEM UNITS RECEIVED AND STORED ON THE JOB SITE SHALL BE STORED ON WOODEN RAILS, WOODEN PALLETS, OR SHIPPING SKIDS. UNDER NO CONDITION SHALL THE CONDENSING UNITS OR AIR HANDLING UNITS BE STORED IN SUCH A WAY THAT METAL COMPONENTS ARE IN

DIRECT CONTACT WITH THE GROUND OR FLOOR SLABS B. SPLIT SYSTEM UNITS SHALL BE COVERED WITH 6 MIL POLYETHYLENE SHEET (TAPED IN PLACE) TO PROTECT THE EQUIPMENT FROM DAMAGE AND THE WEATHER.

A. SPLIT SYSTEM UNITS SHALL BE FACTORY FABRICATED WITH MATCHED INDOOR AND OUTDOOR UNITS. INDOOR AND OUTDOOR UNITS SHALL BE CONSTRUCTED AND RATED IN ACCORDANCE WITH AHRI 210/240.

A. INDOOR UNITS SHALL BE HORIZONTAL OR VERTICAL DRAW THROUGH ARRANGEMENT AS INDICATED ON THE DRAWINGS. B. CASING SHALL BE STEEL WITH INTERNAL REINFORCING FRAME AND

FACTORY BAKED ENAMEL FINISH. C. FAN SHALL BE CENTRIFUGAL TYPE WITH DIRECT DRIVEN 3 SPEED. FAN SHALL BE DYNAMICALLY BALANCED AND RATED IN ACCORDANCE WITH AMCA 210. FAN BEARINGS SHALL HAVE GREASE FITTINGS ACCESSIBLE

FROM OUTSIDE OF CASING WHILE UNIT IS OPERATING D. REFRIGERANT COIL SHALL HAVE COPPER TUBES AND ALUMINUM FINS. FINS SHALL BE MECHANICALLY BONDED TO THE TUBES. COIL PERFORMANCE SHALL BE RATED IN ACCORDANCE WITH AHRI 410. COILS SHALL BE FACTORY

PRESSURE TESTED. E. FILTER SHALL BE MANUFACTURER'S STANDARD. FILTER SHALL CONFORM TO GENERAL UL 900 FOR CLASS I CONSTRUCTION.

F. THERMOSTAT SHALL BE MANUFACTURES STANDARD 7-DAY / 4-EVENT THERMOSTAT WITH DIGITAL DISPLAY AND AUTO CHANGEOVER.

G. PROVIDE CONDENSATE PUMP AND ROUTE CONDENSATE DRAIN TO AN APPROVED DISCHARGE LOCATION OR AS INDICATED ON THE FLOOR PLANS.

OUTDOOR UNITS SHALL INCLUDE COMPRESSOR, COIL, COIL FAN, MOTORS, REVERSING VALVE, CHARGING VALVES, SIGHT GLASS, FILTER-DRYER AND CONTROLS. UNITS SHALL REQUIRE ONLY ONE ELECTRICAL SERVICE CONNECTION. B. ENCLOSURE SHALL BE CONSTRUCTED OF STEEL WITH BAKED ENAMEL

A. OUTDOOR UNITS SHALL BE DESIGNED FOR HIGH-WIND RATED EXPOSURE

FINISH. COIL SECTION AIR INTAKE AND DISCHARGE SHALL HAVE WIRE SCREEN GUARDS. PROVIDE MANUFACTURER'S STANDARD HAIL GUARDS C. COMPRESSOR(S) SHALL BE RECIPROCATING HERMETIC TYPE WITH OIL PUMP, CRANKCASE HEATER, HIGH PRESSURE LIMIT SWITCH, AND VIBRATION ISOLATORS. COMPRESSOR MOTOR SHALL HAVE BOTH THERMAL AND

CURRENT OVERLOAD PROTECTION. D. COIL SHALL BE CONSTRUCTED WITH COPPER TUBES AND ALUMINUM FINS. FINS SHALL BE MECHANICALLY BONDED TO TUBES. COIL CAPACITY SHALL BE RATED IN ACCORDANCE WITH ARI 210. PROVIDE MANUFACTURER'S STANDARD CORROSION-RESISTANT COATING FOR SEACOAST

ENVIRONMENT E. FAN(S) SHALL BE PROPELLER TYPE WITH DIRECT DRIVEN PERMANENTLY LUBRICATED MOTOR AND FAN GUARD(S). FANS SHALL BE STATICALLY AND

DYNAMICALLY BALANCED AND RATED IN ACCORDANCE WITH AMCA. F. CONTROLS SHALL BE MOUNTED IN A SEPARATE COMPARTMENT WITH HINGED COVER AND ACCESSIBLE FROM OUTSIDE THE UNITS WHILE OPERATING. CONTROLS SHALL INCLUDE; LINE TO 24 VOLT TRANSFORMER, COMPRESSOR AND FAN CONTACTORS, AUTOMATIC DEFROST CYCLE.

COOLING TO HEATING CHANGE OVER, AND OVERLOAD PROTECTION

A. REFRIGERANT PIPING TO BE SOFT, COILED COPPER. SIZE ACCORDING TO MANUFACTURER'S RECOMMENDATION. B. COPPER PIPING BETWEEN OUTDOOR UNIT AND INDOOR UNIT TO BE A

D. EXTERIOR PIPING SHALL HAVE ALUMINUM INSULATION JACKET.

G. CURBS SHALL BE FLASHED AND COUNTER FLASHED.

SINGLE RUN. PIPING SHALL NOT BE JOINED OR SPLICED. INSULATION AND PIPING MAY BE SOURCED SEPARATELY OR AS A SINGLE PACKAGE.

E. ALL PIPE SUPPORTS MUST BE THERMALLY BROKEN SADDLE TYPE TO PREVENT CONDENSATION. F. PIPING PENETRATING ROOF SHALL UTILIZE AN ALUMINUM, HORIZONTAL EXIT TYPE ROOF CURB WITH GRADUATED PIPE BOOTS.

A. COPPER TUBE: TYPE L WITH SOLDER FITTINGS B. CPVC SCHEDULE 40 WITH SOCKET TYPE FITTINGS AND SOLVENT CEMENT.

C. PVC SCHEDULE 40 WITH SOCKET TYPE FITTINGS AND SOLVENT CEMENT.

ELECTRIC UNIT HEATERS

A. WALL-MOUNTED INDOOR UNITS SHALL BE SECURED ABOVE DOOR OR AS SHOWN ON DRAWINGS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN DOCUMENTATION.

B. OUTDOOR UNITS SHALL BE MOUNTED ON EQUIPMENT RAILS AND SECURED

TO ROOF STRUCTURE.

A. THE HEATING EQUIPMENT SHALL INCLUDE AN ELECTRIC AUTOMATIC FAN

FORCED AIR HEATER. THE HEATER SHALL BE DESIGNED FOR CEILING, RECESSED, OR SURFACE MOUNTING AS INDICATED IN THE EQUIPMENT SCHEDULE. HEATERS SHALL BE UL LISTED OR EQUIVALENT (ETL). HEATERS SHALL HAVE BUILT IN THERMOSTAT AND DISCONNECT SWITCH. B. THE BACKBOX SHALL BE DESIGNED FOR DUTY AS A RECESSED ROUGH-IN

BOX IN EITHER MASONRY OR FRAME INSTALLATIONS AND IS ALSO USED WITH THE SURFACE MOUNTING FRAME IN SURFACE MOUNTING INSTALLATIONS. THE BACKBOX SHALL BE HEAVY GAUGE GALVANIZED STEEL AND SHALL CONTAIN KNOCKOUTS FOR POWER. C. A DOUBLE-POLE SINGLE THROW ON/OFF SWITCH SHALL BE MOUNTED ON

THE BACK BOX FOR POSITIVE DISCONNECT OF POWER SUPPLY. IT SHALL BE

CONCEALED BEHIND THE FRONT COVER. D. THE FAN MOTOR SHALL BE IMPEDANCE PROTECTED, PERMANENTLY LUBRICATED AND WITH TOTALLY ENCLOSED ROTOR. FAN CONTROL SHALL BE OF THE BI-METALLIC, SNAPACTION TYPE AND SHALL ACTIVATE FAN AFTER HEATING ELEMENT REACHES OPERATING TEMPERATURE, AND CONTINUE TO OPERATE THE FAN AFTER THE THERMOSTAT IS SATISFIED AND UNTIL ALL HEATED AIR HAS BEEN DISCHARGED. THE THERMOSTAT SHALL BE SINGLE POLE TYPE ON ALL MODELS. MANUAL-RESET THERMAL CUTOUT SHALL BE BI-METALLIC, SNAPACTION TYPE DESIGNED TO SHUT OFF HEAT IN THE EVENT OF OVERHEATING. THE FAN SHALL BE FOUR-BLADED ALUMINUM.

E. THE LOUVERED FRONT COVER SHALL BE OF HEAVY GAUGE STEEL WITH A POLYESTER POWDER COAT FINISH. A PLUG BUTTON SHALL BE PROVIDED TO REPLACE THE THERMOSTAT KNOB AND RENDER THE UNIT TAMPER-

F. INSTALL IN ACCORDANCE WITH MANUFACTURER'S WRITTEN DOCUMENTATION.

GRAVITY VENILATORS

ROOF HOODS: A. MATERIAL, ALUMINUM: THICKNESS REQUIRED TO COMPLY WITH STRUCTURAL PERFORMANCE REQUIREMENTS, BUT NOT LESS THAN 0.063-INCH- (1.6-MM-) THICK BASE AND 0.050-INCH- (1.27-MM-) THICK HOOD; SUITABLY REINFORCED.

B. BIRD SCREENING: ALUMINUM, 1/2-INCH- (12.7-MM-) SQUARE MESH OR FLATTENED, EXPANDED ALUMINUM, 3/4-INCH (19-MM) DIAMOND MESH WIRE C. UNIT MUST BE HIGH WIND RATED.

D. DAMPERS: LOCATION: CURB DAMPER TRAY. 2. CONTROL: MOTORIZED.

E. ROOF HOODS MUST BE (OR APPROVED EQUAL): 1. GREENHECK FAN CORPORATION 2. LOREN COOK COMPANY

. PENNBARRY

C. OVERALL HEIGHT: 22 INCHES

 A. GALVANIZED-STEEL SHEET; WITH MITERED AND WELDED CORNERS; 1-1/2-INCH- (40-MM-) THICK. RIGID FIBERGLASS INSULATION ADHERED TO INSIDE WALLS; AND 1-1/2-INCH (40-MM) WOOD NAILER. SIZE AS REQUIRED TO FIT ROOF OPENING AND VENTILATOR BASE

B. PROVIDE DAMPER TRAY OR SHELF WITH OPENING 3 INCHES (MM) LESS THAN INTERIOR CURB DIMENSIONS INDICATED.

INSTALLATION: A. INSTALL GRAVITY VENTILATORS LEVEL, PLUMB, AND AT INDICATED

ALIGNMENT WITH ADJACENT WORK. B. SECURE GRAVITY VENTILATORS TO ROOF CURBS WITH ZINC-PLATED HARDWARE. USE CONCEALED ANCHORAGES WHERE POSSIBLE

C. INSTALL GRAVITY VENTILATORS WITH CLEARANCES FOR SERVICE AND D. PROTECT GALVANIZED AND NONFERROUS-METAL SURFACES FROM CORROSION OR GALVANIC ACTION BY APPLYING A HEAVY COATING OF BITUMINOUS PAINT ON SURFACES THAT WILL BE IN CONTACT WITH

E. ADJUST DAMPER LINKAGES FOR PROPER DAMPER OPERATION. ROOFTOP AIR CONDITIONING UNITS AND ENERGY RECOVERY UNITS: STANDARDS

A. AIR CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE (AHRI): 1. STANDARD 210, UNITARY AIR CONDITIONING EQUIPMENT (3 TO 5 TON 2. STANDARD 340, UNITARY AIR CONDITIONING EQUIPMENT (6 TO 25 TON)

3. STANDARD 410, FORCED CIRCULATION AIR COOLING AND AIR HEATING B. UNDERWRITER'S LABORATORIES (UL)

CONCRETE, MASONRY, OR DISSIMILAR METALS.

. 1995/C 22.2, 236-05

WITH ARI 210.

A. ROOFTOP AIR CONDITIONING HEAT PUMP UNIT SHALL BE FACTORY ASSEMBLED, SINGLE ZONE TYPE, VARIABLE AIR VOLUME (VAV) WITH FACTORY FABRICATED AND INSULATED ROOF CURB MATCHED TO THE UNIT. ROOFTOP UNITS SHALL BE CONSTRUCTED AND RATED IN ACCORDANCE

B. ALL RTU'S SHALL HAVE FACTORY MUTUAL (FM) APPROVAL C. UNITS SHALL BE DESIGNED FOR HIGH-WIND RATED EXPOSURE. A. UNIT ENCLOSURE SHALL BE CONSTRUCTED OF 18 GAUGE (MINIMUM) GALVANIZED SHEET METAL PANELS WITH FACTORY BAKED ENAMEL FINISH.

INCLUDE ACCESS SECTIONS TO INTERNAL COMPONENTS. INTERIOR OF PANEL SHALL BE SOLID METAL AT ACCESS DOORS. ALL OTHER INTERIOR PANELS SHALL BE PERFORATED. B. ENCLOSURE SHALL HAVE SCREENED OUTSIDE AIR OPENING, BASE PAN DISCHARGE AND RETURN ARRANGEMENT AS SHOWN ON THE DRAWINGS AND CURB FLASHING FLANGE. ENCLOSURE SHALL BE INSULATED WITH MANUFACTURER'S STANDARD INSULATION. OUTSIDE AIR OPENING SHALL HAVE 100% OUTSIDE AIR ECONOMIZER CAPABILITY WITH MOTOR OPERATED RA/OA MIXING DAMPERS AND BAROMETRIC RELIEF (ECONOMIZER APPLIES

PANELS SHALL BE INTERNALLY REINFORCED, SEALED WATERTIGHT, AND

ONLY TO RTU-01).

. COMPRESSORS SHALL BE THE SCROLL OR RECIPROCATING HERMETIC OR SEMI HERMETIC TYPE WITH HIGH LOW PRESSURE CUTOUT AND CRANKCASE HEATERS. COMPRESSOR MOTORS SHALL HAVE THERMAL AND CURRENT

OVERLOAD PROTECTION. B. PROVIDE MINIMUM OF 5-YEAR WARRANTY ON COMPRESSORS

<u>CONDENSER</u>

A. CONDENSER COIL SHALL BE CONSTRUCTED OF COPPER TUBES WITH ALUMINUM FINS MECHANICALLY BONDED TO THE TUBES. THE COIL SHALL BE FACTORY PRESSURE AND LEAK TESTED AT NOT LESS THAN 425 PSI. B. CONDENSER FANS SHALL BE STATICALLY AND DYNAMICALLY BALANCED AND FAN BEARING SHALL BE PERMANENTLY LUBRICATED TYPE. FAN

PRESSURE CONTROL. D. PROVIDE MANUFACTURER'S STANDARD CORROSION-RESISTANT COATING FOR SEACOAST ENVIRONMENT.

MOTORS SHALL HAVE BUILT IN THERMAL OVERLOAD PROTECTION.

C. VARIABLE VOLUME UNITS SHALL HAVE CONDENSER FAN SPEED HEAD

A. EVAPORATOR COIL SHALL BE CONSTRUCTED OF COPPER TUBES WITH ALUMINUM FINS MECHANICALLY BONDED TO THE TUBES. THE COIL SHALL BE FACTORY PRESSURE AND LEAK TESTED AT NOT LESS THAN 300 PSI.

B. EVAPORATOR FANS SHALL BE FORWARD CURVED CENTRIFUGAL TYPE, V BELT DRIVEN BY A VARIABLE SPEED MOTOR. BELT DRIVE SHALL HAVE AN ADJUSTABLE SHEAVE. FAN MOTOR SHALL HAVE DRIP PROOF ENCLOSURES

AND BUILT IN THERMAL OVERLOAD PROTECTION. C. PROVIDE MANUFACTURER'S STANDARD CORROSION-RESISTANT COATING FOR SEACOAST ENVIRONMENT.

A. HEATERS SHALL BE STAGED THROUGH MANUFACTURER PROVIDED CONTROLLER

B. HEATERS SHALL MEETS ALL NEC AND CEC REQUIREMENTS WHEN INSTALLED

FOR SEACOAST ENVIRONMENT.

THROW AWAY FILTERS.

DAMPER SECTION.

ADJUSTMENT

A. HOT-GAS REHEAT COIL SHALL BE CONSTRUCTED OF COPPER TUBES WITH ALUMINUM FINS MECHANICALL BONDED TO THE TUBES THE COIL SHALL BE FACOTRY PRESSURE AND LEAKE TESTED AT NOT LESS THAN 300 PSI. B. PROVIDE MANUFACTURER'S STANDARD CORROSION-RESISTANT COATING

A. FULLY MODULATING 0 TO 100 PERCENT MOTOR AND DAMPERS, MINIMUM POSITION SETTING, PRESET LINKAGE, WIRING HARNESS WITH PLUG, SPRING

A. UNIT SHALL BE EQUIPPED WITH MANUFACTURER'S STANDARD 2-INCH

RETURN ACTUATOR AND FIXED DRY BULB CONTROL B. BAROMETRIC RELIEF DAMPER 1. MANUFACTURER TO PROVIDE ROOFTOP UNITS WITH BAROMETRIC RELIEF

A. MANUFACTURER TO PROVIDED INTEGRAL BACNET CONTROLLER FOR

INTEGRATION INTO BMS. B. WALL-MOUNTED COMBINATION TEMPERATURE AND HUMIDISTAT SHALL PROVIDE ADJUSTABLE, 7-DAY PROGRAMMABLE CONTROL FOR EACH INDIVIDUAL UNIT.

2. DAMPER SHALL BE ADJUSTABLE TO BUILDING PRESSURE VIA SPRING

A. ROOFTOP AIR CONDITIONING UNITS SHALL BE FACTORY WIRED, PIPED, AND TESTED. UNITS SHALL REQUIRE ONLY ONE ELECTRICAL POWER CONNECTION.

B. INTERNAL WIRING SHALL INCLUDE FACTORY INTEGRATED DISCONNECT AND

CONVENIENCE OUTLET (WITH INTEGRAL 120V TRANSFORMER). UNIT SHALL

BE WIRED SUCH THAT WHEN DISCONNECT IS IN OFF POSITION AND UNIT IS

DE-ENERGIZED, CONVENIENCE OUTLET WILL REMAIN POWERED.

CURB. CURB SHALL BE FLASHED AND COUNTER FLASHED

B. INSTALL IN ACCORDANCE WITH MANUFACTURER'S WRITTEN DOCUMENTATION.

SINGLE MANUFACTURER.

IN OUTDOOR AIR STREAM.

<u>TOTAL ENERGY CORE (APPLICABLE UNITS)</u> A. OBTAIN UNIT WITH ALL APPURTENATN COMPNENTS OR ACCESSORIES FROM

A. ROOFTOP UNITS SHALL BE MOUNTED ON FACTORY PROVIDED 22" ROOF

B. UNIT MUST BE ETL CERTIFIED PER U.L. 1812 AND BEAR AN ETL LABEL C. ENERGY COVER PERFORMANCE MUST BE AHIR CERTIFIED PER STANDARD D. ENERGY CORE MUST BE REMOVABLE FROM CABINET. CORE MEDIA MUST BE

A. FACTORY-WIRED, MOUNTED, AND POWERED AIRFLOW MONITORING SYSTEM

DEMAND-CONTROLLED VENTILATION (APPLICABLE UNITS

B. AIRFLOW MEASUREMENT SHALL BE INTEGRATED INTO FACTORY

CONTROLLER AND READ BY BUILDING MANAGMENT SYSTEM.

A. FACTORY OR FIELD INSTALLED DEMAND-CONTROLLED VENTILATION. <u> AIRFLOW MONITORING STATION (APPLICABLE UNITS)</u>

CORRUGATED POLYMER MEMBRANE IN A CORROSION RESISTANT

SUBMITTED BY PROJECT #:

SPECIFICATIONS

ORIGINAL SHEET SIZE:

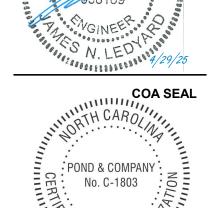
M-702

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3500 Parkway Lane

EOR/AOR SEAL SEAL 038169



CLIENT INFORMATION SEEFRIED INDUSTRIAL **PROPERTIES**

PROJECT NAME OFFICE/

DRIVE WILMINGTON, **NORTH CAROLINA** 28435

DRAWING ISSUE

DESIGNED BY: DRAWN BY: CHECKED BY:

30" X 42"

SHEET TITLE BTS -**MECHANCIAL**

SHEET NUMBER

WAREHOUSE **DEVELOPMEN**

QUALITY ASSURANCE

- A. THE MECHANICAL EQUIPMENT AND INSTALLATION SHALL CONFORM TO THE
- FOLLOWING CODES: 1. NORTH CAROLINA BUILDING CODE - 2018

4. NATIONAL ELECTRIC CODE - 2017

- 2. NORTH CAROLINA MECHANICAL CODE 2018
- 3. NORTH CAROLINA PLUMBING CODE 2018
- B. THE MECHANICAL EQUIPMENT AND INSTALLATION SHALL CONFORM TO THE FOLLOWING STANDARDS:
- 1. DESIGN CRITERIA FOR BUILD-TO-SUIT (BTS) DELIVERY STATION V6.0 (09 AUGUST
- 2. ASSOCIATE AIR BALANCE COUNCIL (AABC): NATIONAL STANDARD FOR TOTAL SYSTEM BALANCE. 3. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION
- (SMACNA): HVAC DUCT CONSTRUCTION STANDARDS.
- 4. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA): HVAC AIR DUCT LEAKAGE TEST MANUAL
- 5. ASHRAE 90.1 2016

6. ASHRAE 62.1 - 2016

- C. PUBLICATION DATES: WHERE THE DATE OF ISSUE OF A REFERENCE STANDARD IS NOT SPECIFIED, COMPLY WITH THE STANDARD THAT IS EFFECTIVE AS OF DATE OF
- D. PERMITS: OBTAIN ALL PERMITS AND INSPECTIONS FOR THE INSTALLATION OF THIS WORK AND PAY ALL CHARGES INCIDENT THERETO. DELIVER TO THE OWNER ALL
- E. WORKMANSHIP AND MATERIALS COVERED BY THESE SPECIFICATIONS SHALL CONFORM TO ALL ORDINANCES AND REGULATIONS OF THE CITY, COUNTY, AND/OR

CERTIFICATES OF SAID INSPECTION ISSUED BY AUTHORITIES HAVING JURISDICTION.

OTHER AUTHORITIES HAVING JURISDICTION. . OPERATIONS AND MAINTENANCE MANUALS FOR ALL SCHEDULED EQUIPMENT SHALL BE PROVIDED TO OWNER AS PART OF FINAL ACCEPTANCE.

A. THE COMPONENTS OF THE MECHANICAL SYSTEM FURNISHED UNDER THIS DIVISION OF THE SPECIFICATIONS SHALL BE GUARANTEED FOR A PERIOD OF TWO YEARS FROM THE DATE OF ACCEPTANCE THEREOF, EITHER FOR BENEFICIAL USE OR FINAL ACCEPTANCE, WHICHEVER IS EARLIER, AGAINST DEFECTIVE MATERIAL, DESIGN, AND WORKMANSHIP

ELECTRICAL WORK

- A. ALL ELECTRICAL EQUIPMENT FURNISHED UNDER THIS DIVISION OF THESE SPECIFICATIONS SHALL COMPLY THE ELECTRICAL SYSTEM CHARACTERISTICS INDICATED ON THE ELECTRICAL DRAWINGS
- B. MOTOR CONTROL COMPONENTS FURNISHED AS AN INTEGRAL PART OF MECHANICAL EQUIPMENT SHALL CONFORM TO REQUIREMENTS OF ELECTRICAL DRAWINGS. C. POWER WIRING SHALL BE PROVIDED BY ELECTRICAL
- D. WIRING AND CONDUIT BETWEEN VFD AND MOTOR SHALL BE UNDER THIS DIVISION UNLESS IT IS INDICATED ON THE ELECTRICAL DRAWINGS. WIRING AND CONDUIT SHALL BE PER NEC AND ELECTRICAL SPECIFICATIONS

IDENTIFICATION FOR HVAC EQUIPMENT

- A. PROVIDE NAMEPLATES FOR ALL SCHEDULED EQUIPMENT B. NAMEPLATES SHALL BE PLASTIC MATERIAL WITH 1.5 INCH TALL LETTERING. RIVETED
- TO EQUIPMENT CASING. C. PROVIDE LABELS FOR EACH SPACE THERMOSTAT OR CONTROL SENSOR BY NOTING WHICH EQUIPMENT IT IS ASSOCIATED WITH.

PAINTING

- A. FACTORY PAINTED EQUIPMENT THAT HAS BEEN SCRATCHED OR MARRED SHALL BE REPAINTED TO MATCH ORIGINAL COLOR.
- B. STEEL EQUIPMENT HANGERS, SUPPORTS, AND UNINSULATED BLACK STEEL PIPE EXPOSED TO SIGHT INSIDE THE BUILDING WHICH ARE NOT PROVIDED WITH A FACTORY APPLIED PRIME COAT SHALL BE CLEANED OF RUST, GREASE, AND SCALE AFTER CLEANING HANGERS, SUPPORTS AND PIPE, A FIELD-APPLIED PRIME COAT SHALL BE PROVIDED. IN ADDITION, SUCH ITEMS IN FINISHED SPACES SHALL BE PROVIDED WITH TWO COATS OF FINISH PAINT IN A COLOR TO MATCH ADJACENT SURFACES.

CLEANING AND ADJUSTING

- A. ALL EQUIPMENT, PIPE, VALVES, AND FITTINGS SHALL BE CLEANED OF GREASE, OIL, PAINT SPOTS, METAL CUTTINGS, SLUDGE, AND CONSTRUCTION DEBRIS
- B. DUCTS, PLENUMS, AND CASINGS SHALL BE CLEANED OF ALL DEBRIS AND BLOWN
- FREE OF ALL PARTICLES OF RUBBISH AND DUST BEFORE INSTALLING OUTLET FACES. C. BEARINGS SHALL BE LUBRICATED AS RECOMMENDED BY THE EQUIPMENT
- MANUFACTURER. D. TEMPORARY FILTERS SHALL BE PROVIDED FOR FANS THAT ARE USED DURING CONSTRUCTION. AT THE TIME OF STARTING THE BALANCING OF THE AIR DISTRIBUTION SYSTEM, NEW FILTERS SHALL BE INSTALLED.

DRAWINGS AND MANUALS

- A. AS-BUILT DRAWINGS OF THE ACTUAL INSTALLATION SHALL BE PROVIDED TO THE BUILDING OWNER OR THE BUILDING OWNER'S DESIGNATED REPRESENTATIVE WITHIN 90 DAYS OF SYSTEM ACCEPTANCE. AS-BUILT DRAWINGS SHALL INCLUDE (AS A MINIMUM) LOCATION AND PERFORMANCE DATA ON EACH PIECE OF EQUIPMENT, GENERAL CONFIGURATION OF THE DUCT AND PIPE DISTRIBUTION SYSTEM INCLUDING SIZES. AND TERMINAL AIR FLOW RATES.
- B. INSTALLATION, OPERATION, AND MAINTENANCE (IOM) MANUALS SHALL BE PROVIDED TO THE BUILDING OWNER OR THE BUILDING OWNER'S DESIGNATED REPRESENTATIVE WITHIN 90 DAYS OF SYSTEM ACCEPTANCE. IOM MANUALS SHALL BE IN ACCORDANCE WITH INDUSTRY-ACCEPTED STANDARDS; REFER TO ASHRAE 90.1 INFORMATIVE APPENDIX E.

TEST AND BALANCE:

- A. INSTRUMENTS USED FOR BALANCING SHALL HAVE BEEN CALIBRATED WITHIN 6
- MONTHS PRIOR TO THE BALANCING OF THE SYSTEMS. B. ALL INSTRUMENTS REQUIRED TO BALANCE THE SYSTEM SHALL BE PROVIDED AT THE CONTRACTOR'S EXPENSE.

GENERAL BALANCING

A. AIR 1. ADJUST AND BALANCE AIR SYSTEMS INDICATED HEREIN TO OBTAIN DESIGN FLOW RATES FOR SYSTEMS AS A WHOLE AND EACH INLET AND OUTLET, ±10%. USE BALANCING DAMPERS AND/OR FLOW SETTING DEVICES FOR INLET, OUTLET AND

BRANCH ADJUSTMENTS. USE FAN SPEED ADJUSTMENT FOR BELT DRIVE FANS.

2. PITOT TUBE TRAVERSES SHALL BE PERFORMED IN ACCORDANCE WITH ASHRAE FUNDAMENTALS.

- A. TEST AND BALANCE AND ASSOCIATED REPORT SHALL BE COMPLETED BY AN
- INDEPENDENT AABC OR NEBB CERTIFIED AGENCY. B. THE REPORT OF PERFORMANCE TESTING AND BALANCING SHALL INCLUDE DATA
- LISTED BELOW: 1. NAME AND ADDRESS OF PROJECT, NAME AND ADDRESS OF CONTRACTOR, DATES OF ALL TESTS, NAME AND TELEPHONE NUMBER OF THE TEST ENGINEER.
- 2. GRILLES, REGISTERS AND DIFFUSERS:
- A. FAN SYSTEM AND/OR ZONE NUMBER B. ROOM NUMBER
- C. SIZE OF INLET OR OUTLET
- D. MANUFACTURER'S EFFECTIVE DATA E. REQUIRED, INITIAL, AND FINAL FLOW AND VELOCITY
- 3. FANS: A. SYSTEM AND/OR FAN NUMBER
- B. FAN MANUFACTURER, SERIAL NUMBER, AND MODEL NUMBER C. MOTOR MANUFACTURER, HORSEPOWER, VOLTAGE, PHASE, RPM, TYPE AND
- SERVICE FACTOR, AMPERAGE NAMEPLATE RATING.
- D. SCHEDULED DATA ON DRAWINGS OR IN SPECIFICATIONS
- E. FINAL AIRFLOW, RPM, TOTAL AND SUCTION STATIC PRESSURE, MOTOR AMPERAGE, AND BRAKE HORSEPOWER.
- C. ANY DEVIATIONS FROM DESIGN DATA SHALL BE EXPLAINED IN THE REPORT INCLUDING POSSIBLE REASONS FOR AND SOLUTIONS TO ISSUES. D. REPORT SHALL BE SIGNED AND DATED BY BALANCE ENGINEER. PROVIDE TO ENGINEER OF RECORD FOR REVIEW AND COMMENT. DEFICIENCIES NOTED IN
- ENGINEER OF RECORD REVIEW SHALL BE CORRECTED PRIOR TO FINAL TEST AND BALANCE REPORT BEING SUBMITTED TO THE DEVELOPER AND TENANT CONTRACT MANAGER, AS REQUIRED IN THE CLOSE-OUT PHASE OF THE PROJECT. . TEST AND BALANCE SHALL NOT BE PERFORMED UNTIL SYSTEM INSTALLATION IS COMPLETE.

SEQUENCES OF OPERATION AIR HANDLING UNIT

A. GENERAL

- 1. AHU TO BE INTEGRATED INTO AND CONTROLLED BY THE LOCAL BMS
- 2. THE AHU SHALL BE PACKAGED WITH BACNET CONTROLLER BY THE
- FACTORY. 3. AHU SHALL OPERATE IN A SINGLE ZONE VAV OPERATION AS NOTED IN THE EQUIPMENT SCHEDULE.
- B. SETPOINTS 1. ALL SETPOINTS SHALL BE ADJUSTABLE.
 - 2. THE AHU SHALL OPERATE TO MAINTAIN THE FOLLOWING ZONE SETPOINTS (AHU-01) OCCUPIED: 75°F DB @ 50% RH (COOLING), 70°F DB (HEATING)

82°F DB @ 50% RH (COOLING), 65°F DB (HEATING)

- C. UNOCCUPIED MODE 1. WHEN THE AHU IS INDEXED INTO UNOCCUPIED MODE, THE SUPPLY FAN SHALL BE OFF, THE OUTSIDE AIR (OA) DAMPER SHALL BE CLOSED, AND THE RETURN
- AIR (RA) DAMPER SHALL BE OPEN. 2. WHEN THE UNOCCUPIED ZONE TEMPERATURE SETPOINT IS NOT SATISFIED, THE REFRIGERATION SYSTEM AND SUPPLY FAN SHALL BE STAGED IN SEQUENCE TO MAINTAIN THE UNOCCUPIED ZONE TEMPERATURE SETPOINT
- VIA ITS RESPECTIVE ZONE THERMOSTAT. 3. WHEN THE UNOCCUPIED ZONE TEMPERATURE SETPOINT IS SATISFIED, THE SUPPLY FAN AND COILS SHALL BE DEENERGIZED.
- 4. ALL SYSTEM SAFETIES SHALL REMAIN OPERATIONAL D. MORNING WARM UP / COOL DOWN:
- 1. THE MODE SHALL BE INITIATED BY THE CENTRALIZED CONTROL PLATFORM THROUGH AN OPTIMAL START CALCULATION. WHEN INITIATED, THE SUPPLY FAN SHALL START, THE OA DAMPER SHALL BE CLOSED, AND THE RA DAMPER SHALL BE OPEN.
- 2. WARM UP: A. THE HEAT PUMP AND ELECTRIC HEATING COIL (IF NECESSARY) SHALL MODULATE TO MAINTAIN THE OCCUPIED ZONE TEMPERATURE SETPOINT
- VIA ITS RESPECTIVE ROOM THERMOSTAT. B. WHEN THE ZONE REACHES SETPOINT, THE SYSTEM WILL BE INDEXED TO "OCCUPIED MODE".
- A. THE REFRIGERATION SYSTEM SHALL BE STAGED TO MAINTAIN THE OCCUPIED ZONE TEMPERATURE SETPOINT VIA ITS RESPECTIVE ROOM
- **THERMOSTAT** B. WHEN THE ZONE REACHES SETPOINT, THE SYSTEM SHALL BE INDEXED TO "OCCUPIED MODE".
- E. OCCUPIED MODE: 1. WHEN THE AHU IS INDEXED TO OCCUPIED MODE, THE OA DAMPER SHALL OPEN TO ITS POSITION (AS DETERMINED DURING TEST AND BALANCE) TO ACHIEVE DESIGN OUTSIDE AIRFLOW AND THE SUPPLY FAN SHALL START AND RUN CONTINUOUSLY
- 2. VARIABLE SUPPLY FAN SHALL FULLY MODULATE BETWEEN ITS SCHEDULED MINIMUM AND MAXIMUM SETPOINTS.
- F. COOLING MODE: COOLING MODE SHALL BE ENABLED WHENEVER THE OA AMBIENT TEMPERATURE IS GREATER THAN OR EQUAL TO 60°F DB (ADJ) AND A CALL FOR **COOLING EXISTS**
- 2. THE REFRIGERATION SYSTEM AND SUPPLY FAN SHALL MODULATE TO MAINTAIN THE COOLING ZONE TEMPERATURE AND RELATIVE HUMIDITY SETPOINT IN ACCORDANCE WITH MANUFACTURER'S SINGLE ZONE VAV SEQUENCE OF OPERATIONS.
- G. HEATING MODE: 1. HEATING MODE SHALL BE ENABLED WHENEVER THE OUTSIDE AIR TEMPERATURE IS LESS THAN OR EQUAL TO 55°F DB (ADJ) AND A CALL FOR
- **HEATING EXISTS** 2. THE HEAT PUMP SHALL MODULATE TO MAINTAIN THE HEATING ZONE TEMPERATURE SETPOINT IN ACCORDANCE WITH MANUFACTURER'S SINGLE
- ZONE VAV SEQUENCE OF OPERATIONS H. DEHUMIDIFICATION MODE: 1. EACH AHU SHALL MONITOR RELATIVE HUMIDITY IN THE ASSOCIATED ZONE VIA
- COMBINATION TEMPERATURE/HUMIDITY SENSORS. 2. WHEN ZONE RELATIVE HUMIDITY EXCEEDS 55% (ADJ), THE ASSOCIATED AHU
- SHALL ENABLE MODULATING HOT GAS REHEAT A. WHEN A UNIT ENTERS DEHUMIDIFICATION MODE, ITS COMPRESSOR(S) SHALL BEGIN OPERATING AT 100% CAPACITY. THE UNIT SHALL ACTIVATE ITS REHEAT COIL AND ASSOCIATED CONTROL TO
- ECONOMIZER MODE (ONLY APPLIES TO UNITS INDICATED ON EQUIPMENT SCHEDULES) 1. THE UNIT SHALL MONITOR THE RETURN AIR AND OUTSIDE AIR ENTHALPY AND OUTSIDE AIR TEMPERATURE. ECONOMIZER MODE SHALL BE CONTROLLED BASED ON DIFFERENTIAL ENTHALPY WITH FIXED OUTDOOR DRY-BULB
- TEMPERATURE. A. WHEN OUTSIDE AIR ENTHALPY IS LESS THAN THE RETURN AIR ENTHALPY OR WHEN THE OUTSIDE AIR TEMPERATURE IS LESS THAN 75 °F, THE SYSTEM SHALL BE ENABLE ECONOMIZER MODE. THE REFRIGERATION SYSTEM. AND THE OA AND RA DAMPERS SHALL MODULATE IN SEQUENCE TO MAINTAIN THE COOLING ZONE TEMPERATURE AND RELATIVE HUMIDITY SETPOINT
- B. THE SYSTEM SHALL DISABLE ECONOMIZER MODE WHEN THE OUTSIDE AIR ENTHALPY IS GREATER THAN THE RETURN AIR ENTHALPY OR WHEN THE OUTSIDE AIR TEMPERATURE IS GREATER THAN 75 °F OR THE ZONE RELATIVE HUMIDITY IS OUTSIDE OF SETPOINT BY 3% (ADJ) FOR MORE THAN 5 MINUTES (ADJ).

ENERGY REC<u>OVERY UNIT (ERU-01)</u>

- A. GENERAL: 1. ERU TO BE INTEGRATED INTO AND CONTROLLED BY THE LOCAL BMS
- **PROTOCOL** 2. THE ERU SHALL BE PACKAGED WITH BACNET CONTROLLER BY THE FACTORY. B. SETPOINTS:
- ALL SETPOINTS SHALL BE ADJUSTABLE. THE AHU SHALL OPERATE TO MAINTAIN THE FOLLOWING ZONE SETPOINTS(AHU-01)
- OCCUPIED: 75°F DB @ 50% RH (COOLING), 70°F DB (HEATING UNOCCUPIED: 82°F DB @ 50% RH (COOLING), 65°F DB (HEATING) C. UNOCCUPIED MODE
- 1. WHEN THE ERU IS INDEXED INTO UNOCCUPIED MODE, THE SUPPLY FAN, EXHAUST FAN, AND ENERGY RECOVERY WHEEL SHALL BE OFF, AND THE OUTSIDE AIR (OA) DAMPER SHALL BE CLOSED.
- D. OCCUPIED MODE: 1. WHEN THE ERU IS INDEXED TO OCCUPIED MODE, THE OA DAMPER SHALL OPEN TO ITS POSITION (AS DETERMINED DURING TEST AND BALANCE) TO ACHIEVE
- DESIGN OUTSIDE AIRFLOW AND THE SUPPLY FAN, EXHAUST FAN, AND ENERGY RECOVERY WHEEL SHALL START AND RUN CONTINUOUSLY 2. THE EXHAUST AND SUPPLY FANS MUST RUN AT LOW SPEED DURING OCCUPIED TIMES
- 3. THE GAS DETECTION PANEL MUST RECEIVE CO AND NOx FROM ASSOICATED SENSORS AND TAKE HIGHEST VALUE FROM THE PAIR OF CO AND PAIR OF NOx SENSORS. THE EXHAUST AND SUPPLY FANS MUST RUN AT HIGH SPEED BASED
- ON THE FOLLOWING: A. SPACE CO SENSOR READINGS > 25 PPM OR NOx READINGS > 0.7 PPM.
- E. COOLING MODE:
- COOLING MODE SHALL BE ENABLED WHENEVER A CALL FOR COOLING EXISTS. 2. THE REFRIGERATION SYSTEM AND SUPPLY FAN SHALL BE STAGED TO MAINTAIN THE COOLING ZONE TEMPERATURE AND RELATIVE HUMIDITY SETPOINT. F. HEATING MODE:
- 1. HEATING MODE SHALL BE ENABLED WHENEVER A CALL FOR HEATING EXISTS. 2. THE HEAT PUMP SHALL MODULATE TO MAINTAIN THE HEATING ZONE TEMPERATURE SETPOINT. G. DEHUMIDIFICATION MODE:
- 1. EACH ERU SHALL MONITOR RELATIVE HUMIDITY IN THE ASSOCIATED ZONE VIA COMBINATION TEMPERATURE/HUMIDITY SENSORS. 2. WHEN ZONE RELATIVE HUMIDITY EXCEEDS 60% (ADJ), THE ASSOCIATED RTU

SHALL ENABLE MODULATING HOT GAS REHEAT.

A. WHEN A UNIT ENTERS DEHUMIDIFICATION MODE, ITS COMPRESSOR(S) SHALL BEGIN OPERATING AT 100% CAPACITY. 3. THE UNIT SHALL ACTIVATE ITS REHEAT COIL AND ASSOCIATED CONTROL TO MAINTAIN A LEAVING AIR TEMPERATURE OF NO LESS THAN 65°F (ADJ).

- A. EF-02, EF-03, EF-04 SHALL RUN CONTINUOUSLY DURING OCCUPIED HOURS AS
- DEFINED BY THE LOCAL BMS SYSTEM.
- B. EF-01 SHALL BE THERMOSTATICALLY CONTROLLED. 1. EF-01 SHALL OPERATE AT FIRST STAGE (820 CFM) IF THE TEMPERATURE IN
- THE SPACE EXCEEDS 75°F 2. EF-01 SHALL OPERATE AT SECOND STAGE (1640 CFM) ONCE THE
- TEMPERATURE IN THE SPACE EXCEEDS 80°F

DUCTLESS SPLIT HEAT PUMPS

- A. THE BMS MUST MONITOR THE ZONE TEMPERATURE OF THE ZONE AND THE SPLIT
- B. THE LOCAL THERMOSTAT MUST MAINTAIN THE FOLLOWING TEMPERATURE

SETPOINTS:

- 1. 80°F (ADJ) COOLING SETPOINT 2. 55°F (ADJ) HEATING SETPOINT
- C. BMS SHALL ALARM IF ZONE TEMPERATURE IS GREATER THAN 80°F (ADJ.) OR IF ZONE TEMPERATURE IS BELOW 55°F (ADJ.).

A. ALL UNIT HEATERS SHALL CYCLE ON AND OFF TO MAINTAIN SETPOINT OF 40°F

- INSTRUMENTATION AND CONTROLS
- COMPATIBLE WITH TENANT'S ENTERPRISE SYSTEM PROVIDED THROUGH NIAGARA N4 PLATFORM B. LOCAL BMS SHALL BE CAPABLE OF INTEGRATING UNIT DDC CONTROLLERS WITHIN A WEB-BASED NETWORK INTERFACE. THE SYSTEM INTERFACE SHALL

A. PROVIDE A LOCAL BUILDING MANAGEMENT SYSTEM (BMS), BACNET PROTOCOL

- DEPICT EACH MECHANICAL SYSTEM ON THE BUILDING FLOORPLAN WITH POINT-AND-CLICK GRAPHICAL INTERFACE. C. BUILDING MANAGEMENT SYSTEM SHALL INTERFACE WITH CLIENT'S EXISTING CENTRALIZED SQL SERVER (NIAGARA N4 PLATFORM) AND SHALL GATHER THE
- DATA FROM THE SITE AND DISPLAY IN AN APPROVED FORMAT. D. THE FOLLOWING EQUIPMENT SHALL BE MONITORED AND CONTROLLED:
- ROOFTOP PACKAGED A/C UNITS, HVLS FANS, VENTILATION FANS, AND EXHAUST E. SPACE TEMPERATURE, SPACE RELATIVE HUMIDITY, FIRE ALARM CONTROL
- PANELS. AND METERS (ELECTRIC. WATER) SHALL BE MONITORED BY THE BMS. F. PROVIDE SIGNAL CONVERTER AS REQUIRED TO ALLOW SIGNALS FROM FIRE ALARM PANEL TO BE UTILIZED BY BMS G. SYSTEM SHALL PROVIDE THE ABILITY TO CONTROL EACH PIECE OF EQUIPMENT
- INDIVIDUALLY USING TIME OF DAY SCHEDULING, OCCUPIED / UNOCCUPIED SCHEDULING, ENABLE / DISABLE CONTROL, MANUAL CONTROL, SET POINT CONTROL, ETC. AS DESIRED. H. THE BMS SHALL BE WEB BASED AND SHALL HAVE THE ABILITY TO VIEW THE CURRENT OPERATING STATUS OF EACH PIECE OF EQUIPMENT, AS WELL AS THE ABILITY TO ENABLE / DISABLE OPERATION, ADJUST SET POINTS, ETC., AS WELL
- AS VIEW INTERNAL POINTS OF PACKAGED EQUIPMENT ON-BOARD CONTROLLERS (AHU, EF, ETC.). THE SYSTEM SHALL HAVE THE ABILITY TO NOTIFY SELECT PERSONNEL (VIA PAGER, PHONE, EMAIL, ETC.) OF ALARM OR OTHER CONDITIONS AS DESIRED BY
- . ALL SPACE SENSORS SHALL BE COMBINATION TEMPERATURE, RELATIVE HUMIDITY, AND CO2 LEVEL TYPE TO ALLOW MONITORING OF SPACE CONDITIONS
- AND CALCULATION OF THE SPACE HEAT INDEX. K. THE SYSTEM SHALL PROVIDE CONNECTION TO THE OWNER'S VIRTUAL PRIVATE NETWORK (VPN) FOR REMOTE ACCESS TO DATA. BMS INTEGRATION SHALL BE COORDINATED WITH OWNER'S SYSTEM INTEGRATOR, ENVIRONMENTAL SYSTEMS INCORPORATED (ESI).

METAL DUCTS AND ACCESSORIES

- A. DUCT CONSTRUCTION, INCLUDING SHEET METAL THICKNESSES, SEAM AND JOINT CONSTRUCTION, REINFORCEMENTS, AND HANGERS AND SUPPORTS, SHALL COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" AND WITH PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED HEREINAFTER COMPLY WITH REQUIREMENTS IN ASHRAE/IES 90.1,
- SECTION 6.4.4 "HVAC SYSTEM CONSTRUCTION AND INSULATION." 1. CONSTRUCT DUCTS OF GALVANIZED SHEET STEEL UNLESS OTHERWISE INDICATED.
- 2. ELBOWS, TRANSITIONS, OFFSETS, BRANCH CONNECTIONS, AND OTHER DUCT CONSTRUCTION: SELECT TYPES AND FABRICATE IN ACCORDANCE WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," CH. 4, "FITTINGS AND OTHER CONSTRUCTION"

- B. DUCT LINER SHALL COMPLY WITH ASTM C1071, NFPA 90A, OR NFPA 90B; AND WITH NAIMA AH124, "FIBROUS GLASS DUCT LINER STANDARD." ADHERE A SINGLE LAYER OF 1" THICK OF DUCT LINER WITH AT LEAST 90 PERCENT
- ADHESIVE COVERAGE AT LINER CONTACT SURFACE AREA 1. PROVIDE INTERNAL DUCT LINER ON THE FIRST 15'-0" OF DUCTWORK ASSOCIATED WITH SUPPLY AND RETURN DUCTWORK FROM ROOFTOP
- C. SEALANT AND GASKET REQUIREMENTS: SURFACE-BURNING CHARACTERISTICS FOR SEALANTS AND GASKETS SHALL BE A MAXIMUM FLAME-SPREAD INDEX OF 25 AND A MAXIMUM SMOKE-DEVELOPED INDEX OF

50 WHEN TESTED IN ACCORDANCE WITH UL 723; CERTIFIED BY AN NRTL.

HANGERS AND SUPPORTS

A. GALVANIZED-STEEL RODS AND NUTS. B. STRAP AND ROD SIZES: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," TABLE 5-1 (TABLE 5-1M), "RECTANGULAR DUCT HANGERS MINIMUM SIZE," AND TABLE 5-2, "MINIMUM HANGER SIZES FOR ROUND DUCT."

DUCT CONSTRUCTION / INSTALLATION

- A. DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF DUCT SYSTEM. INDICATED DUCT LOCATIONS, CONFIGURATIONS, AND ARRANGEMENTS WERE USED TO SIZE DUCTS AND CALCULATE FRICTION LOSS FOR AIR-HANDLING EQUIPMENT SIZING AND FOR OTHER DESIGN CONSIDERATIONS. INSTALL DUCT SYSTEMS AS INDICATED UNLESS DEVIATIONS TO LAYOUT ARE APPROVED ON SHOP
- DRAWINGS AND COORDINATION DRAWINGS B. INSTALL FACTORY- OR SHOP-FABRICATED FITTINGS FOR CHANGES IN
- DIRECTION, SIZE, AND SHAPE AND FOR BRANCH CONNECTIONS. C. WHERE DUCTS PASS THROUGH NON-FIRE-RATED INTERIOR PARTITIONS AND EXTERIOR WALLS AND ARE EXPOSED TO VIEW, COVER THE OPENING BETWEEN THE PARTITION AND DUCT OR DUCT INSULATION WITH SHEET METAL FLANGES OF SAME METAL THICKNESS AS THE DUCT. OVERLAP OPENINGS ON FOUR SIDES BY AT LEAST 1-1/2 INCHES (38 MM).
- D. ELBOWS: USE 1.5 X RADIUS ELBOWS. ONLY USE MITERED ELBOWS WHERE CONSTRAINTS PROHIBIT 1.5 X RADIUS ELBOWS. FABRICATE 90-DEGREE RECTANGULAR MITERED ELBOWS TO INCLUDE TURNING VANES.
- E. BRANCH CONNECTIONS: USE LATERAL OR CONICAL BRANCH CONNECTIONS. F. FLEXIBLE DUCTS SHALL BE UL 181, CLASS 1, TWO-PLY VINYL FILM SUPPORTED BY HELICALLY WOUND, SPRING-STEEL WIRE; FIBROUS-GLASS INSULATION; POLYETHYLENE VAPOR-BARRIER FILM. FLEXIBLE DUCTWORK SHALL NOT EXCEED 5'-0" IN LENGTH.

G. FABRICATE ALL DUCTS TO ACHIEVE SMACNA PRESSURE CLASS, SEAL

- CLASS, AND LEAKAGE CLASS OF 150% OF THE SCHEDULED FAN EXTERNAL STATIC PRESSURE OR AS INDICATED BELOW, WHICHEVER IS GREATER: 1. SUPPLY DUCTS CONNECTED TO FAN COIL UNITS, CONSTANT VOLUME AIR
- HANDLERS, FURNACES, HEAT PUMPS, AND TERMINAL UNITS: PRESSURE CLASS: POSITIVE 2 INCH WG. SEAL CLASS A. 2. SUPPLY DUCTS CONNECTED TO VARIABLE-AIR-VOLUME AIR-HANDLING
- UNITS: PRESSURE CLASS: POSITIVE 4 INCH WG. SEAL CLASS: A. 3. RETURN AND EXHAUST DUCTS: PRESSURE CLASS NEGATIVE 1-INCH WG, SEAL CLASS A

HANGER AND SUPPORT INSTALLATION

- A. COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE," CHAPTER 5, "HANGERS AND SUPPORTS." B. BUILDING ATTACHMENTS: CONCRETE INSERTS, POWDER-ACTUATED
- FASTENERS, OR STRUCTURAL-STEEL FASTENERS APPROPRIATE FOR CONSTRUCTION MATERIALS TO WHICH HANGERS ARE BEING ATTACHED. C. HANGER SPACING: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," TABLE 5-1 (TABLE 5-1M), "RECTANGULAR DUCT HANGERS MINIMUM SIZE," AND TABLE 5-2, "MINIMUM

FIELD QUALITY CONTROL A. COMPLY WITH SMACNA'S "HVAC AIR DUCT LEAKAGE TEST MANUAL."

INSTALL HANGERS AND SUPPORTS WITHIN 24 INCHES (610 MM) OF EACH

ELBOW AND WITHIN 48 INCHES (1220 MM) OF EACH BRANCH INTERSECTION.

HANGER SIZES FOR ROUND DUCT," FOR MAXIMUM HANGER SPACING;

- MANUAL DAMPERS A. DAMPERS SHALL BE SINGLE BLADE BUTTERFLY TYPE IN DUCTS UP TO AND INCLUDING 18" X 12" SINGLE; FOR DUCTS LARGE THAN 18" X 12", IN EITHER
- OR BOTH DIMENSIONS, THE DAMPERS SHALL BE THE MULTI-LOUVER TYPE B. SINGLE BLADE BUTTERFLY DAMPERS SHALL BE CONSTRUCTED OF NOT LESS THAN 16-GAUGE GALVANIZED STEEL BLADE MOUNTED IN A GALVANIZED STEEL FRAME. DAMPER SHALL BE PROVIDED WITH AN EXTENDED ROD TO
- PERMIT INSTALLATION OF A DAMPER REGULATOR. C. MULTI-LOUVER DAMPERS SHALL BE OPPOSED BLADE TYPE, CONSTRUCTED OF NOT LESS THAN 16-GAUGE GALVANIZED STEEL BLADE MOUNTED IN GALVANIZED STEEL CHANNEL FRAME. BLADE SPACING SHALL NOT EXCEED 6-INCHES AND THE TOP AND BOTTOM EDGES OF THE BLADES SHALL BE CRIMPED TO STIFFEN THE BLADES. DAMPER BLADES SHALL BE INTERCONNECTED BY RODS AND LINKAGES TO PROVIDE SIMULTANEOUS OPERATION OF ALL BLADES. DAMPER SHALL BE PROVIDED WITH AN

EXTENDED ROD TO PERMIT INSTALLATION OF A DAMPER REGULATOR.

- MOTOR-OPERATED DAMPERS A. DAMPER RATINGS:
- 1. PRESSURE: UP TO 5 IN. W.G. DIFFERENTIAL 2. VELOCITY: UP TO 3000 FPM
- 3. LEAKAGE: A. CLASS 1A AT 1 IN. W.G.
- B. CLASS 1 AT UP TO 5 IN. W.G. 4. TEMPERATURE: -40 °F TO 250°F B. DAMPER BLADES SHALL BE 16 GA. (1.5MM) GALVANIZED STEEL 3V TYPE WITH THREE LONGITUDINAL GROOVES FOR REINFORCEMENT. BLADES SHALL BE
- COMPLETELY SYMMETRICAL RELATIVE TO THEIR AXLE PIVOT POINT, PRESENTING IDENTICAL RESISTANCE TO AIRFLOW AND OPERATION IN EITHER DIRECTION THROUGH THE DAMPER. C. BLADE SEALS SHALL BE TPE. LINKAGE SHALL BE BLADE-TO BLADE
- REDUCE PRESSURE DROP AND NOISE. D. DAMPER FRAME SHALL BE 16 GA. (1.5MM) GALVANIZED STEEL FORMED INTO A STRUCTURAL HAT CHANNEL SHAPE WITH REINFORCED CORNERS TO MEET 11 GA. (3.1MM) CRITERIA.

CONCEALED IN JAMB (OUT OF THE AIRSTREAM) TO PROTECT LINKAGE AND

- E. BEARINGS SHALL BE CORROSION RESISTANT, PERMANENTLY LUBRICATED, SYNTHETIC (ACETAL) SLEEVE TYPE ROTATING IN EXTRUDED HOLES IN THE
- DAMPER FRAME FOR MAXIMUM SERVICE. F. AXLES SHALL BE SQUARE AND POSITIVELY LOCKED INTO THE DAMPER
- G. JAMB SEALS SHALL BE FLEXIBLE STAINLESS STEEL COMPRESSION TYPE TO PREVENT LEAKAGE BETWEEN BLADE END AND DAMPER FRAME. H. SUBMITTAL DATA SHALL CERTIFY ALL AIR LEAKAGE AND AIR PERFORMANCE PRESSURE DROP DATA IS LICENSED IN ACCORDANCE WITH THE AMCA CERTIFIED RATINGS PROGRAM FOR TEST FIGURES 5.2, 5.3, AND 5.5. DAMPER AIR PERFORMANCE DATA SHALL BE DEVELOPED IN ACCORDANCE WITH THE
- LATEST EDITION OF AMCA STANDARD 500-D. DAMPER ACTUATOR: 1. ACTUATOR SHALL BE ON/OFF, SPRING RETURN, CONSTANT TORQUE
- OPERATION. 2. ACTUATOR SHALL BE PROTECTED FROM OVERLOAD AT ALL ANGLES OF ROTATION.
- 3. ACTUATOR SIZING SHALL BE IN ACCORDANCE WITH THE MOTOR-OPERATED DAMPER MANUFACTURER'S WRITTEN INSTRUCTIONS.
- 4. IF REQUIRED, TWO SINGLE-POLE DOUBLE-THROW (SPDT) AUXILIARY SWITCHES SHALL BE PROVIDED; AT LEAST ONE SHALL BE ADJUSTABLE
- 5. ACTUATOR SHALL HAVE A 5-YEAR MANUFACTURER'S WARRANTY, UNDER ISO 9001: INTERNATIONAL QUALITY CONTROL STANDARDS. 6. ACTUATOR SHALL BE MOUNTED TO THE MOTOR-OPERATED DAMPER IN

ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.

- FIRE DAMPERS
- A. FIRE DAMPERS SHALL BE FUSIBLE LINK TYPE TESTED FOR CLOSURE UNDER AIR FLOW, CONFORMING TO UL 555 AND LABELED FOR INSTALLATION IN FIRE RATED WALLS AND FLOORS. DAMPERS IN FLOOR SHALL HAVE SPRING OPERATOR. DAMPERS SHALL HAVE BLADES OUT OF THE AIRSTREAM WHEN DAMPER IS IN THE OPEN POSITION. DAMPERS IN WALLS OR FLOORS RATED 2 HOURS OR LESS SHALL BE RATED FOR 1-1/2 HOURS; DAMPERS IN WALLS RATED 3 OR 4 HOURS SHALL BE RATED FOR 3 HOURS. DAMPERS SHALL BE
- CONSTRUCTED OF GALVANIZED STEEL B. FIRE DAMPERS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

DUCT AND PLENUM ACCESS DOORS

A. DUCT ACCESS DOORS SHALL BE SIZED IN ACCORDANCE WITH GENERAL

- B. FOR ACCESS DOORS IN DUCT PRESSURE CLASS 2", DOORS SHALL BE DOUBLE WALL CONSTRUCTION OF NOT LESS THAN 24-GAUGE GALVANIZED STEEL SHEET, WITH 1-INCH THICK NEOPRENE COATED FIBERGLASS INSULATION BETWEEN THE WALLS. DOORS SHALL HAVE A CONTINUOUS HINGE ON ONE SIDE AND SAME LATCH WITH STRIKER PLATE ON THE OTHER SIDE; DOORS WITH THE HEIGHT OVER 12-INCHES SHALL HAVE NOT LESS THAN 2 CAM LATCHES WITH STRIKER PLATES. DOOR FRAME SHALL BE CONSTRUCTED OF NOT LESS THAN 22-GUAGE GALVANIZED STEEL AND SHALL HAVE KNOCK-OVER EDGES FOR SECURING TO DUCT. THE DOOR ASSEMBLY SHALL BE DOUBLE GASKETED TO PROVIDE SEALS FROM THE DOOR TO THE FRAME AND FROM THE FRAME TO THE DUCT.
- C. ACCESS DOORS IN DUCT PRESSURE CLASSES 3" AND ABOVE SHALL BE THE COMBINATION ACCESS/VACUUM RELIEF TYPE DESIGNED FOR HIGH PRESSURE SERVICE.

WIND LOAD PROTECTION DEVICES

3. WIND-RESTRAINT DETAIL DRAWING:

- A. DELEGATED DESIGN SUBMITTAL 1. DESIGN OF WIND-LOAD PROTECTION DEVICES AND BRACING IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE. SMACNA DUCT DESIGN GUIDELINES, AND ASCE 7-10, CHAPTERS 26 THROUGH 30. WHERE "ASCE/SEI 7" IS USED THROUGHOUT THIS SECTION, IT IS TO BE UNDERSTOOD THAT THE EDITION REFERRED TO IN THIS PARAGRAPH IS THE EDITION INTENDED AS REFERENCE THROUGHOUT THIS SECTION OF
- .. INCLUDE DESIGN CALCULATIONS AND DETAILS FOR SELECTING WIND-LOAD RESTRAINTS COMPLYING WITH PERFORMANCE REQUIREMENTS, DESIGN CRITERIA, AND ANALYSIS DATA SIGNED AND SEALED BY THE QUALIFIED PROFESSIONAL ENGINEER RESPONSIBLE FOR THEIR **PREPARATION**
 - A. CONCRETE ANCHORS AND INSERTS: INCLUDE CALCULATIONS
- SHOWING ANTICIPATED WIND LOADS. B. WIND-LOAD DESIGN CALCULATIONS: SUBMIT ALL STATIC AND DYNAMIC LOADING CALCULATIONS PREPARED UNDER "WIND-LOAD DESIGN CALCULATIONS" PARAGRAPH HEREINAFTER.
- A. DESIGN ANALYSIS: TO SUPPORT SELECTION AND ARRANGEMENT OF WIND RESTRAINTS. INCLUDE CALCULATIONS OF COMBINED TENSILE AND SHEAR LOADS B. DETAILS: INDICATE FABRICATION AND ARRANGEMENT. DETAIL ATTACHMENTS OF RESTRAINTS TO RESTRAINED ITEMS AND TO THE

STRUCTURE. SHOW ATTACHMENT LOCATIONS, METHODS, AND

SPACINGS. IDENTIFY COMPONENTS, LIST THEIR STRENGTHS, AND

INDICATE DIRECTIONS AND VALUES OF FORCES TRANSMITTED TO THE

- STRUCTURE DURING WIND EVENTS. INDICATE ASSOCIATION WITH VIBRATION ISOLATION DEVICES. C. COORDINATE VIBRATION ISOLATION DETAILS WITH WIND-RESTRAINT DETAILS REQUIRED FOR EQUIPMENT MOUNTED OUTDOORS, COMPLY
- ALSO WITH REQUIREMENTS IN OTHER SECTIONS FOR EQUIPMENT MOUNTED OUTDOORS. B. WIND-LOAD-RESTRAINT DEVICE LOAD RATINGS: DEVICES TO BE TESTED AND RATED IN ACCORDANCE WITH APPLICABLE CODE REQUIREMENTS AND AUTHORITIES HAVING JURISDICTION. DEVICES TO BE LISTED BY A NATIONALLY RECOGNIZED THIRD PARTY THAT REQUIRES PERIODIC FOLLOW-
- C. WIND-LOAD DESIGN CALCULATIONS 1. PERFORM CALCULATIONS TO OBTAIN FORCE INFORMATION NECESSARY TO PROPERLY SELECT WIND-LOAD-RESTRAINT DEVICES, FASTENERS, AND ANCHORAGE. PERFORM CALCULATIONS USING METHODS ACCEPTABLE TO APPLICABLE CODE AUTHORITIES AND AS PRESENTED IN

UP INSPECTIONS AND HAS A LISTING DIRECTORY AVAILABLE TO THE PUBLIC.

- ASCE/SEI 7. .. FACTORS INDICATED BELOW THAT ARE SPECIFIC TO INDIVIDUAL PIECES OF EQUIPMENT MUST BE OBTAINED BY CONTRACTOR AND MUST BE INCLUDED IN INDIVIDUAL COMPONENT SUBMITTAL PACKAGES.
- 3. COORDINATE DESIGN WIND-LOAD CALCULATIONS WITH VIBRATION ISOLATION REQUIREMENTS. COMPLY WITH REQUIREMENTS IN OTHER SECTIONS IN ADDITION TO THOSE IN THIS SECTION FOR EQUIPMENT MOUNTED OUTDOORS.
- 4. DESIGN WIND PRESSURE "P" FOR EXTERNAL SIDEWALL-MOUNTED EQUIPMENT SUCH AS LOUVERS IS TO BE CALCULATED BY DELEGATED-DESIGN CONTRACTOR USING METHODS IN ASCE/SEI 7, CH. 30. 5. DESIGN WIND PRESSURE "P" FOR ROOFTOP EQUIPMENT IS TO BE
- CALCULATED BY DELEGATED-DESIGN CONTRACTOR USING METHODS IN ASCE/SEI 7, CH. 30, PART 6: BUILDING APPURTENANCES AND ROOFTOP
- STRUCTURES AND EQUIPMENT. RISK CATEGORY: II.
- h = MEAN ROOF HEIGHT: 39'-1" V = BASIC WIND SPEED: 143 MPH Kd = WIND DIRECTIONALITY FACTOR:0.85
- EXPOSURE CATEGORY: C Kzt = TOPOGRAPHIC FACTOR: N/A Kz = VELOCITY PRESSURE EXPOSURE COEFFICIENT (EVALUATED AT
- HEIGHT Z): 0.85 Kh = VELOCITY PRESSURE EXPOSURE COEFFICIENT (EVALUATED AT HEIGHT H): 1.04

• qz = VELOCITY PRESSURE: VALUE CALCULATED BY DELEGATED WIND-

LOAD DESIGN CONTRACTOR USING METHODS DETAILED IN ASCE/SEI

- LOAD DESIGN CONTRACTOR USING METHODS DETAILED IN ASCE/SEI 7-16 SECTION 26.10.1 OR OTHER SOURCE APPROVED BY AUTHORITIES HAVING JURISDICTION. qh = VELOCITY PRESSURE: VALUE CALCULATED BY DELEGATED WIND-
- 7-16 SECTION 26.10.1 OR OTHER SOURCE APPROVED BY AUTHORITIES HAVING JURISDICTION. • G = GUST-EFFECT FACTOR: 0.85
- ENCLOSURE CLASSIFICATION: ENCLOSED BUILDING GCpi = INTERNAL PRESSURE COEFFICIENT: +/- 0.18

EOR/AOR SEAL SEAL 038169 COA SEAL

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CLIENT INFORMATION

POND & COMPANY

No. C-1803

SEEFRIED INDUSTRIAL **PROPERTIES**

PROJECT NAME OFFICE/ WAREHOUSE

DRIVE WILMINGTON, **NORTH CAROLINA** 28435

DEVELOPMEN

DRAWING ISSUE

DESIGNED BY: DRAWN BY:

CHECKED BY:

SUBMITTED BY:

PROJECT #:

SHEET TITLE FSC -**MECHANCIAL SPECIFICATIONS**

1240989

M-703

SHEET NUMBER

ORIGINAL SHEET SIZE: 30" X 42"

2. RESTRAINED ISOLATION ROOF-CURB RAILS A. DESCRIPTION: FACTORY-ASSEMBLED, FULLY ENCLOSED, INSULATED, AIR-AND WATERTIGHT CURB RAIL DESIGNED TO RESILIENTLY SUPPORT

EQUIPMENT AND TO WITHSTAND WIND FORCES B. UPPER FRAME: TO PROVIDE CONTINUOUS SUPPORT FOR EQUIPMENT AND

TO BE CAPTIVE TO RESILIENTLY RESIST WIND FORCES. C. LOWER SUPPORT ASSEMBLY: TO BE FORMED SHEET METAL SECTION CONTAINING ADJUSTABLE AND REMOVABLE STEEL SPRINGS THAT SUPPORT THE UPPER FRAME. LOWER SUPPORT ASSEMBLY TO HAVE A MEANS FOR ATTACHING TO BUILDING STRUCTURE AND A WOOD NAILER FOR ATTACHING ROOF MATERIALS, AND TO BE INSULATED WITH A MINIMUM OF 2 INCHES OF RIGID, GLASS-FIBER INSULATION ON INSIDE OF ASSEMBLY. MOUNT ADJUSTABLE, RESTRAINED-SPRING ISOLATORS ON ELASTOMERIC VIBRATION ISOLATION PADS AND PROVIDE ACCESS PORTS, FOR LEVEL ADJUSTMENT. WITH REMOVABLE WATERPROOF COVERS AT ALL ISOLATOR LOCATIONS. LOCATE ISOLATORS SO THEY ARE ACCESSIBLE FOR ADJUSTMENT AT ANY TIME DURING THE LIFE OF THE INSTALLATION

WITHOUT INTERFERING WITH INTEGRITY OF ROOF D. SNUBBER BUSHINGS: ALL-DIRECTIONAL, ELASTOMERIC SNUBBER BUSHINGS AT LEAST 1/4 INCH THICK.

E. WATER SEAL: GALVANIZED SHEET METAL WITH EPDM SEALS AT CORNERS. ATTACHED TO UPPER SUPPORT FRAME. EXTENDING DOWN PAST WOOD NAILER OF LOWER SUPPORT ASSEMBLY, AND COUNTERFLASHED OVER ROOF MATERIALS

E. INSTALLATION: 1. PROVIDE WIND-LOAD CONTROL DEVICES FOR SYSTEMS AND EQUIPMENT WHERE INDICATED IN EQUIPMENT SCHEDULES. WHERE INDICATED ON

DRAWINGS, OR AS DETERMINED BY DELEGATED DESIGN OR WHERE SPECIFICATIONS INDICATE THEY ARE TO BE INSTALLED ON SPECIFIC EQUIPMENT AND SYSTEMS, AND WHERE REQUIRED BY APPLICABLE CODES. 2. INSTALLATION OF WIND-LOAD RESTRAINTS, MUST NOT CAUSE ANY CHANGE OF POSITION OF EQUIPMENT, PIPING, OR DUCTWORK RESULTING IN STRESSES OR MISALIGNMENT.

3. INSTALL WIND LOAD RESTRAINT DEVICES USING METHODS APPROVED BY AN AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION THAT PROVIDES REQUIRED SUBMITTALS FOR COMPONENT.

MECHANICAL SYSTEMS INSULATION:

FIBERGLASS BLANKET INSULATION FOR DUCTWORK A. BLANKET TYPE FIBERGLASS INSULATION WITH AVERAGE THERMAL CONDUCTIVITY NOT EXCEEDING 0.29 BTU-IN. PER SQUARE FEET PER °F PER HOUR AT MEAN TEMPERATURE OF 75 °F.

1. MINIMUM DENSITY 1 LB./CU. FT, 2" THICK MINIMUM. 2. ACCEPTABLE PRODUCTS:

MANVILLE MICROLITE FSK FACED WRAP 1 LB./ 3 FT. OWENS-CORNING FIBERGLASS FACED DUCT WRAP COMMERCIAL GRADE. CERTAINTEED STANDARD DUCT WRAP

KNAUF DUCT WRAP B. FIRE RETARDATION ADHESIVE SHALL BE FOSTER 85-20, VIMASCO 733, OR CHILDERS CP-82.

C. WHITE VAPOR BARRIER SHALL BE FOSTER 30-35, VIMASCO 740, CHILDERS CP-30, OR EPOLUX CADALER 650.

D. FOIL REINFORCED KRAFT TAPE. (3" WIDE) SHALL BE ARNO C-430, EASSON 0822, OR NASHUA FSK.

INSTALLATION, GENERAL

A. DO NOT USE STAPLES FOR SECURING ANY INSULATION. B. APPLY INSULATION ONLY ON CLEAN, DRY SURFACES.

C. CONTINUE INSULATION THROUGH WALL AND CEILING OPENINGS AND SLEEVES, EXCEPT TERMINATE DUCT INSULATION AT FIRE DAMPERS AND AT FLEXIBLE DUCT CONNECTIONS AT AIR HANDLING UNITS.

D. PROVIDE CONTINUOUS UNBROKEN VAPOR SEAL INSULATION ON ALL COLD SURFACES WHERE VAPOR JACKETS ARE SEALED.

E. INSULATE AND VAPOR SEAL SUPPORTS THAT ARE SECURED TO COLD SURFACES

TO PREVENT CONDENSATION. F. DO NOT INSULATE UNIONS. G. FILL PIPE INSULATION PROTECTIVE SADDLES ON HOT PIPES WITH SAME

INSULATION AS ADJOINING PIPE INSULATION.

H. COLD PIPE LINES CONSIST OF PIPES OPERATING AT 60 DEGREES F AND BELOW. I. HOT PIPE LINES CONSIST OF ALL OTHER PIPES

INSTALLATION. FIBERGLASS BLANKET INSULATION FOR DUCTWORK

A. INSULATE THE FOLLOWING:

 ALL GALVANIZED STEEL SUPPLY AND RETURN DUCTWORK WHICH IS NOT LOCATED IN MECHANICAL ROOMS OR INTERNALLY LINED

2. THE LAST 10'-0" OF EXHAUST DUCTWORK BEFORE EXITING THE BUILDING 3. THE PORTION OF CEILING DIFFUSERS WHICH ARE EXPOSED ABOVE CEILINGS. B. PROVIDE DUCT LINER ON THE FIRST 15'-0" OF DUCTWORK ASSOCIATED WITH SUPPLY AND RETURN DUCTWORK FROM AIR HANDLING UNITS. DUCTWORK DOWNSTREAM OF DUCT LINER SHALL HAVE EXTERNAL DUCT INSULATION. C. WRAP INSULATION AROUND DUCTS. BUTT ALL CIRCUMFERENTIAL JOINTS.

OVERLAP LONGITUDINAL JOINTS 2" MINIMUM. SECURE INSULATION WITH 18-GAUGE SOFT ANNEALED WIRE SPIRALLY WRAPPED AT 12" O.C. WELD TO DUCT D. FOR DUCTS OVER 24" WIDE, IN ADDITION TO ADHESIVE, IMPALE INSULATION ON THE BOTTOM OF DUCTS ON METAL PINS MAXIMUM 18" O.C. WELD TO DUCT SECURE INSULATION ON PINS WITH SPEED WASHERS AND SEAL WITH BARRIER

COATING. E. SEAL CIRCUMFERENTIAL JOINTS AT FIRE DAMPERS, FLEXIBLE CONNECTIONS, AND ENDS OF DUCTS WITH 3" WIDE FOIL REINFORCED KRAFT TAPE.

F. TAPE LONGITUDINAL JOINTS WITH 3" WIDE FOIL REINFORCED KRAFT TAPE G. SEAL PENETRATIONS AND PUNCTURES WITH 3" WIDE FOIL REINFORCED KRAFT TAPE AND APPLY VAPOR BARRIER COATING.

H. WRAP PORTIONS OF CEILING DIFFUSERS DESCRIBED ABOVE WITH INSULATION OVERLAP ENDS OF INSULATION 2" MINIMUM

AIR DISTRIBUTION DEVICES:

<u>GENERAL</u> A. FINISH

> I. ALUMINUM GRILLES, REGISTERS, AND DIFFUSERS WHICH ARE CEILING MOUNTED SHALL BE PROVIDED WITH A FACTORY APPLIED WHITE BAKED ENAMEL FINISH UNLESS INDICATED OTHERWISE, HEREIN OR ON THE

2. ALUMINUM GRILLES AND REGISTERS WHICH ARE WALL-MOUNTED SHALL BE FACTORY ETCHED TO A SATIN FINISH AND COATED WITH A CLEAR LACQUER B. MOUNTING

1. MODEL NUMBERS INDICATED ON DRAWINGS ARE FOR SURFACE MOUNTING IN EXPOSED TEE-BAR GRIDS OR FOR INTEGRAL MOUNTING IN EXPOSED TEE-BAR

2. WHERE GRILLES, REGISTERS OR DIFFUSERS ARE TO BE INSTALLED IN CONCEALED SPINE CEILINGS OR PLASTER CEILINGS, THE MOUNTING FRAME SHALL BE ADJUSTED TO MATCH THE CEILING REQUIREMENTS 3. IN PLASTER CEILINGS, PROVIDE PLASTER FRAMES.

A. SQUARE PLAQUE SUPPLY CEILING DIFFUSERS SHALL BE ALUMINUM MATERIAL DIFFUSERS MUST BE CONSIST OF A SEAMLESS, ONE-PIECE, PRECISION

FORMED BACKPAN THAT INCORPORATES A ROUND INLET COLLAR. 2. AN INNER PLAQUE ASSEMBLY MUST BE INCORPORATED AND MUST DROP NO MORE THAN 1/4 INCH BELOW THE CELING PLANE TO ENSURE PROPER AIR

DISTRIBUTION PERFORMANCE. 3. FACE PANEL SHALL FIT 24" X 24" LAY-IN TEE-BAR CEILING GRID OR 12" X 12" HARD CEILING MOUNT WHERE INDICATED IN THE AIR TERMINALS SCHEDULE.

4. THROW PATTERN SHALL BE AS INDICATED ON THE DRAWINGS. B. EGGCRATE TYPE CEILING GRILLES SHALL BE ALUMINUM MATERIAL.

1. GRILLES MUST PROVIDE A FREE AREA OF AT LEAST 90%. 2. 1" X 1" X 1" GRID TYPE.

3. OUTER BORDERS SHALL BE CONSTRUCTED OF HEAVY EXTRUDED ALUMINUM WITH A THICKNESS OF 0.040-0.050" AND SHALL HAVE COUNTERSUNK SCREW HOLES. BORDER WIDTH SHALL BE 1-1/4" ON ALL SIDES AND SHALL BE INTERLOCKED AT THE FOUR CORNERS AND MECHANICALLY STAKED TO FORM A RIGID FRAME.

4. OPPOSED-BLADE VOLUME DAMPER SHALL BE CONSTRUCTED OF HEAVY GAUGE STEEL OR ALUMINUM. DAMPER MUST BE OPERABLE FROM THE FACE C. SIDEWALL GRILLES SHALL BE ALUMINUM MATERIAL, SINGLE DEFLECTION

TYPE WITH 3/4" BLADE SPACING. DEFLECTION ANGLE SHALL BE 35 DEGREES 2. OPPOSED BLADE VOLUME DAMPER SHALL BE CONSTRUCTED OF HEAVY GAUGE STEEL OR ALUMINUM. DAMPER MUST BE OPERABLE FROM THE FACE OF THE GRILLE WHERE NOT PROVIDED IN ACCESSIBLE BRANCH

D. ROUND CONE DIFFUSERS SHALL BE ALUMINUM MATERIAL, WITH FOUR SEAMLESS, ONE-PIECE SPUN CONES CENTERED AROUND A ROUND INLET COLAR

1. DIFFUSER SHALL INTEGRATE WITH DUCT SIZES SHOWN ON PLANS 2. DIFFUSER MOUNTING FRAME SHALL BE SUITABLE FOR DUCT MOUNT

A. INSTALL IN ACCORDANCE WITH MANUFACTURER'S WRITTEN

DOCUMENTATION. B. GRILLES, REGISTERS, AND DIFFUSERS SHALL BE INSTALLED VOID OF DEFECTS, DAMAGES, AND SCUFF MARKS.

C. GRILLES AND REGISTERS MOUNTED IN WALLS SHALL BE SECURED TO DUCTWORK WITH SHEET METAL SCREWS D. GRILLES, REGISTERS, AND DIFFUSERS NOT SIZED TO FIT CEILING GRID SYSTEMS SHALL BE SECURED TO DUCTWORK WITH SHEET METAL SCREWS. WHERE DIFFUSER IS ATTACHED TO DUCT SYSTEM WITH FLEXIBLE DUCT,

DIFFUSERS SHALL BE SUPPORTED FROM STRUCTURES WITH FOUR

GALVANIZED STEEL WIRE HANGERS E. GRILLES, REGISTERS, AND CEILING DIFFUSERS SIZED TO FIT CEILING GRID SYSTEM SHALL BE SUPPORTED FROM GRID SYSTEM.

F. COORDINATE LOCATION OF AIR DISTRIBUTION DEVICES WITH OTHER TRADES PRIOR TO SECURE ATTACHMENT.

FANS: GENERAL

A. TESTING AND RATINGS

APPLICATIONS.

1. FANS SHALL BE TESTED AND RATED IN ACCORDANCE WITH AMCA 210. B. BALANCING 1. CENTRIFUGAL FAN WHEELS SHALL BE STATICALLY AND DYNAMICALLY

BALANCED. C. DISCONNECTS

1. SAFETY DISCONNECT SWITCHES SHALL CONFORM TO REQUIREMENTS OF ELECTRICAL

INLINE FANS A. FANS SHALL BE IN-LINE CABINET TYPE WITH SQUARE OR RECTANGULAR HOUSING AND BACK DRAFT DAMPER. FAN SHALL BE DESIGNED FOR HORIZONTAL MOUNTING.

B. FAN HOUSING SHALL BE STEEL WITH FACTORY APPLIED BAKED ENAMEL PAINT ONE EXTERIOR. HOUSING SHALL BE INTERNALLY INSULATED WITH1/2" THICK (MINIMUM) COATED FIBERGLAS INSULATION. INSULATION SHALL COMPLY WITH ASTM E84 AND NFPA 255 FOR MAXIMUM RATINGS OF FLAME 25 AND SMOKE 50, HOUSING SHALL HAVE MOUNTING BRACKETS AT EACH

C. FAN WHEEL SHALL BE BACKWARD INCLINED CENTRIFUGAL TYPE WITH ALUMINUM CONSTRUCTION. ON BELT DRIVEN UNITS, SHAFT BEARINGS SHALL BE SELF-ALIGNING, PILLOW BLOCK BALL TYPE. BEARINGS NOT PERMANENTLY SEALED AND LUBRICATED SHALL HAVE GREASE FITTINGS

D. MOTOR AND DRIVE SHALL BE MOUNTED ON VIBRATION ISOLATORS. FAN SHALL HAVE A FACTORY INSTALLED DISCONNECT SWITCH MOUNTED ON EXTERIOR OF HOUSING AND PRE-WIRED TO FAN MOTOR.

F. IN-LINE CABINET FANS SHALL BE SUSPENDED FROM STRUCTURE WITH HANGER RODS AT EACH CORNER.

E. DIRECT DRIVEN FANS SHALL BE PROVIDED WITH AN ELECTRONIC SPEED

CEILING CENTRIFUGAL FANS A. FANS SHALL BE CEILING CENTRIFUGAL TYPE WITH INSULATED METAL

HOUSING, BACKDRAFT DAMPER, AND INTEGRAL EXHAUST GRILLE. B. HOUSING SHALL BE GALVANIZED STEEL WITH 1/2" THICK (MINIMUM) COATED FIBERGLASS INSULATION. INSULATION SHALL COMPLY WITH ASTM E84 AND

NFPA 255 FOR MAXIMUM RATINGS OF FLAME - 25 AND SMOKE - 50. C. FAN WHEEL SHALL BE FORWARD CURVED CENTRIFUGAL TYPE WITH DIRECT

D. MOTOR AND DRIVE SHALL BE MOUNTED ON VIBRATION ISOLATORS.

E. ROUTE VENT TO EXTERIOR WALL AND TERMINATE THROUGH WALL WITH MANUFACTURER'S WALL CAP. COORDINATE WALL TERMINATION WITH OTHER TRADES PRIOR TO ROUGH-IN.

LOUVERS:

STATIONARY LOUVERS A. LOUVERS SHALL BE WIND DRIVEN, HURRICANE RATED TYPE, CONSTRUCTED OF EXTRUDED ALUMINUM (6063-T5 ALLOY) WITH ALL JOINTS WELDED AND PROVIDED WITH 3/4" EXPANDED ALUMINUM MESH BIRDSCREEN ON THE REAR FACE OF THE LOUVER.

B. LOUVER PERFORMANCE SHALL BE AMCA CERTIFIED AND UNIT SHALL BEAR THE AMCA SEAL:

1. AMCA 500-L 2. AMCA 540 - BASIC (MISSILE LEVEL D)

3. AMCA 550 C. LOUVER BLADES SHALL BE NOT LESS THAN 0.094" THICK, HEAD/SILL 0.094" THICK, AND JAMBS 0.102" THICK. EXCEPT AS OTHERWISE SPECIFICALLY INDICATED HEREIN, BLADE ANGLE SHALL BE 35 DEGREES AND CENTERLINE SPACING OF BLADES SHALL NOT EXCEED 3-1/2".

D. LOUVER BLADES OVER 48" LONG SHALL BE PROVIDED WITH INTERMEDIATE ALUMINUM BRACES ON THE REAR FACE OF THE LOUVER. PROVIDE WITH 12 GA. (2.75MM) EXTRUDED ALUMINUM RAIN SILL

E. LOUVER SHALL BE PROVIDED WITH A COLOR ANODIZED FINISH. COLOR SHALL BE SELECTED BY THE ARCHITECT.

A. INSTALL LOUVERS AND VENTS IN ACCORDANCE WITH MANUFACTURER'S

INSTRUCTIONS B. CAULK ALL AROUND LOUVER FRAME TO MAKE INSTALLATION WATERTIGHT

SPLIT SYSTEM UNITS - UP TO 5 TONS:

A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND OTHER DIVISION 1

SPECIFICATION SECTIONS, APPLY TO THIS SECTION. B. ALL SUBMITTALS SHALL COMPLY WITH THE REQUIREMENTS OF DIVISION 1. DATA SHALL BE SUBMITTED ON THE FOLLOWING ITEMS:

1. INDOOR UNITS 2. OUTDOOR UNITS

C. OPERATION AND MAINTENANCE DATA: DATA SHALL BE PROVIDED ON THE **FOLLOWING ITEMS:** 1. INDOOR UNITS

2. OUTDOOR UNITS

1. AIR MOVEMENT AND CONTROL ASSOCIATION (AMCA)

A. STANDARD 210, LABORATORY METHOD OF TESTING FANS FOR RATING. 2. AIR CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE. (AHRI) A. STANDARD 210/240, PERFORMANCE RATING OF UNITARY AIR-

CONDITIONING & AIR-SOURCE HEAT PUMP EQUIPMENT B. STANDARD 410, FORCED CIRCULATION AIR COOLING AND AIR HEATING COILS.

3. UNDERWRITERS' LABORATORIES (UL): A. STANDARD 900.

DELIVERY, STORAGE, AND HANDLING

A. SPLIT SYSTEM UNITS RECEIVED AND STORED ON THE JOB SITE SHALL BE STORED ON WOODEN RAILS, WOODEN PALLETS, OR SHIPPING SKIDS. UNDER NO CONDITION SHALL THE CONDENSING UNITS OR AIR HANDLING UNITS BE STORED IN SUCH A WAY THAT METAL COMPONENTS ARE IN DIRECT CONTACT WITH THE GROUND OR FLOOR SLABS

B. SPLIT SYSTEM UNITS SHALL BE COVERED WITH 6 MIL POLYETHYLENE SHEET (TAPED IN PLACE) TO PROTECT THE EQUIPMENT FROM DAMAGE AND THE WEATHER.

A. SPLIT SYSTEM UNITS SHALL BE FACTORY FABRICATED WITH MATCHED INDOOR AND OUTDOOR UNITS. INDOOR AND OUTDOOR UNITS SHALL BE CONSTRUCTED AND RATED IN ACCORDANCE WITH AHRI 210/240.

INDOOR UNITS

A. INDOOR UNITS SHALL BE HORIZONTAL OR VERTICAL DRAW THROUGH ARRANGEMENT AS INDICATED ON THE DRAWINGS.

B. CASING SHALL BE STEEL WITH INTERNAL REINFORCING FRAME AND FACTORY BAKED ENAMEL FINISH. C. FAN SHALL BE CENTRIFUGAL TYPE WITH DIRECT DRIVEN 3 SPEED. FAN SHALL BE DYNAMICALLY BALANCED AND RATED IN ACCORDANCE WITH

AMCA 210. FAN BEARINGS SHALL HAVE GREASE FITTINGS ACCESSIBLE FROM OUTSIDE OF CASING WHILE UNIT IS OPERATING. D. REFRIGERANT COIL SHALL HAVE COPPER TUBES AND ALUMINUM FINS. FINS SHALL BE MECHANICALLY BONDED TO THE TUBES. COIL PERFORMANCE

PRESSURE TESTED. E. FILTER SHALL BE MANUFACTURER'S STANDARD. FILTER SHALL CONFORM TO

UL 900 FOR CLASS I CONSTRUCTION. F. THERMOSTAT SHALL BE MANUFACTURES STANDARD 7-DAY / 4-EVENT

THERMOSTAT WITH DIGITAL DISPLAY AND AUTO CHANGEOVER. G. PROVIDE CONDENSATE PUMP AND ROUTE CONDENSATE DRAIN TO AN APPROVED DISCHARGE LOCATION OR AS INDICATED ON THE FLOOR PLANS.

A. OUTDOOR UNITS SHALL BE DESIGNED FOR HIGH-WIND RATED EXPOSURE OUTDOOR UNITS SHALL INCLUDE COMPRESSOR, COIL, COIL FAN, MOTORS, REVERSING VALVE, CHARGING VALVES, SIGHT GLASS, FILTER-DRYER AND CONTROLS. UNITS SHALL REQUIRE ONLY ONE ELECTRICAL SERVICE CONNECTION.

B. ENCLOSURE SHALL BE CONSTRUCTED OF STEEL WITH BAKED ENAMEL FINISH. COIL SECTION AIR INTAKE AND DISCHARGE SHALL HAVE WIRE SCREEN GUARDS. PROVIDE MANUFACTURER'S STANDARD HAIL GUARDS. C. COMPRESSOR(S) SHALL BE RECIPROCATING HERMETIC TYPE WITH OIL PUMP, CRANKCASE HEATER, HIGH PRESSURE LIMIT SWITCH, AND VIBRATION C. PROVIDE MANUFACTURER'S STANDARD CORROSION-RESISTANT COATING

CURRENT OVERLOAD PROTECTION. D. COIL SHALL BE CONSTRUCTED WITH COPPER TUBES AND ALUMINUM FINS. FINS SHALL BE MECHANICALLY BONDED TO TUBES. COIL CAPACITY SHALL BE RATED IN ACCORDANCE WITH AHRI 210. PROVIDE MANUFACTURER'S STANDARD CORROSION-RESISTANT COATING FOR SEACOAST

ISOLATORS. COMPRESSOR MOTOR SHALL HAVE BOTH THERMAL AND

ENVIRONMENT E. FAN(S) SHALL BE PROPELLER TYPE WITH DIRECT DRIVEN PERMANENTLY LUBRICATED MOTOR AND FAN GUARD(S). FANS SHALL BE STATICALLY AND DYNAMICALLY BALANCED AND RATED IN ACCORDANCE WITH AMCA.

F. CONTROLS SHALL BE MOUNTED IN A SEPARATE COMPARTMENT WITH HINGED COVER AND ACCESSIBLE FROM OUTSIDE THE UNITS WHILE OPERATING. CONTROLS SHALL INCLUDE: LINE TO 24 VOLT TRANSFORMER. COMPRESSOR AND FAN CONTACTORS, AUTOMATIC DEFROST CYCLE. COOLING TO HEATING CHANGE OVER, AND OVERLOAD PROTECTION.

REFRIGERANT PIPING

A. REFRIGERANT PIPING TO BE SOFT, COILED COPPER. SIZE ACCORDING TO MANUFACTURER'S RECOMMENDATION.

B. COPPER PIPING BETWEEN OUTDOOR UNIT AND INDOOR UNIT TO BE A SINGLE RUN. PIPING SHALL NOT BE JOINED OR SPLICED. C. INSULATE LINES WITH SEAMLESS CLOSED CELL, ELASTOMERIC FOAM.

INSULATION AND PIPING MAY BE SOURCED SEPARATELY OR AS A SINGLE PACKAGE. D. EXTERIOR PIPING SHALL HAVE ALUMINUM INSULATION JACKET

E. ALL PIPE SUPPORTS MUST BE THERMALLY BROKEN SADDLE TYPE TO PREVENT CONDENSATION. F. PIPING PENETRATING ROOF SHALL UTILIZE AN ALUMINUM, HORIZONTAL EXIT

TYPE ROOF CURB WITH GRADUATED PIPE BOOTS. G. CURBS SHALL BE FLASHED AND COUNTER FLASHED.

CONDENSATE DRAIN PIPING A. COPPER TUBE: TYPE L WITH SOLDER FITTINGS B. CPVC SCHEDULE 40 WITH SOCKET TYPE FITTINGS AND SOLVENT CEMENT. C. PVC SCHEDULE 40 WITH SOCKET TYPE FITTINGS AND SOLVENT CEMENT.

A. WALL-MOUNTED INDOOR UNITS SHALL BE SECURED ABOVE DOOR OR AS SHOWN ON DRAWINGS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN DOCUMENTATION.

B. OUTDOOR UNITS SHALL BE MOUNTED ON EQUIPMENT RAILS AND SECURED TO ROOF STRUCTURE.

ELECTRIC UNIT HEATERS A. THE HEATING EQUIPMENT SHALL INCLUDE AN ELECTRIC AUTOMATIC FAN FORCED AIR HEATER. THE HEATER SHALL BE DESIGNED FOR CEILING. RECESSED. OR SURFACE MOUNTING AS INDICATED IN THE EQUIPMENT SCHEDULE, HEATERS SHALL BE UL LISTED OR EQUIVALENT (ETL), HEATERS

SHALL HAVE BUILT IN THERMOSTAT AND DISCONNECT SWITCH. B. THE BACKBOX SHALL BE DESIGNED FOR DUTY AS A RECESSED ROUGH-IN BOX IN EITHER MASONRY OR FRAME INSTALLATIONS AND IS ALSO USED WITH THE SURFACE MOUNTING FRAME IN SURFACE MOUNTING

INSTALLATIONS. THE BACKBOX SHALL BE HEAVY GAUGE GALVANIZED STEEL AND SHALL CONTAIN KNOCKOUTS FOR POWER. C. A DOUBLE-POLE SINGLE THROW ON/OFF SWITCH SHALL BE MOUNTED ON THE BACK BOX FOR POSITIVE DISCONNECT OF POWER SUPPLY. IT SHALL BE

CONCEALED BEHIND THE FRONT COVER. D. THE FAN MOTOR SHALL BE IMPEDANCE PROTECTED, PERMANENTLY LUBRICATED AND WITH TOTALLY ENCLOSED ROTOR. FAN CONTROL SHALL BE OF THE BI-METALLIC, SNAPACTION TYPE AND SHALL ACTIVATE FAN AFTER HEATING ELEMENT REACHES OPERATING TEMPERATURE. AND CONTINUE TO OPERATE THE FAN AFTER THE THERMOSTAT IS SATISFIED AND UNTIL ALL HEATED AIR HAS BEEN DISCHARGED. THE THERMOSTAT SHALL BE SINGLE POLE TYPE ON ALL MODELS. MANUAL-RESET THERMAL CUTOUT SHALL BE BI-METALLIC, SNAPACTION TYPE DESIGNED TO SHUT OFF HEAT IN THE EVENT OF OVERHEATING. THE FAN SHALL BE FOUR-BLADED ALUMINUM.

E. THE LOUVERED FRONT COVER SHALL BE OF HEAVY GAUGE STEEL WITH A POLYESTER POWDER COAT FINISH. A PLUG BUTTON SHALL BE PROVIDED TO REPLACE THE THERMOSTAT KNOB AND RENDER THE UNIT TAMPER-RESISTANT

. INSTALL IN ACCORDANCE WITH MANUFACTURER'S WRITTEN DOCUMENTATION.

PACKAGED AIR HANDLING UNIT AND ENERGY RECOVERY UNIT:

A. AIR CONDITIONING REFRIGERATION INSTITUTE (ARI) 1. STANDARD 210. UNITARY AIR CONDITIONING EQUIPMENT 2. STANDARD 410, FORCED CIRCULATION AIR COOLING AND AIR HEATING

B. UNDERWRITER'S LABORATORIES (UL):

1. 1995/C 22.2, 236-05

 A. PACKAGED AIR CONDITIONING HEAT PUMP UNIT SHALL BE FACTORY ASSEMBLED, SINGLE ZONE TYPE, VARIABLE AIR VOLUME (VAV) WITH FACTORY FABRICATED AND INSULATED ROOF CURB MATCHED TO THE UNIT. PACKAGED AIR HANDLING UNITS SHALL BE CONSTRUCTED AND RATED IN ACCORDANCE WITH ARI 210.

B. ALL RTU'S SHALL HAVE FACTORY MUTUAL (FM) APPROVAL C. UNITS SHALL BE DESIGNED FOR HIGH-WIND RATED EXPOSURE.

A. UNIT ENCLOSURE SHALL BE CONSTRUCTED OF 18 GAUGE (MINIMUM) GALVANIZED SHEET METAL PANELS WITH FACTORY BAKED ENAMEL FINISH PANELS SHALL BE INTERNALLY REINFORCED, SEALED WATERTIGHT, AND INCLUDE ACCESS SECTIONS TO INTERNAL COMPONENTS. INTERIOR OF PANEL SHALL BE SOLID METAL AT ACCESS DOORS. ALL OTHER INTERIOR PANELS SHALL BE PERFORATED.

B. ENCLOSURE SHALL HAVE SCREENED OUTSIDE AIR OPENING, BASE PAN DISCHARGE AND RETURN ARRANGEMENT AS SHOWN ON THE DRAWINGS AND CURB FLASHING FLANGE. ENCLOSURE SHALL BE INSULATED WITH MANUFACTURER'S STANDARD INSULATION. OUTSIDE AIR OPENING SHALL HAVE 100% OUTSIDE AIR ECONOMIZER CAPABILITY WITH MOTOR OPERATED RA/OA MIXING DAMPERS AND BAROMETRIC RELIEF.

 A. COMPRESSORS SHALL BE THE SCROLL OR RECIPROCATING HERMETIC OR SEMI HERMETIC TYPE WITH HIGH LOW PRESSURE CUTOUT AND CRANKCASE HEATERS. COMPRESSOR MOTORS SHALL HAVE THERMAL AND CURRENT

OVERLOAD PROTECTION. B. PROVIDE MINIMUM OF 5-YEAR WARRANTY ON COMPRESSORS

<u>CONDENSER</u> SHALL BE RATED IN ACCORDANCE WITH AHRI 410. COILS SHALL BE FACTORY A. CONDENSER COIL SHALL BE CONSTRUCTED OF COPPER TUBES WITH ALUMINUM FINS MECHANICALLY BONDED TO THE TUBES. THE COIL SHALI BE FACTORY PRESSURE AND LEAK TESTED AT NOT LESS THAN 425 PSI B. CONDENSER FANS SHALL BE STATICALLY AND DYNAMICALLY BALANCED

AND FAN BEARING SHALL BE PERMANENTLY LUBRICATED TYPE. FAN MOTORS SHALL HAVE BUILT IN THERMAL OVERLOAD PROTECTION. C. VARIABLE VOLUME UNITS SHALL HAVE CONDENSER FAN SPEED HEAD

D. PROVIDE MANUFACTURER'S STANDARD CORROSION-RESISTANT COATING FOR SEACOAST ENVIRONMENT.

PRESSURE CONTROL.

A. EVAPORATOR COIL SHALL BE CONSTRUCTED OF COPPER TUBES WITH ALUMINUM FINS MECHANICALLY BONDED TO THE TUBES. THE COIL SHALI BE FACTORY PRESSURE AND LEAK TESTED AT NOT LESS THAN 300 PSI B. EVAPORATOR FANS SHALL BE FORWARD CURVED CENTRIFUGAL TYPE, V BELT DRIVEN BY A CONSTANT SPEED MOTOR. BELT DRIVE SHALL HAVE AN

ADJUSTABLE SHEAVE. FAN MOTOR SHALL HAVE DRIP PROOF ENCLOSURES AND BUILT IN THERMAL OVERLOAD PROTECTION. FOR SEACOAST ENVIRONMENT.

A. HEATERS SHALL BE STAGED THROUGH MANUFACTURER PROVIDED CONTROLLER B. HEATERS SHALL MEETS ALL NEC AND CEC REQUIREMENTS WHEN

INSTALLED

THROW AWAY FILTERS.

B. BAROMETRIC RELIEF DAMPER

DAMPER SECTION.

<u>HOT-GAS REHEAT</u> A. HOT-GAS REHEAT COIL SHALL BE CONSTRUCTED OF COPPER TUBES WITH ALUMINUM FINS MECHANICALL BONDED TO THE TUBES THE COIL SHALL BE FACOTRY PRESSURE AND LEAKE TESTED AT NOT LESS THAN 300 PSI.

B. PROVIDE MANUFACTURER'S STANDARD CORROSION-RESISTANT COATING FOR SEACOAST ENVIRONMENT.

A. MANUFACTURER TO PROVIDED INTEGRAL BACNET CONTROLLER FOR INTEGRATION INTO BMS.

B. WALL-MOUNTED THERMOSTATS SHALL PROVIDE ADJUSTABLE, 7-DAY

A. UNIT SHALL BE EQUIPPED WITH MANUFACTURER'S STANDARD 2-INCH

GRADE.

A. PACKAGED AIR CONDITIONING UNITS SHALL BE FACTORY WIRED, PIPED, AND TESTED. UNITS SHALL REQUIRE ONLY ONE ELECTRICAL POWER CONNECTION.

A. ROOFTOP UNITS SHALL BE MOUNTED ON EQUIPMENT PAD LOCATED ON

PROGRAMMABLE CONTROL FOR EACH INDIVIDUAL UNIT.

B. INSTALL IN ACCORDANCE WITH MANUFACTURER'S WRITTEN DOCUMENTATION.

AIR-SIDECONOMIZER (APPLICABLE UNITS) A. FULLY MODULATING 0 TO 100 PERCENT MOTOR AND DAMPERS, MINIMUM POSITION SETTING, PRESET LINKAGE, WIRING HARNESS WITH PLUG, SPRING RETURN ACTUATOR AND FIXED DRY BULB CONTROL

2. DAMPER SHALL BE ADJUSTABLE TO BUILDING PRESSURE VIA SPRING ADJUSTMENT.

1. MANUFACTURER TO PROVIDE ROOFTOP UNITS WITH BAROMETRIC RELIEF

<u> AIRFLOW MONITORING STATION (APPLICABLE UNITS)</u>

A. FACTORY-WIRED, MOUNTED, AND POWERED AIRFLOW MONITORING SYSTEM IN OUTDOOR AIR STREAM.

B. AIRFLOW MEASUREMENT SHALL BE INTEGRATED INTO FACTORY

CONTROLLER AND READ BY BUILDING MANAGMENT SYSTEM.

ENTHALPY WHEEL (APPLICABLE UNITS) A. OBTAIN UNIT WITH ALL APPURTENATN COMPNENTS OR ACCESSORIES FROM

SINGLE MANUFACTURER. B. UNIT MUST BE ETL CERTIFIED PER U.L. 1995 AND BEAR AN ETL LABEL

D. ENERGY CORE MUST BE REMOVABLE FROM CABINET. CORE MEDIA MUST BE CORRUGATED POLYMER MEMBRANE IN A CORROSION RESISTANT ALUMINUM FRAME. PROVIDE SILICA GEL DESICCANT PERMANENTLY BONDED TO THE POLYMER FILM.

C. ENERGY COVER PERFORMANCE MUST BE AHIR CERTIFIED PER STANDARD

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COA SEAL POND & COMPANY No. C-1803

CLIENT INFORMATION

SEEFRIED

INDUSTRIAL

PROPERTIES

PROJECT NAME

WAREHOUSE DEVELOPMEN^T

DRIVE WILMINGTON, **NORTH CAROLINA** 28435

DESIGNED BY: DRAWN BY: CHECKED BY:

FSC -**MECHANCIAL SPECIFICATIONS**

SUBMITTED BY:

PROJECT #:

M-704

30" X 42"

OF THE GRILLE WHERE NOT PROVIDED IN ACCESSIBLE BRANCH DUCT

DRAWING ISSUE

1240989

SHEET TITLE

ORIGINAL SHEET SIZE:

SHEET NUMBER