

GENERAL LEGEND

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|--|-----------------------------------------|--|---------------------------------------------------------------------|
| | PIPE SECTION-SUPPLY | | VOLUME DAMPER |
| | PIPE SECTION-RETURN | | DUCT TAKE-OFF W/ VOLUME DAMPER (CONICAL, RECTANGULAR) |
| | FLOW ARROW | | DOUBLE WALL DUCT |
| | PITCH PIPE DOWN IN DIRECTION OF ARROW | | FIRE DAMPER |
| | PIPE UP | | SMOKE DAMPER |
| | PIPE DOWN | | COMBINATION - FIRE/SMOKE DAMPER |
| | PIPE ANCHOR | | SMOKE DETECTOR |
| | PIPE GUIDE | | DOWN DUCT STATIC PRESSURE SENSOR |
| | EXPANSION JOINT | | MOTORIZED DAMPER |
| | FLEXIBLE CONNECTOR | | REMOTE TEMPERATURE SENSOR |
| | BALL VALVE | | BACKDRAFT DAMPER |
| | CHECK VALVE, HORIZONTAL SWING | | AIR FLOW MEASURING STATION |
| | CHECK VALVE, VERTICAL SPRING LOADED | | SPACE CARBON DIOXIDE SENSOR |
| | GATE VALVE | | SPACE TEMPERATURE SENSOR |
| | GLOBE VALVE | | MECHANICAL THERMOSTAT |
| | BALANCING COCK | | SPACE HUMIDITY SENSOR |
| | BUTTERFLY VALVE, TAPPED LUG WAFER | | HUMIDISTAT |
| | STRAINER, Y-TYPE AND BLOW-OFF VALVE | | MOTORIZED VALVE |
| | SHUT-OFF VALVE & PRESSURE TAP | | FLOW METER |
| | SHUT-OFF VALVE & PRESSURE TAP | | DOOR UNDERCUT TAG |
| | CONTROL VALVE (2-WAY, 3-WAY) | | CEILING AIR DEVICE - SUPPLY (SHADED AREA DENOTES BLANKED OFF PANEL) |
| | NEEDLE VALVE | | CEILING AIR DEVICE - RETURN |
| | MANUAL AIR VENT | | CEILING AIR DEVICE - EXHAUST |
| | AUTOMATIC AIR VENT | | DIFFUSER TYPE (REFER TO SCHEDULE AND SPECIFICATIONS) |
| | TEMPERATURE & PRESSURE TAP (PET'S PLUG) | | AIRFLOW (CFM) |
| | PRESSURE GAUGE W/ BALL VALVE (WATER) | | TYPICAL FIXTURE COUNT |
| | PRESSURE GAUGE TAPPING (WATER) | | RECTANGULAR ELBOW WITH TURNING VANES |
| | SOLENOID VALVE | | SIDE WALL RETURN AIR DEVICE |
| | PIPE REDUCTION | | SIDE WALL SUPPLY AIR DEVICE |
| | THERMOMETER | | POINT OF CONNECTION |
| | THERMOMETER WELL | | POINT OF DISCONNECTION |
| | CAPPED LINE | | FLEXIBLE ROUND DUCT |
| | PIPE CONTINUATION | | ACCESS DOOR IN DUCT |
| | | | SECTION DESIGNATION |
| | | | SHEET WHERE SECTION APPEARS |

PIPE DESIGNATIONS

| | |
|--------|--------------------------------------|
| CHS-UG | CHILLED WATER SUPPLY (BELOW GRADE) |
| CHS | CHILLED WATER SUPPLY (ABOVE GRADE) |
| CHR-UG | CHILLED WATER RETURN (BELOW GRADE) |
| CHR | CHILLED WATER RETURN (ABOVE GRADE) |
| CF | CHEMICAL FEED PIPING |
| CD-UG | CONDENSATE DRAIN (BELOW GRADE) |
| CD | CONDENSATE DRAIN (ABOVE GRADE) |
| CWS-UG | CONDENSER WATER SUPPLY (BELOW GRADE) |
| CWS | CONDENSER WATER SUPPLY (ABOVE GRADE) |
| CWR-UG | CONDENSER WATER RETURN (BELOW GRADE) |
| CWR | CONDENSER WATER RETURN (ABOVE GRADE) |

MECHANICAL SHEET INDEX

| SHEET NUMBER | SHEET NAME |
|--------------|-----------------------------------------------------|
| M000 | GENERAL NOTES, LEGEND, ABBREVIATIONS, & SHEET INDEX |
| M101 | FLOOR PLAN - LEVEL 1 OVERALL - MECHANICAL |
| M101A | FLOOR PLAN - LEVEL 1 AREA A - MECHANICAL |
| M101B | FLOOR PLAN - LEVEL 1 AREA B - MECHANICAL |
| M102 | ROOF PLAN - OVERALL - MECHANICAL |
| M102A | ROOF PLAN - AREA A - MECHANICAL |
| M102B | ROOF PLAN - AREA B - MECHANICAL |
| M501 | CONTROLS - MECHANICAL |
| M502 | CONTROLS - MECHANICAL |
| M503 | CONTROLS - MECHANICAL |
| M601 | MECHANICAL SCHEDULES |
| M602 | MECHANICAL SCHEDULES |
| M901 | MECHANICAL DETAILS |
| M902 | MECHANICAL DETAILS |
| M903 | MECHANICAL DETAILS |
| M904 | MECHANICAL DETAILS |

MECHANICAL ABBREVIATIONS

| | | | | | |
|--------|--------------------------------|-------|----------------------------------|-------|---------------------------------------|
| A | AMPERES | EVAP | EVAPORATOR | MCA | MAXIMUM CIRCUIT AMPS |
| AC | AIR CONDITIONING | EWB | ENTERING WET BULB TEMPERATURE | MOCP | MAXIMUM OVERCURRENT PROTECTION |
| ADJ | ACCESS DOOR | EWTF | ENTERING WATER TEMPERATURE | LRA | LOCK ROTOR AMPS |
| AFF | ABOVE FINISHED FLOOR | EXIST | EXISTING | RLA | RATED LOAD AMPS |
| AHU | AIR HANDLING UNIT | EXP | EXPANSION | PC | PLUMBING CONTRACTOR |
| APPROX | APPROXIMATELY | F | FIRE SPRINKLER PIPING | PCHWP | PRIMARY CHILLED WATER PUMP |
| AP | ACCESS PANEL | *F | DEGREES FAHRENHEIT | PD | PRESSURE DROP |
| ARCH | ARCHITECTURAL | FA | FREE AREA (SQ. FT.) OR FACE AREA | PHC | PREHEAT COIL |
| AS | AIR SEPARATOR | FBP | FIELD BUILT PLENUM | PSI | POUNDS PER SQUARE INCH |
| AUTO | AUTOMATIC | FCO | FLOOR CLEANOUT | PSIA | PSI ABSOLUTE |
| AUX | AUXILIARY | FCU | FAN COIL UNIT | PSIG | PSI GAUGE |
| BAS | BUILDING AUTOMATION SYSTEM | FD | FLOOR DRAIN | PRESS | PRESSURE |
| BHP | BRAKE HORSEPOWER | FDPR | FIRE DAMPER | PVC | POLYVINYL CHLORIDE |
| BLDG | BUILDING | FLA | FULL LOAD AMPERES | RA | RETURN AIR |
| BOD | BOTTOM OF DUCT | FLEX | FLEXIBLE | RAF | RETURN AIR FAN |
| BTU | BRITISH THERMAL UNIT | FPI | FINS PER INCH | REQD | REQUIRED |
| BTUH | BRITISH THERMAL UNITS PER HOUR | FPM | FEET PER MINUTE | RF | RELIEF FAN |
| CC | COOLING COIL | FPS | FEET PER SECOND | RH | RELATIVE HUMIDITY |
| CD | CONDENSATE DRAIN | FTB | FAN POWERED TERMINAL BOX | RHC | REHEAT COIL |
| CFM | CUBIC FEET PER MINUTE | FV | FACE VELOCITY | RHG | *REFRIGERANT HOT GAS DISCHARGE |
| CH | CHILLER | GA | GAUGE | RLL | *REFRIGERANT LIQUID LINE |
| CHR | CHILLED WATER RETURN | GAL | GALLONS | RM | ROOM |
| CHS | CHILLED WATER SUPPLY | GPH | GALLONS PER HOUR | RPM | REVOLUTIONS PER MINUTE |
| CHWP | CHILLED WATER PUMP | GPM | GALLONS PER MINUTE | RSL | *REFRIGERANT SUCTION LINE |
| CLG | CEILING | HB | HOSE BIBB | RV | RELIEF VALVE |
| CMJ | CONCRETE MASONRY UNIT | H2O | WATER | SFDRP | SMOKE AND FIRE DAMPER |
| CO | CLEAN-OUT | HT | HEATING COIL | SA | SUPPLY AIR |
| COMB | COMBINATION | HD | HEAD | SAF | SUPPLY AIR FAN |
| COMPR | COMPRESSOR | HORIZ | HORIZONTAL | SAN | SANITARY |
| COND | CONDENSATE OR CONDENSER | HP | HORSEPOWER OR HEAT PUMP | SAU | SOUND ATTENUATION UNIT |
| CONN | CONNECTION | HW | HOT WATER | SCHWP | SECONDARY CHILLED WATER PUMP |
| CONT | CONTINUATION | KW | KILOWATT | SCOHS | SECONDARY GLYCOL CHILLED WATER SUPPLY |
| CU | CONDENSING UNIT | HT | HEIGHT | SCGHR | SECONDARY GLYCOL CHILLED WATER RETURN |
| CU FT | CUBIC FEET | HZ | FREQUENCY (HERTZ) | SODR | SMOKE DAMPER |
| CUH | CABINET UNIT HEATER | ID | INSIDE DIAMETER | SP | STATIC PRESSURE |
| CU IN | CUBIC INCHES | IN | INCH OR INCHES | SPEC | SPECIFICATION |
| CW | COLD WATER (CITY) | INSUL | INSULATION | TAO | TRANSFER AIR OPENING |
| CWP | CONDENSER WATER PUMP | INT | INTERIOR | TD | TRENCH DRAIN |
| CWR | CONDENSER WATER RETURN | LAT | LEAVING AIR TEMPERATURE | TDH | TOTAL DYNAMIC HEAD |
| CWS | CONDENSER WATER SUPPLY | LBHR | POUNDS PER HOUR | TEMP | TEMPERATURE |
| D | DRAIN LINE | LBS | POUNDS | TYP | TYPICAL |
| DB | DRY BULB | LDB | LEAVING DRY BULB TEMPERATURE | UG | UNDERGROUND |
| DG | DOOR GRILLE | LN FT | LINEAR FEET | UH | UNIT HEATER |
| DIAM | DIAMETER | LWB | LEAVING WET BULB | VAV | VARIABLE AIR VOLUME UNIT |
| DN | DOWN | LWT | LEAVING WATER TEMPERATURE | VD | VOLUME DAMPER |
| DWG | DRAWING | MAX | MAXIMUM | W | WATT |
| DX | DIRECT EXPANSION | MB | MIXING BOX | W/ | WITH |
| EA | EXHAUST AIR | MBH | BTUH, THOUSANDS | W/O | WITHOUT |
| EAT | ENTERING AIR TEMPERATURE | MC | MECHANICAL CONTRACTOR | WB | WET BULB |
| EDB | ENTERING DRY BULB TEMPERATURE | MIN | MINIMUM | WC | WATER COLUMN |
| EDH | ELECTRIC DUCT HEATER | NC | NORMALLY CLOSED | WCO | WALL CLEANOUT |
| EF | EXHAUST FAN | NIC | NOT IN CONTRACT | WG | WATER GAUGE |
| EH | ELECTRIC HEATER | NO | NORMALLY OPEN | WP | WORKING PRESSURE |
| EL | ELEVATION | NO | NUMBER | WMS | WIRE MESH SCREEN |
| ELEC | ELECTRICAL | NTS | NOT TO SCALE | ZD | ZONE DAMPER |
| EQ | EQUAL | OA | OUTSIDE AIR | | |
| ET | EXPANSION TANK | OD | OUTSIDE DIAMETER | | |
| | | OV | OUTLET VELOCITY | | |

PROJECT DESIGN CONDITIONS

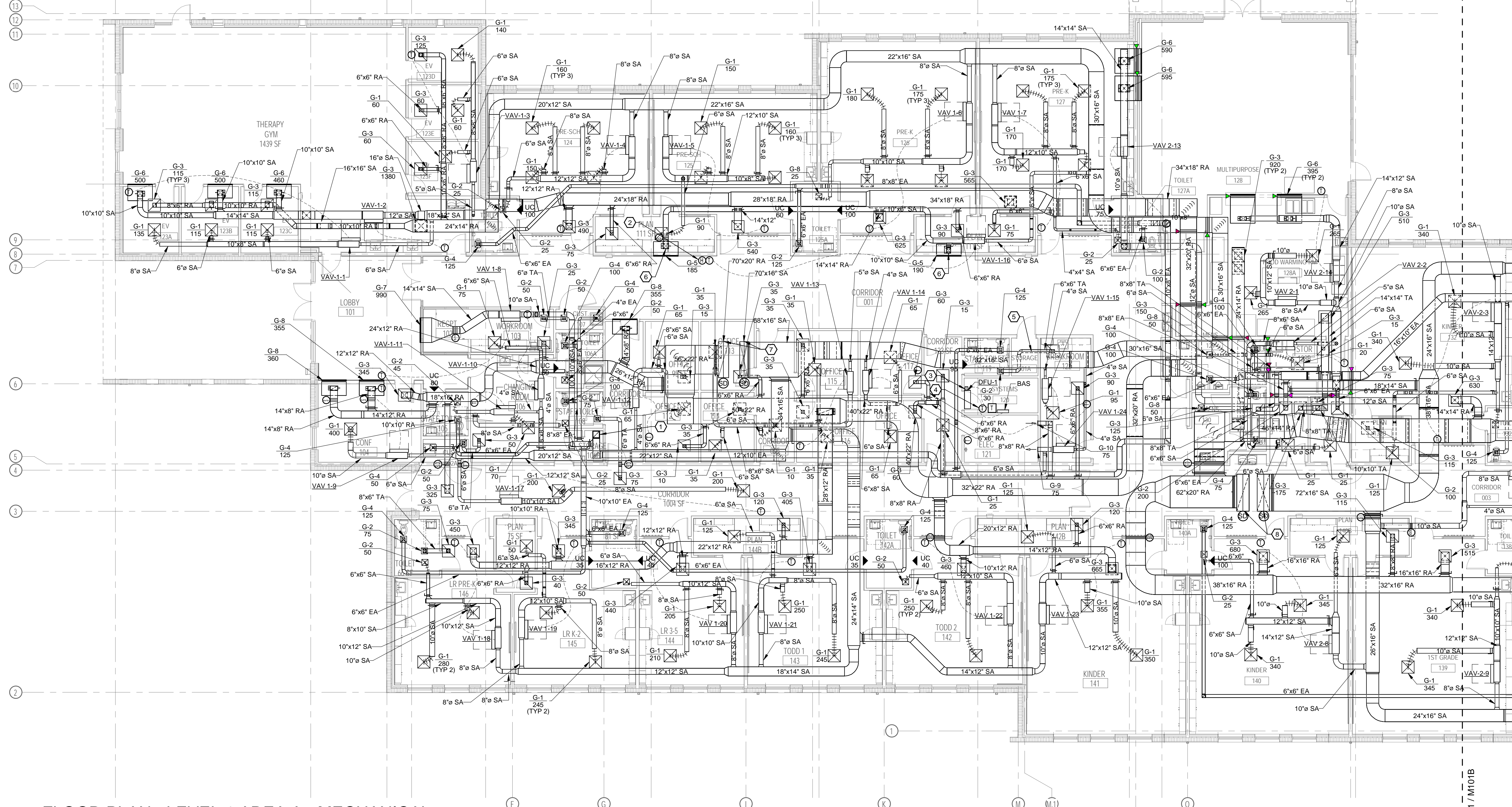
| | TEMPERATURE CONDITIONS | | | BUILDING LOAD CONDITIONS | | |
|---------------------------------------------------|------------------------|--------------|------------------------------|--------------------------|---------|-----------------------------------------------------|
| | DRY BULB (F) | WET BULB (F) | COMMENTS | QUANTITY | UNITS | COMMENTS |
| OUTDOOR | | | | | | |
| SUMMER | 95 | 78 | (0.40% mean coincided db/wb) | PEOPLE | VARIES | PEOPLE BASED ON FURNITURE LAYOUTS |
| SUMMER | N/A | N/A | N/A | LIGHTING | VARIES | W/SF BASED ON FBC TABLE C405.3.2(2) |
| WINTER | 35 | X | (99.6% db) | EQUIPMENT | VARIES | W BASED ON FURNITURE LAYOUT AND ASHRAE FUNDAMENTALS |
| DAILY RANGE | 16 | X | (Hottest month, August) | VENTILATION AIR | VARIES | CFM/SQFT & CFM/PERSON BASED ON ASHRAE 90.1 |
| LOCATION BASED ON ASHRAE WEATHER DATA FOR: | | | ORLANDO EXECUTIVE, FL | FLOOR AREA | 32,700 | SF APPROXIMATE |
| INDOOR | | | | | | |
| COOLING | 75 | 50 | | WALL | 0.08438 | X CALCULATED BASED ON BLDG CONSTRUCTS |
| HEATING | 68 | | | ROOF | 0.0333 | X CALCULATED BASED ON BLDG CONSTRUCTS |
| | | | | GLAZING | 0.28 | 0.24 CALCULATED BASED ON BLDG CONSTRUCTS |
| | | | | | | |

VENTILATION DETERMINATION IS BASED ON OCCUPANCY PER ASHRAE STD. 62.1-2019
ENVELOPE AND EQUIPMENT EFFICIENCIES ARE BASED ON ASHRAE STD. 90.1-2019 & THE 2023 8th EDITION FLORIDA BUILDING CODE - ENERGY CONSERVATION
THIS PROJECT IS DESIGNED UNDER THE 2023 8th EDITION FLORIDA BUILDING CODE & 2023 8th EDITION OF THE FLORIDA FIRE PREVENTION CODE

MECHANICAL GENERAL NOTES

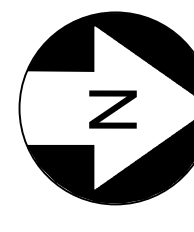
- GENERAL:**
- REFER TO THE DIVISION 23 SPECIFICATIONS.
 - THE CONTRACTOR SHALL DEMONSTRATE EACH HVAC SYSTEMS PERFORMANCE IN THE PRESENCE OF THE ENGINEER, THE OWNER'S PROJECT MANAGER AND THE COMMISSIONING AGENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF ANY ADDITIONAL SYSTEM TEST REQUIRED IF IN THE OPINION OF THE ENGINEER, THE OWNER'S PROJECT MANAGER AND/OR THE COMMISSIONING AGENT THAT THE SYSTEMS DO NOT PERFORM AS SPECIFIED.
 - VISIT AND CAREFULLY EXAMINE THOSE PORTIONS OF THE BUILDING AND SITE AFFECTED BY THIS WORK BEFORE SUBMITTING PROPOSALS, SO AS TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT EXECUTION OF THE WORK. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH EXAMINATION HAS BEEN MADE AND LATER CLAIMS FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WILL NOT BE RECOGNIZED.
 - ALL AIR HANDLING UNITS SHALL UTILIZE A FULLY DUCTED RETURN AIR SYSTEM.
 - ALL GRILLES, REGISTERS OR DIFFUSERS SHOWN IN THE CEILING SHALL BE 24x24 UNLESS OTHERWISE NOTED.
 - PROVIDE A DUCT ACCESS DOOR FOR ALL S/DRP, SDRP AND/OR FDRP SHOWN ON CONSTRUCTION DOCUMENTS. ACCESS DOORS MAY NOT BE SHOWN FOR CLARITY OF THE DOCUMENTS.
 - PROVIDE A VOLUME DAMPER AT EVERY BRANCH DUCT AND AS SHOWN ON THE DOCUMENTS FOR ALL DUCTWORK SYSTEMS. ALL DAMPERS MAY NOT BE SHOWN ON THE DOCUMENTS FOR CLARITY.
 - ALL VOLUME DAMPERS INSTALLED ABOVE GYPSUM BOARD CEILING SHALL HAVE A REMOTELY OPERATED DAMPER OR BE IN A FULLY ACCESSIBLE SPACE. FIELD VERIFY LOCATION OF DEVICE PRIOR TO INSTALLATION.
 - FULLY COORDINATE ALL CEILING MOUNTED AIR DISTRIBUTION DEVICES WITH ARCHITECTURAL CEILING GRID.
 - VERIFY EXACT LOCATION OF ALL ELECTRICAL EQUIPMENT INCLUDING WALL SWITCHES, FIRE ALARM DEVICES, ETC. WITH ELECTRICAL CONTRACTOR AND ELECTRICAL DRAWINGS.
 - ALL OUTSIDE AIR INTAKES SHALL HAVE A REMOVABLE AND CLEANABLE BIRD SCREEN, PRIOR TO ANY DEVICE INSTALL IN THE OA DUCTWORK. THE REMOVABLE SCREEN SHALL BE EASILY ACCESSIBLE.
 - INSTALL A SMOKE DETECTOR IN THE SUPPLY AND RETURN DUCTWORK IN ANY AHU DUCTWORK FOR A UNIT 2000 CFM OR OVER, REGARDLESS IF SHOWN. DETECTOR SHALL BE ENERGIZED THE SUPPLY FAN WHEN SMOKE IS DETECTED. CONNECT TO THE FIRE ALARM SYSTEM, SO THAT THE ALARM ENUNCIATED AT THE FIRE ALARM PANEL CORRESPONDS TO THE AREA IN ALARM.
 - ALL DUCT SIZES INDICATED ON THE DOCUMENTS ARE NET FREE AREA DIMENSIONS.
 - UNFORESEEN CONDITIONS MAY EXIST AND WORK MAY NOT BE FIELD LOCATED EXACTLY AS SHOWN ON THE DRAWINGS. COOPERATION WITH OTHER TRADES IN ROUTING AS DETERMINED DURING CONSTRUCTION AND AS DIRECTED BY THE ARCHITECT/ENGINEER MAY BE NECESSARY. IT IS INTENDED THAT SUCH DEVIATIONS SHALL BE CONSIDERED AS PART OF THIS CONTRACT. SUCH DEVIATIONS MAY NOT BE CONSIDERED AS PART OF THIS CONTRACT WHEN PROPERLY DOCUMENTED IN WRITING. THE PLANS ARE NOT COMPLETELY TO SCALE. THIS CONTRACTOR IS TO FIELD VERIFY DIMENSIONS OF ALL SITE UTILITIES, ETC., PRIOR TO BID AND INCLUDE ANY DEVIATIONS IN THE CONTRACT.
 - ALL PIPING AND DUCT IS TO BE CONCEALED ABOVE CEILING OR IN NEW WALLS, UNLESS SPECIFICALLY NOTED AS EXPOSED OR SURFACE MOUNTED.
 - WORK SHALL BE PERFORMED, IN STRICT COMPLIANCE WITH THE ESTABLISHED WORK SCHEDULE BEING SET FORTH BY THE OWNER. COORDINATE ALL WORK WITH GENERAL CONTRACTOR OR CONSTRUCTION MANAGER. THIS CONTRACTOR SHALL FURNISH ADEQUATE FORCES, CONSTRUCTION PLANT AND EQUIPMENT, AND SHALL WORK SUCH HOURS, INCLUDING NIGHT SHIFTS, OVERTIME OPERATIONS, SUNDAYS AND HOLIDAYS IN ACCORDANCE WITH THE OWNER'S OPERATIONAL SCHEDULE AS LISTED IN DIVISION 1 OF THE SPECIFICATIONS. IF THE CONTRACTOR DOES NOT MAINTAIN THE CONSTRUCTION SCHEDULE BECAUSE OF INADEQUATE FORCES, SUPERVISION OR ANY OTHER REASON UNDER THE CONTRACTOR'S CONTROL, THE OWNER MAY REQUIRE THE CONTRACTOR TO INCREASE THE NUMBER OF SHIFTS AND/OR OVERTIME OPERATIONS, DAY OF WORK AND/OR THE AMOUNT OF CONSTRUCTION PLANT, AT NO ADDITIONAL COST TO THE OWNER UNDER THIS CONTRACT. FAILURE TO MAINTAIN THE CONSTRUCTION SCHEDULE DUE TO OWNER'S OPERATIONAL INTERFERENCES, WHICH WERE NOT IDENTIFIED IN OR PRIOR TO THE PRE-BID CONFERENCE, SHALL NOT BE THE CONTRACTOR'S LIABILITY.
 - ALL CONCRETE, WALL PATCHING, CEILING REPAIR, FENCE WORK AND OTHER GENERAL CONSTRUCTION WORK REQUIRED FOR INSTALLING MECHANICAL/PLUMBING OR FIRE PROTECTION SYSTEMS SHALL BE PROVIDED BY MECHANICAL CONTRACTOR AND FULLY COORDINATED WITH GENERAL CONTRACTOR USING THE APPROPRIATE CONSTRUCTION TRADES.
 - ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND SHALL BE UL LISTED WHERE APPLICABLE.
 - DUCTWORK SHALL NOT BE SUPPORTED BY THE CEILING SUSPENSION SYSTEM. COORDINATE LOCATIONS OF GRILLES, DIFFUSERS AND LOUVERS WITH ELECTRICAL, ARCHITECTURAL AND PLUMBING WORK.
 - THE ROOF DECK SHALL NOT SUPPORT DUCTWORK, PIPING, EQUIPMENT OR ANY OTHER DEVICES. ALL SUPPORTS SHALL BE SPAN BETWEEN THE STRUCTURAL BEAMS TO SUPPORT THE MECHANICAL EQUIPMENT. PENETRATION OF THE ROOF DECK WILL NOT BE ACCEPTED.
 - IN GENERAL, PLANS AND DIAGRAMS ARE SCHEMATIC ONLY AND SHOULD NOT BE SCALED. CONTRACTOR SHALL COORDINATE ALL PLUMBING, HEATING AND ELECTRICAL WORK AT THE SITE, SO AS NOT TO CONFLICT IN LOCATION WITH OTHER WORK UNDER THE CONTRACT. ALL PIPING SHOWN ON A SITE PLAN SHALL BE VERIFIED AND COORDINATED WITH THE CIVIL DOCUMENTS PRIOR TO THE BID.
 - ANY CONFLICT WITH DOORS, WINDOWS, CABINETS OR ANY OTHER EQUIPMENT SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER.
 - THE MECHANICAL CONTRACTOR IS DIRECTED TO COMPLY WITH DIVISION 26 OF THE CONTRACT SPECIFICATIONS REFERRING TO MOTORS, STARTERS, ETC.
 - ALL DOOR GRILLES, OUTSIDE AIR LOUVERS, DISCHARGE LOUVERS, SHOWN ON THE MECHANICAL DRAWINGS, SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR. THE SIZE AND LOCATION OF EQUIPMENT INSTALLED UNDER DIVISION 23 - MECHANICAL SHALL BE COORDINATED WITH OTHER TRADES. THE MECHANICAL CONTRACTOR SHALL VERIFY ALL COLORS AND FINISHES OF THESE DEVICES, WITH THE ARCHITECT, PRIOR TO ORDERING OF THE EQUIPMENT.
 - WHENEVER A REFERENCE IS MADE TO STANDARD, INSTALLATION AND MATERIALS SHALL COMPLY WITH THE LATEST PUBLISHED EDITION AT THE TIME THE PROJECT IS BID UNLESS OTHERWISE SPECIFIED.
 - ALL MATERIAL STORED ON SITE SHALL BE PROPERLY PROTECTED FROM INJURY OR DETERIORATION. MATERIAL SHALL NOT BE STORED IN CONTACT WITH THE GROUND OR FLOOR. ALL DUCTWORK AND EQUIPMENT STORED SHALL BE SEALED AT ANY OPENING TO PREVENT ANY DEBRIS OR DIRT ENTERING THE INSIDE OF THE DUCTWORK AND EQUIPMENT. IF DEBRIS OR DIRT IS FOUND INSIDE THE DUCTWORK DURING ANY INSPECTION, THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL COSTS INCURRED TO CLEAN THE DUCTWORK TO THE SATISFACTION OF THE OWNER AND ENGINEER.
 - ALL SUPPLY AIR DUCT BENDS FROM THE VERTICAL TO THE HORIZONTAL AND ANGLED TURNS OF DUCTWORK SHALL HAVE LONG RADIUS ELBOWS. TURNING VANES WILL ONLY BE ACCEPTED WHERE SHOWN ON THE DOCUMENTS.
 - VOLUME DAMPERS SHALL BE INSTALLED IN ALL SUPPLY, RETURN AND EXHAUST BRANCH DUCTS LEADING FROM MAIN TRUNK LINES, WHETHER SHOWN OR NOT.
 - ALL EXTERNAL FIBROUS GLASS WRAPPED INSULATION JOINTS, SEAMS AND CONNECTIONS SHALL BE CONSTRUCTED WITH FAB AND STAPLES AND THEN SEALED WITH MASTIC. HEAT AND PRESSURE SENSITIVE TAPE ARE NOT ACCEPTABLE AS A FINAL CLOSURE.
 - PROVIDE FIRE DAMPERS AT EACH FIRE RATED WALL PENETRATION OF ALL AIR SUPPLY, RETURN, EXHAUST AND VENTILATION DUCTS. IF NOT SHOWN ON THE DOCUMENTS THIS MUST BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO BID.
 - ACCESS DOORS IN WALLS, CEILING AND DUCTS SHALL BE PROVIDED FOR INSPECTION OF ALL FIRE, SMOKE AND FIRE/SMOKE DAMPERS. ACCESS DOORS SHALL BE OF A SIZE ADEQUATE FOR THE PURPOSE AND SHALL MAINTAIN ANY NECESSARY FIRE RATING. SIZE PER SCHEDULE IN SPECIFICATION 23 33 00 SECTION.
 - DUCTWORK SHALL BE SHEET METAL, EXTERNALLY WRAPPED UNLESS OTHERWISE NOTED, MIN. 26 GA. AND CONSTRUCTED IN STRICT ACCORDANCE WITH SMACNA STANDARDS.
 - CONTRACTOR SHALL COORDINATE WORK WITH ALL OTHER TRADES.
 - MECHANICAL CONTRACTOR TO TEST AND BALANCE HVAC SYSTEMS TO PROVIDE MAXIMUM PERFORMANCE WITH REGARDS TO CFM, TEMPERATURE AND STATIC PRESSURE. REFER TO SPECIFICATIONS FOR TEST AND BALANCE REQUIREMENTS.
 - ALL INSULATION USED FOR DUCTWORK SHALL BE INSTALLED THICKNESS RECOMMENDED BY THE ASHRAE GUIDE AND DATA BOOKS. INSULATION MATERIAL SHALL MEET NFPA 90A REQUIREMENTS AND SHALL HAVE COMPOSITE FIRE AND SMOKE HAZARD RATING AS TESTED IN ACCORDANCE WITH NFPA 225 OR UL 723 NOT EXCEEDING FLAME SPREAD OF MORE THAN 25 AND SMOKE DEVELOPED 50. REFER TO SPECIFICATIONS.
 - ALL DUCTWORK AND PIPING SHALL TRANSITION UP INTO JOIST SPACE TO GIVE MAXIMUM CLEARANCES TO CEILING AND LIGHTING DEVICES.
 - ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE FLORIDA BUILDING CODE 8TH EDITION (2023), FLORIDA BUILDING CODE 8TH EDITION (2023) PLUMBING, FLORIDA BUILDING CODE 8TH EDITION (2023) MECHANICAL, FLORIDA FIRE PREVENTION CODE 8TH EDITION (2023), FLORIDA BUILDING CODE 8TH EDITION (2023) ENERGY CONSERVATION & STANDARDS AS REFERENCED IN DIVISION 1 AND THROUGHOUT THE SPECIFICATIONS.
 - ALL AIR HANDLING SYSTEMS SHALL BE PROVIDED WITH ZONE HUMIDITY SENSORS OR COMBINATION TEMPERATURE/HUMIDITY SENSORS. UNIT CONTROLS, WHETHER PACKAGED WITH THE UNIT OR VIA A CENTRAL AUTOMATION SYSTEM, SHALL BE CONFIGURED TO CONTROL ZONE HUMIDITY BY ACTIVATION OF UNIT HOT GAS REHEAT AND/OR ELECTRIC HEATING COIL. WHEN ELECTRIC HEATING COILS ARE USED THE MINIMUM RH SETPOINT SHALL BE NOT LESS THAN 60% RH. IN THE EVENT THAT ADEQUATE SEQUENCES OR HUMIDITY CONTROL EQUIPMENT ARE NOT INDICATED ON THE CONTRACT DOCUMENTS THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO ISSUE REQUIRED DOCUMENTS. INCLUSION OF ACTIVE HUMIDITY CONTROL SHALL BE FURNISHED AND INSTALLED WITH NO ADDITIONAL INCREASE IN CONTRACT PRICE.
 - ALL PLENUMS SHALL BE DOUBLE WALL MADE BY AHU MANUFACTURER. FIELD BUILT PLENUMS ARE NOT ACCEPTABLE. REFER TO SPECIFICATION SECTION 23 73 00 FOR PLENUM REQUIREMENTS.
 - THE MECHANICAL CONTRACTOR SHALL PROVIDE A LOG OF ALL MECHANICAL EQUIPMENT THAT HAS BEEN REPAIRED OR REPLACED PRIOR TO SUBSTANTIAL COMPLETION TO THE ENGINEER TO REVIEW.
 - PIPING CARRYING REFRIGERANTS SHALL BE TYPE ACR HARD-DRAWN COPPER TUBING, ASTM B88, ANSI H2.1. FITTINGS SHALL BE WROUGHT COPPER. ASTM B16.22, ANSI B16.22. ALL 90 ELBOWS SHALL BE THE LONG RADIUS TYPE. REFER TO SPECIFICATION SECTION 23 13 FOR BRAZING OPTIONS.
 - REFER TO CONTROLS GENERAL NOTES.

| REVISIONS | | |
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| MARK | DESCRIPTION | DATE |
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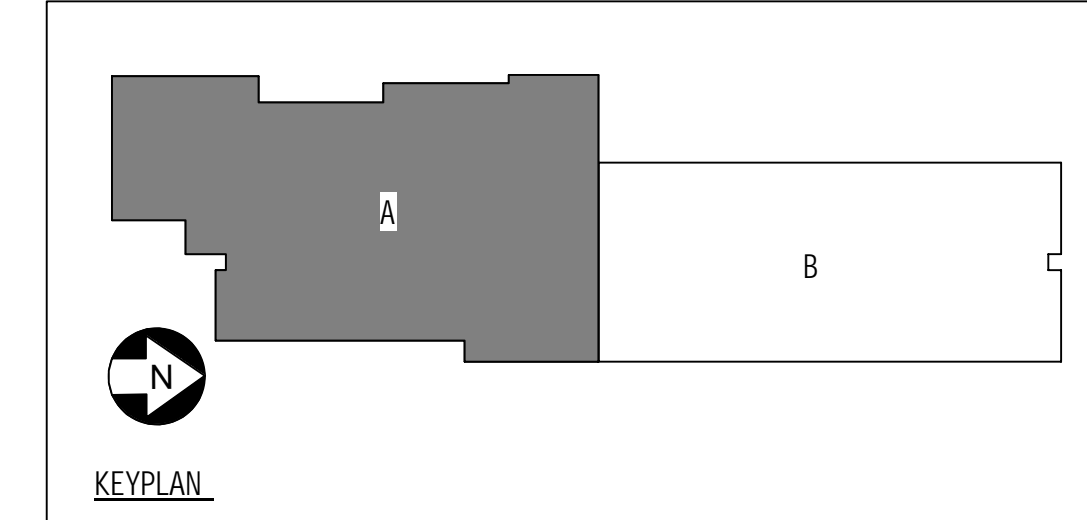
1 FLOOR PLAN - LEVEL 1 AREA A - MECHANICAL

1/8" = 1'-0"



- GENERAL NOTES:**
- REFER TO "MECHANICAL GENERAL NOTES" ON DRAWING M001. THEY ARE APPLICABLE TO ALL WORK DESCRIBED ON EVERY MECHANICAL DRAWING.
 - ALL AIR HANDLING SYSTEMS SHALL UTILIZE A FULLY DUCTED RETURN AIR SYSTEM.
 - PROVIDE A VOLUME DAMPER AT EVERY BRANCH DUCT LEADING FROM MAIN TRUNK LINES FOR ALL LOW-PRESSURE DUCTWORK SYSTEMS, WHETHER SHOWN OR NOT ON THE DRAWINGS. NOT ALL DAMPERS MAY BE SHOWN ON THE DRAWINGS FOR CLARITY. DO NOT INSTALL DAMPERS IN MEDIUM PRESSURE DUCTWORK, BETWEEN AHU DISCHARGE AND VARIABLE VOLUME TERMINALS.
 - ALL VOLUME DAMPERS INSTALLED ABOVE GYPSUM BOARD CEILINGS SHALL HAVE A REMOTELY OPERATED DAMPER ACTUATOR. FIELD VERIFY LOCATION OF DEVICES WITH GENERAL CONTRACTOR.
 - FULLY COORDINATE ALL DUCTWORK AND EQUIPMENT WITH CEILING MOUNTED PROJECTION SYSTEMS AND OTHER DEVICES.
 - RETURN GRILLE LOCATIONS AND DUCT LENGTHS HAVE BEEN SELECTED TO MITIGATE NOISE TRANSMISSION BETWEEN ROOMS. CONTRACTOR SHALL NOT INSTALL RETURN GRILLES IN SUCH A WAY THAT NET DUCT LENGTH BETWEEN RETURN GRILLES IS SHORTENED FROM THAT SHOWN ON THE DRAWINGS.
 - CONTRACTOR SHALL COORDINATE VAV ELECTRICAL CLEARANCES, INCLUDING LOW VOLTAGE, WITH ALL CEILING MOUNTED EQUIPMENT IN SHOP DRAWINGS, WHICH INCLUDES BUT IS NOT LIMITED TO LIGHTING, PROJECTORS, SYSTEMS DEVICES, AND FIRE SPRINKLERS. CLEARANCES SHALL BE SIZED AND COORDINATED AS REQUIRED BASED ON THE AWARDED MANUFACTURER VAV BOX REQUIREMENTS. LIGHTS AND EQUIPMENT BELOW THE VAV CLEARANCE, IN THE CEILING, ARE NOT ACCEPTABLE.
 - FULLY COORDINATE ALL REQUIRED ELECTRICAL CLEARANCES FOR DISCONNECTS, APDS AND ELECTRIC DUCT HEATERS PRIOR TO INSTALLATION. THIS MUST BE INCLUDED ON ALL CONTRACTOR SHOP DRAWINGS, PRIOR TO INSTALLATION.

- HEX NOTES:**
- 14x14 EA UP TO EF-1 ON ROOF.
 - SPACE HUMIDITY SENSOR ASSOCIATED WITH RTU-1.
 - ROUTE 1" CD FROM DFU-1 TO ROOF. PROVIDE LITTLE GIANT MODEL VCMX-20ULS CONDENSATE PUMP. COORDINATE 120V CONNECTION WITH ELECTRICAL CONTRACTOR.
 - BAS TEMPERATURE SENSOR FOR MONITORING PURPOSES ONLY.
 - DUCT SHALL BE 2" ACoustICAL DOUBLEWALL DUCT FROM THIS POINT TO AHU CONNECTION.
 - SMOKE DAMPERS SHALL BE INSTALLED IN THE VERTICAL DROPS MAXIMUM 2' AWAY FROM THE SMOKE BARRIER. SMOKE DAMPERS SHOWN IN HORIZONTAL DUCTWORK FOR CLARITY ONLY.
 - ROUTE FULL SIZE DOUBLE-WALL SUPPLY AND RETURN UP TO RTU-1 ON ROOF. TRANSITION DOUBLE-WALL SUPPLY AND RETURN DOWN FROM RTU-1 TO 72"x16" SA/ 62"x20" RA. PROVIDE SMOOTH RADIUS ELL TO HORIZONTAL.
 - ROUTE FULL SIZE DOUBLE-WALL SUPPLY AND RETURN UP TO RTU-2 ON ROOF. TRANSITION DOUBLE-WALL SUPPLY AND RETURN DOWN FROM RTU-2 TO 72"x16" SA/ 62"x20" RA. PROVIDE SMOOTH RADIUS ELL TO HORIZONTAL.



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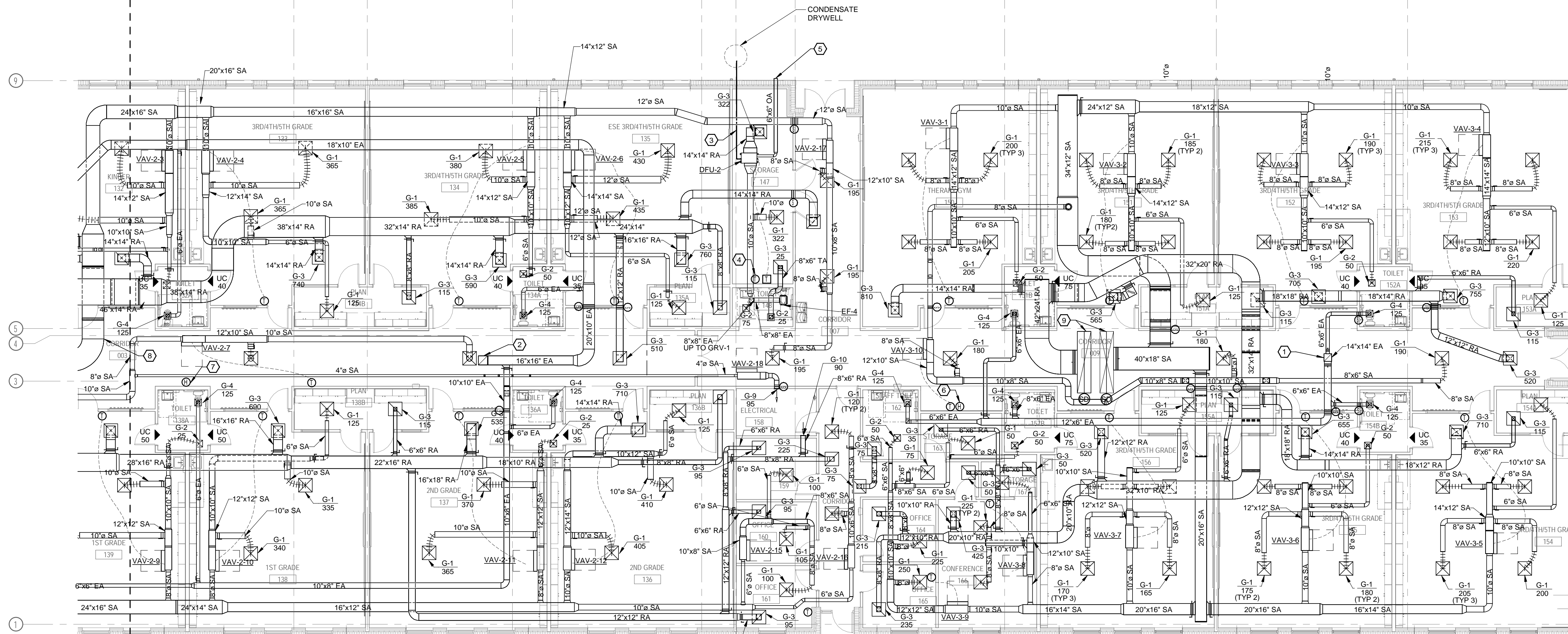
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FLOOR PLAN - LEVEL 1
AREA A - MECHANICAL

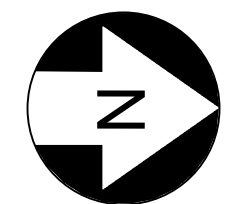
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1 FLOOR PLAN - LEVEL 1 AREA B - MECHANICAL
1/8" = 1'-0"

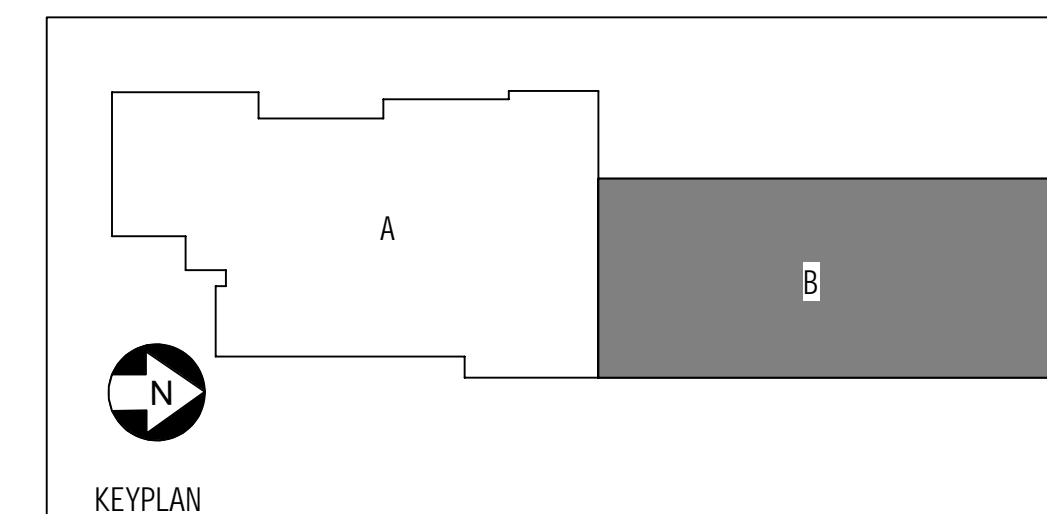


GENERAL NOTES:

- REFER TO "MECHANICAL GENERAL NOTES" ON DRAWING M001. THEY ARE APPLICABLE TO ALL WORK DESCRIBED ON EVERY MECHANICAL DRAWING.
- ALL AIR HANDLING SYSTEMS SHALL UTILIZE A FULLY DUCTED RETURN AIR SYSTEM.
- PROVIDE A VOLUME DAMPER AT EVERY BRANCH DUCT LEADING FROM MAIN TRUNK LINES FOR ALL LOW-PRESSURE DUCTWORK SYSTEMS, WHETHER SHOWN OR NOT ON THE DRAWINGS. NOT ALL DAMPERS MAY BE SHOWN ON THE DRAWINGS FOR CLARITY. DO NOT INSTALL DAMPERS IN MEDIUM PRESSURE DUCTWORK, BETWEEN AHU DISCHARGE AND VARIABLE VOLUME TERMINALS.
- ALL VOLUME DAMPERS INSTALLED ABOVE GYPSUM BOARD CEILINGS SHALL HAVE A REMOTELY OPERATED DAMPER ACTUATOR. FIELD VERIFY LOCATION OF DEVICES WITH GENERAL CONTRACTOR.
- FULLY COORDINATE ALL DUCTWORK AND EQUIPMENT WITH CEILING MOUNTED PROJECTION SYSTEMS AND OTHER DEVICES.
- RETURN GRILLE LOCATIONS AND DUCT LENGTHS HAVE BEEN SELECTED TO MITIGATE NOISE TRANSMISSION BETWEEN ROOMS. CONTRACTOR SHALL NOT INSTALL RETURN GRILLES IN SUCH A WAY THAT NET DUCT LENGTH BETWEEN RETURN GRILLES IS SHORTENED FROM THAT SHOWN ON THE DRAWINGS.
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- FULLY COORDINATE ALL REQUIRED ELECTRICAL CLEARANCES FOR DISCONNECTS, APD'S AND ELECTRIC DUCT HEATERS PRIOR TO INSTALLATION. THIS MUST BE INCLUDED ON ALL CONTRACTOR SHOP DRAWINGS, PRIOR TO INSTALLATION.

HEX NOTES:

- 14x14 EA UP TO EF-3 ON ROOF.
- 16x16 EA UP TO EF-2 ON ROOF.
- PROVIDE 1" CD DRAINING TO CONDENSATE DRYWELL. ROUTE THE PIPE SO AS TO MAINTAIN A SLOPE OF 1/8" PER LINEAR FOOT. DRAINING TO THIS AREA WILL NOT POSE A NUISANCE.
- BAS TEMPERATURE SENSOR FOR MONITORING PURPOSES ONLY.
- 75 CFM 6" INTAKE. PROVIDE WALL CAP WITH DAMPER AND BIRD SCREEN.
- SPACE HUMIDITY SENSOR ASSOCIATED WITH RTU-3.
- SPACE HUMIDITY SENSOR ASSOCIATED WITH RTU-2.
- DUCT SHALL BE 2" ACOUSTICAL DOUBLEWALL DUCT FROM THIS POINT TO AHU CONNECTION.
- TRANSITION FULL SIZE DOUBLE-WALL RETURN FROM RTU-1 ON ROOF TO 42"x24" RA. TRANSITION DOUBLE-WALL SUPPLY DOWN FROM RTU-1 TO 40"x18" SA. PROVIDE SMOOTH RADIUS ELL TO HORIZONTAL.



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FLOOR PLAN - LEVEL 1
AREA B - MECHANICAL

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4780 DATA COURT, ORLANDO, FL 32817

UCP OSCEOLA CAMPUS

PROJECT LOCATION:
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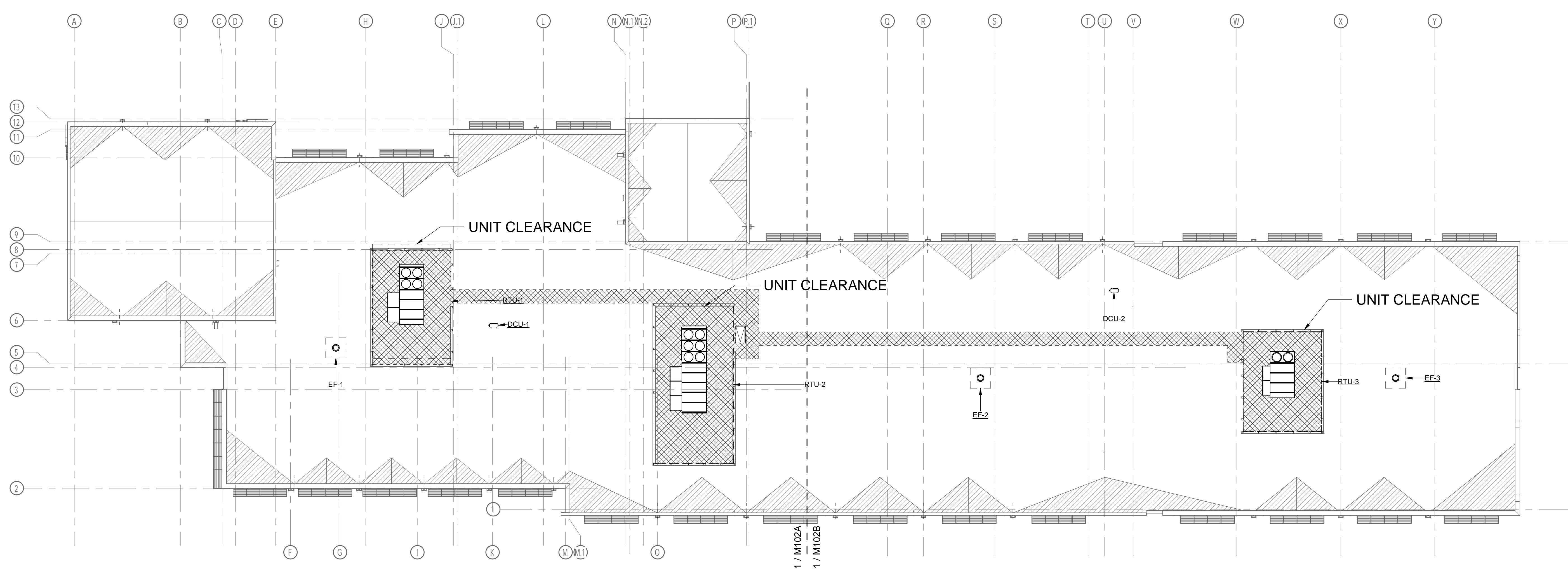


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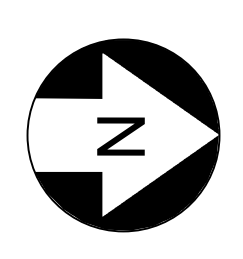


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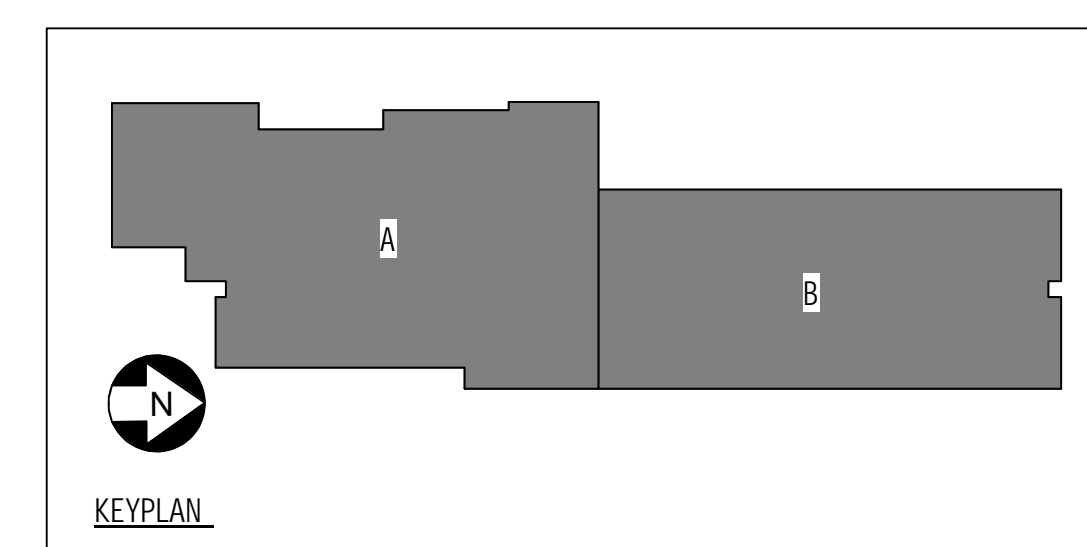


1 ROOF PLAN - OVERALL - MECHANICAL
1/16" = 1'-0"



- GENERAL NOTES:
- REFER TO "MECHANICAL GENERAL NOTES" ON DRAWING M001. THEY ARE APPLICABLE TO ALL WORK DESCRIBED ON EVERY MECHANICAL DRAWING.
 - ALL AIR HANDLING SYSTEMS SHALL UTILIZE A FULLY DUCTED RETURN AIR SYSTEM.
 - PROVIDE A VOLUME DAMPER AT EVERY BRANCH DUCT LEADING FROM MAIN TRUNK LINES FOR ALL LOW-PRESSURE DUCTWORK SYSTEMS, WHETHER SHOWN OR NOT ON THE DRAWINGS. NOT ALL DAMPERS MAY BE SHOWN ON THE DRAWINGS FOR CLARITY. DO NOT INSTALL DAMPERS IN MEDIUM PRESSURE DUCTWORK, BETWEEN AHU DISCHARGE AND VARIABLE VOLUME TERMINALS.
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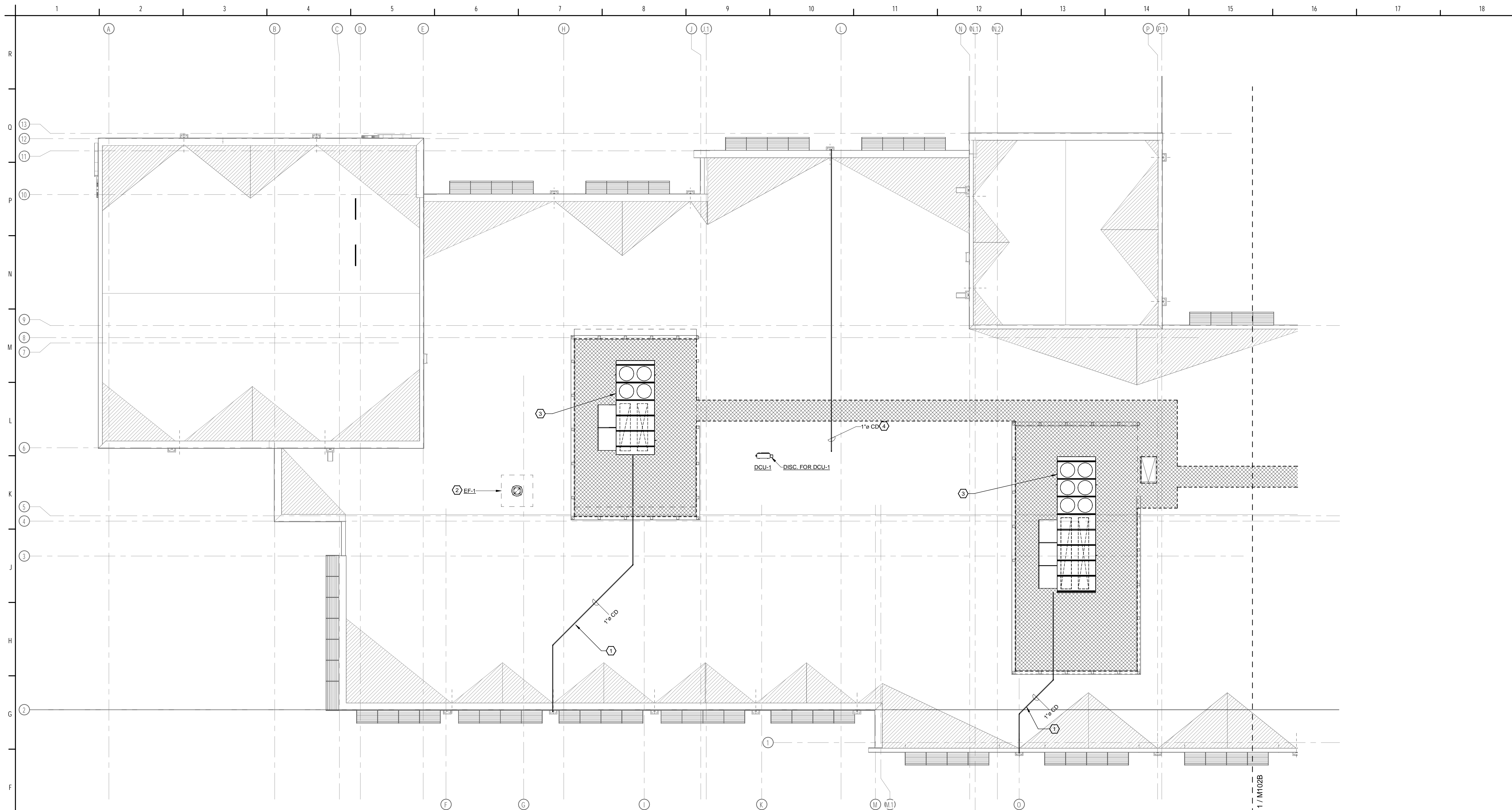
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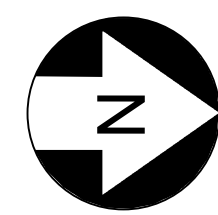
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ROOF PLAN - OVERALL - MECHANICAL

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1 ROOF PLAN - AREA A - MECHANICAL
1/8" = 1'-0"

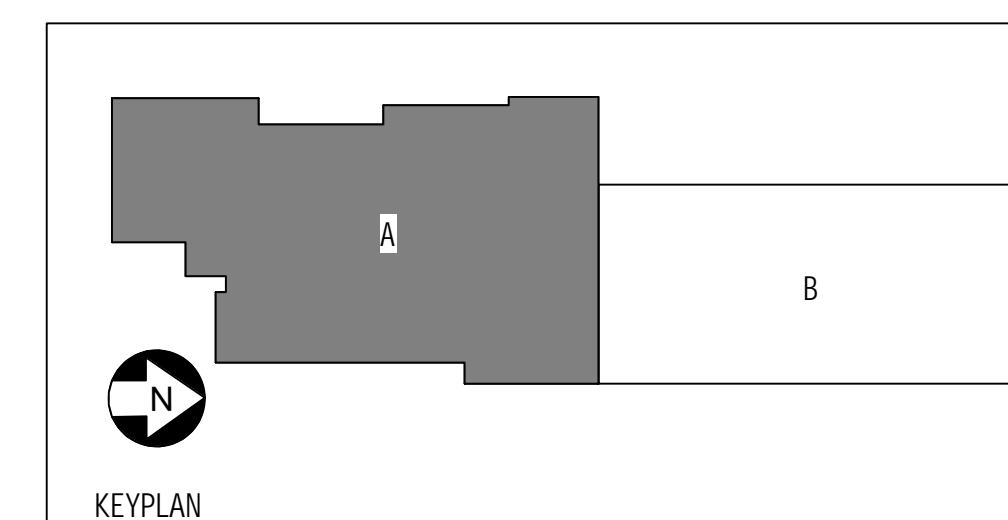


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HEX NOTES:

- 1" CD DRAINING TO PERMEABLE GRADE. DRAINING TO THIS AREA WILL NOT POSE A NUISANCE.
- MAINTAIN A MINIMUM OF 10' BETWEEN INTAKE OF RTU AND DISCHARGE OF EXHAUST. PROVIDE SLOPED ROOF CURB. COORDINATE EXACT ROOF SLOPE WITH ARCHITECT PRIOR TO ORDERING.
- COORDINATE EXACT ROOF SLOPE WITH ARCHITECT PRIOR TO ORDERING.
- ROUTE 1" CONDENSATE DRAIN PIPE TO THE NEAREST PRIMARY ROOF DRAIN. ROUTE PIPING SO AS TO MAINTAIN A SLOPE OF 1/8" PER LINEAR FOOT.



UCP OF CENTRAL FLORIDA
4780 DATA COURT, ORLANDO, FL 32817

UCP OSCEOLA CAMPUS

PROJECT LOCATION:

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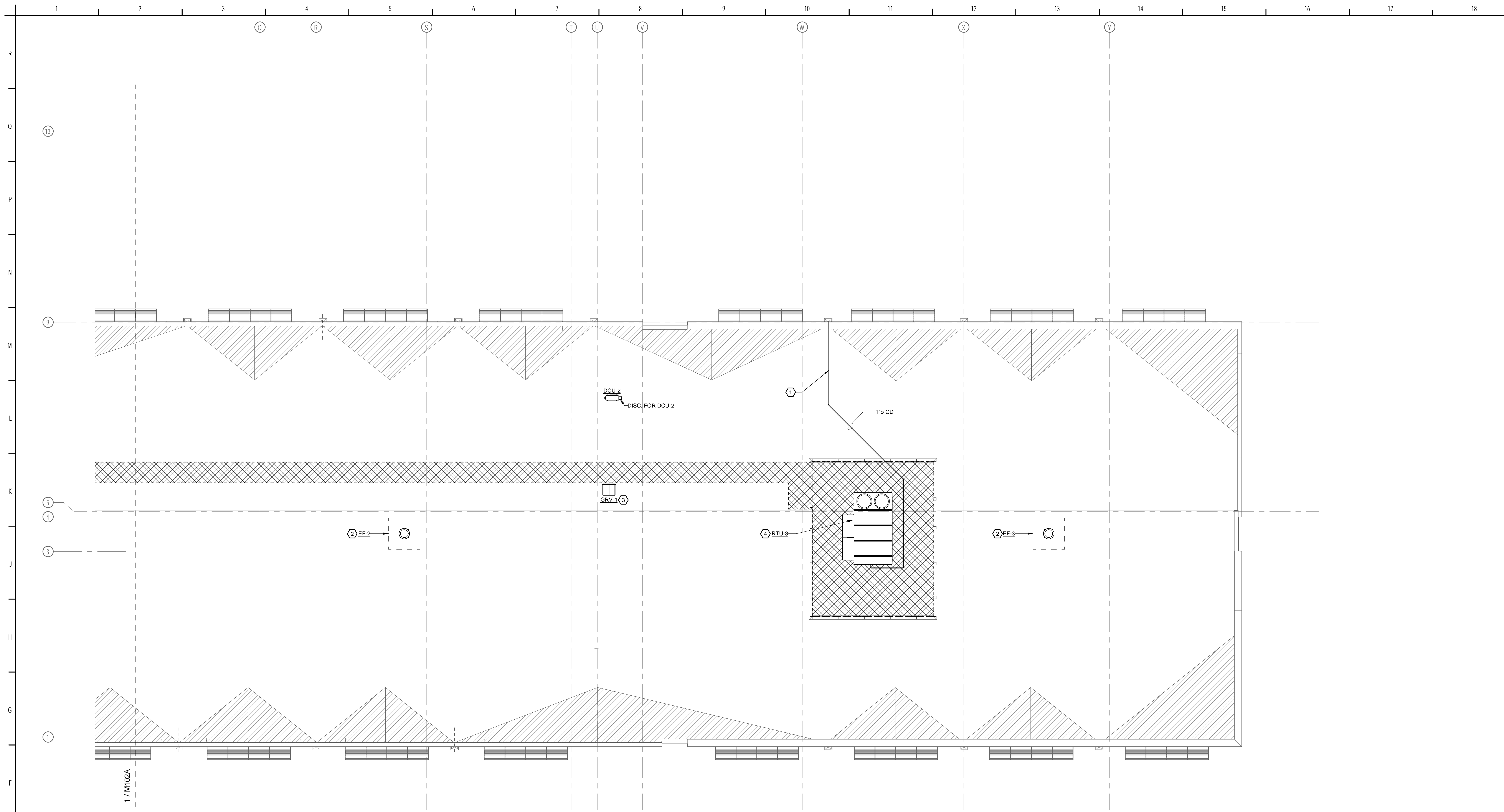
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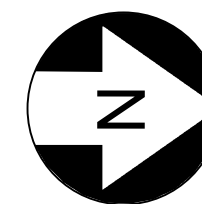
ROOF PLAN - AREA A -
MECHANICAL

M102A

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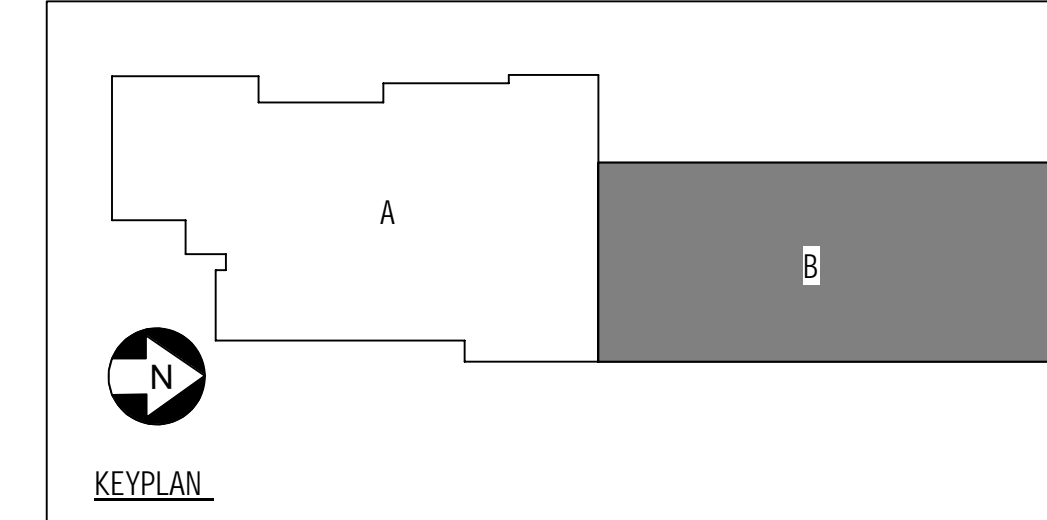


1 ROOF PLAN - AREA B - MECHANICAL
1/8" = 1'-0"



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- HEX NOTES:**
- SLOPE CONDENSATE DRAIN MIN 1/8" PER 12". TERMINATE CONDENSATE DRAIN INTO SCUPPER.
 - MAINTAIN A MINIMUM OF 10' BETWEEN INTAKE OF RTU AND DISCHARGE OF EXHAUST. PROVIDE SLOPED ROOF CURB. COORDINATE EXACT ROOF SLOPE WITH ARCHITECT PRIOR TO ORDERING.
 - MAINTAIN A MINIMUM OF 10' BETWEEN INTAKE OF RTU AND DISCHARGE OF EXHAUST. PROVIDE SLOPED ROOF CURB. COORDINATE EXACT ROOF SLOPE WITH ARCHITECT PRIOR TO ORDERING.
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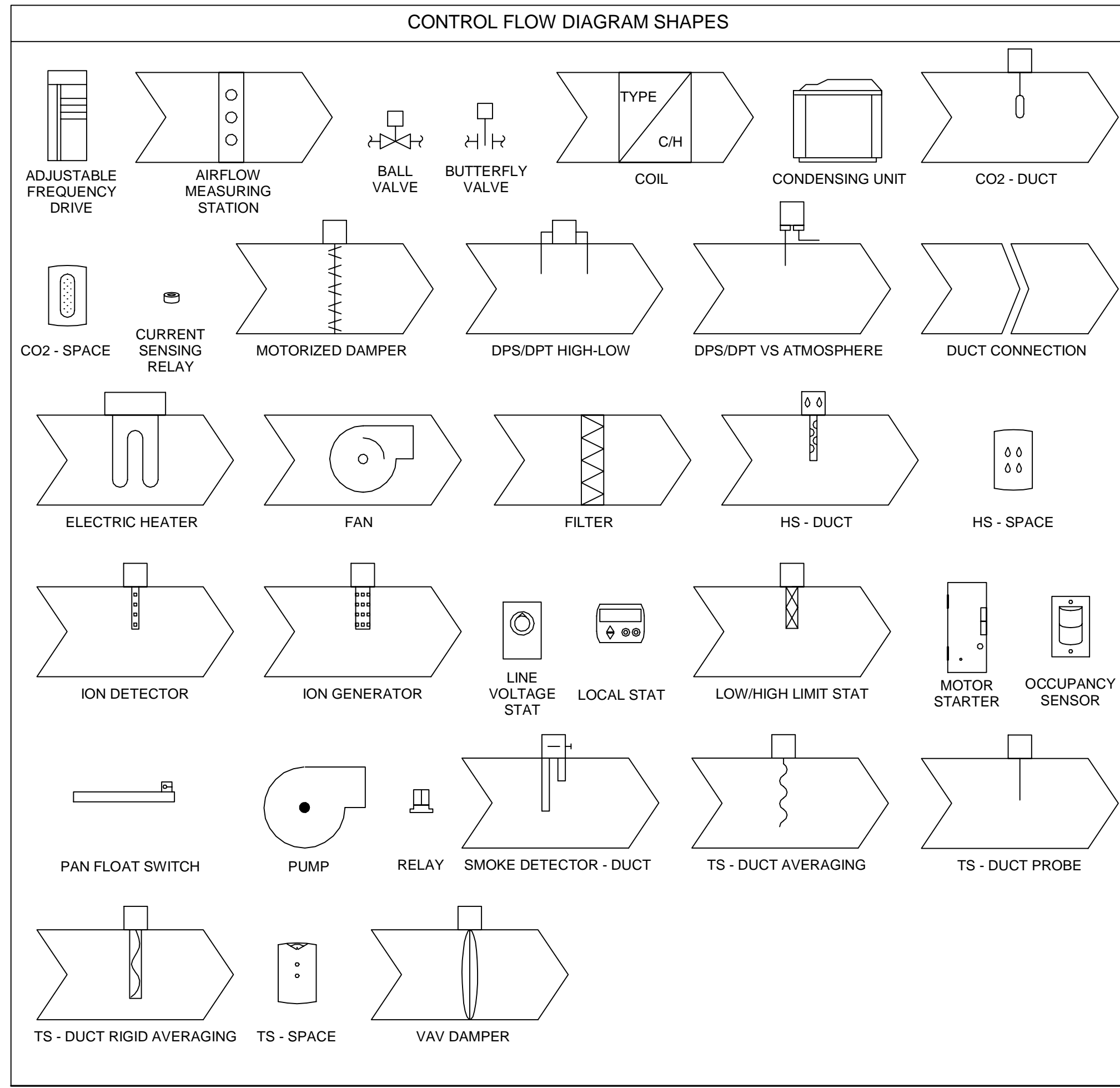
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ROOF PLAN - AREA B - MECHANICAL

M102B



CONTROL DIAGRAM ABBREVIATIONS

| | | | |
|------|----------------------------------|------|-------------------------------|
| AFD | ADJUSTABLE FREQUENCY DRIVE | FLT | FLOATING POINT OUTPUT |
| AFMS | AIR FLOW MEASURING STATION | FM | FLOW METER |
| AI | ANALOG INPUT | FS | FLOW SWITCH |
| AO | ANALOG OUTPUT | FZ | FREEZE-STAT |
| BAS | BUILDING AUTOMATION SYSTEM | HC | HEATING COIL |
| BTU | BTU METER | HS | HUMIDITY SENSOR |
| CC | COOLING COIL | ID | ION DETECTOR |
| CHS | CHILLED WATER SUPPLY | IG | ION GENERATOR |
| CHR | CHILLED WATER RETURN | LA | LEAVING AIR |
| CHW | CHILLED WATER | La | LEVEL ARM |
| CO | CARBON MONOXIDE SENSOR | L/S | LIFE SAFETY |
| CO2 | CARBON DIOXIDE SENSOR | LVT | LINE VOLTAGE THERMOSTAT |
| COS | CONDENSATE OVERFLOW SWITCH | M/S | MOTOR/STARTER DISCONNECT |
| CWS | CONDENSER WATER SUPPLY | MA | MIXED AIR |
| CWR | CONDENSER WATER RETURN | MD | MOTORIZED DAMPER |
| CNW | CONDENSER WATER | NEC | NATIONAL ELECTRICAL CODE |
| CSR | CURRENT SENSING RELAY | NOX | NITROGEN COMPOUND SENSOR |
| CT | CURRENT TRANSUDUCER | OA | OUTSIDE AIR |
| CU | CONDENSING UNIT | OS | OCCUPANCY SENSOR |
| CV | CONTROL VALVE | RA | RETURN AIR |
| DA | DISCHARGE AIR | RH | RELATIVE HUMIDITY |
| DI | DIGITAL INPUT | Sa | SAFETY ALARM/SHUT-DOWN |
| DO | DIGITAL OUTPUT | SA | SUPPLY AIR |
| DPS | DIFFERENTIAL PRESSURE SWITCH | SD | SMOKE DETECTOR |
| DPT | DIFFERENTIAL PRESSURE TRANSDUCER | S/S | START-STOP |
| DX | DIRECT EXPANSION | STAT | THERMOSTAT/HUMIDISTAT |
| EA | EXHAUST AIR | TEMP | TEMPERATURE |
| EH | ELECTRIC HEAT | Ta | TEMPERATURE ALARM |
| ES | END SWITCH | TS | TEMPERATURE SENSOR |
| Fa | FAILURE ALARM | VAV | VARIABLE VOLUME TERMINAL UNIT |
| F/A | FIRE ALARM | VOC | VOLATILE ORGANIC COMPOUND |

CONTROL POINT TYPES

AIRSIDE WATERSIDE

| | | | |
|-----|-----------------------|----|----------------|
| AI | ANALOG INPUT | AO | ANALOG OUTPUT |
| DI | DIGITAL INPUT | DO | DIGITAL OUTPUT |
| FLT | FLOATING POINT OUTPUT | | |

CONTROL PIPING LABELS

| | | | |
|-----|-----------------------------------|-----|----------------------------------|
| AFD | ADJUSTABLE FREQUENCY DRIVE | BTU | BTU/THERMAL ENERGY USAGE METER |
| CHP | CHILLED WATER PUMP | CWP | CONDENSER WATER PUMP |
| CSR | CURRENT SENSING RELAY | CT | CURRENT TRANSDUCER |
| DPS | DIFFERENTIAL PRESSURE SWITCH | DPT | DIFFERENTIAL PRESSURE TRANSDUCER |
| FM | FLOW METER | HWP | HOT WATER PUMP |
| KEW | KWH/ELECTRICAL ENERGY USAGE METER | LD | LEAK DETECTOR |
| LVL | LEVEL SENSOR | MPT | MATCHED PAIR TEMPERATURE SENSORS |
| MWP | MAKE-UP WATER PUMP | PP | POINT PRESSURE SENSOR |
| SS | START - STOP | STP | SET POINT |
| TSA | TEMPERATURE SENSOR ARRAY | T | TEMPERATURE SENSOR |
| V | VALVE - MOTORIZED/CONTROL | VIB | VIBRATION SWITCH |

BUILDING AUTOMATION SYSTEM & CONTROLS GENERAL NOTES

GENERAL NOTES

- REFER TO SPECIFICATION SECTION 23 09 23.
- REFER TO SPECIFICATION SECTION 23 09 93.
- REFER TO SPECIFICATION SECTION 23 06 93.
- REFER TO SPECIFICATION SECTION 23 06 00.
- REFER TO THE DIVISION 23 SPECIFICATIONS.
- REFER TO THE DIVISION 26 SPECIFICATIONS.
- REFER TO NEC.
- REFER TO PROJECT GENERAL NOTES.
- CONTROL DRAWINGS ARE NOT TO SCALE.
- CONTROL FLOW DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE NOT MEANT TO REPRESENT THE PHYSICAL CONFIGURATIONS OR DIMENSIONS OF THE REFERENCED EQUIPMENT.
- CONTROL FLOW SHAPES ARE DIAGRAMMATIC IN NATURE AND ARE NOT MEANT TO REPRESENT THE PHYSICAL CONFIGURATIONS, DIMENSIONS, MODELS, TYPES, GENERATIONS, OR MANUFACTURERS OF THE REFERENCED DEVICES.
- THE CONTROL POINTS INDICATED IN THESE DRAWINGS ARE REPRESENTATIVE OF THE MINIMUM SUCH POINTS REQUIRED TO ACHIEVE THE INTENDED SEQUENCE OF OPERATION AND SYSTEM MONITORING FUNCTIONALITY. CONTROL SCHEMES EMPLOYING FEWER POINTS IN CONCERT WITH SHARED VALUES, COMMUNICATED VALUES, OR CALCULATED VALUES IN LIEU OF INDICATED POINT COUNT SHALL NOT BE ACCEPTABLE.
- THE CONTROL HARDWARE AND END DEVICES INDICATED IN THESE DRAWINGS ARE REPRESENTATIVE OF THE MINIMUM SUCH DEVICES REQUIRED TO ACHIEVE THE INTENDED SEQUENCE OF OPERATION AND SYSTEM MONITORING FUNCTIONALITY. CONTROL SCHEMES EMPLOYING FEWER DEVICES IN CONCERT WITH SHARED VALUES, COMMUNICATED VALUES, OR CALCULATED VALUES IN LIEU OF INDICATED DEVICE QUANTITY SHALL NOT BE ACCEPTABLE.
- CONTROLS HARDWARE AND END DEVICES INSTALLED BY OR PROVIDED BY HVAC EQUIPMENT MANUFACTURER ARE SUBJECT TO THE SAME SPECIFICATIONS AND REQUIREMENTS AS THOSE INSTALLED BY OR PROVIDED BY THE BAS CONTRACTOR.
- ANY INDIVIDUAL SYSTEM, AS DEFINED BY CONTROLS FLOW DIAGRAMS, CONTROLLED OR MONITORED BY THE BAS COMPRISED OF THREE OR GREATER CONTROL POINTS, COMBINATION OF INPUTS AND OUTPUTS, SHALL BE EQUIPPED WITH A DEDICATED CONTROLLER WITHIN THE BAS ARCHITECTURE.
- WHERE PERIPHERAL SYSTEMS ARE CONTROLLED OR MONITORED VIA THE USE OF AUXILIARY POINT TERMINATIONS ON CONTROLLERS NOT DEDICATED TO SAID SYSTEMS, BAS CONTRACTOR SHALL PROVIDE A SCHEDULE OF SUCH SYSTEMS INDICATING THE CONTROL POINTS IN QUESTION, THE LOCATION OF THE ASSOCIATED CONTROLLER, AND THE INDIVIDUAL POINT TERMINATION DESIGNATIONS. THIS INFORMATION SHALL BE DISPLAYED ON THE BAS GRAPHICAL INTERFACE FOR REFERENCE PURPOSES.
- SYSTEM ALARMS AND NOTIFICATIONS SHALL BE IDENTIFIED WITH SPECIFIC UNIT TAGS, BUILDING NUMBERS, ROOM NUMBERS, OR OTHER SITE SPECIFIC IDENTIFYING CRITERIA, VIA THE BAS INTERFACE, SUCH THAT SYSTEM OPERATORS CAN ASSOCIATE ANY ALARM WITH THE SPECIFIC PIECE OF EQUIPMENT IT IS RELATED TO.
- BAS FLOOR PLAN GRAPHICS SHALL INCLUDE SITE SPECIFIC BUILDING NUMBERS OR NAMES, ROOM NUMBERS OR NAMES, GENERAL AREA DESIGNATIONS, AND EQUIPMENT TAGS SUCH THAT SYSTEM OPERATORS CAN ASSOCIATE OCCUPANT COMMUNICATIONS WITH THE SPECIFIC PIECE OF EQUIPMENT SERVING THE LOCATION IN QUESTION.
- BAS GRAPHICS TEXT SHALL BE ARRANGED IN A LOGICAL MANNER AND CONFIGURED TO COINCIDE WITH THE GRAPHICAL DESIGN AND COLOR SCHEME SUCH THAT TEXT IS CLEAR & LEGIBLE AND ITS PLACEMENT DOES NOT RESULT IN EXCESSIVE OVERLAP WITH BACKGROUND IMAGES.
- SPACE SENSORS MOUNTED ON EXTERIOR WALLS SHALL BE THERMALLY INSULATED FROM THE SURFACE TO WHICH THEY ARE MOUNTED.
- BAS CONTROLLERS SHALL BE PROGRAMMED WITH A DEFAULT OPERATIONAL STATE TO BE ACTIVATED IN THE EVENT OF SYSTEM COMMUNICATION FAILURE IN ACCORDANCE WITH THE SEQUENCE OF OPERATION OF THE ASSOCIATED SYSTEM. IF NO DEFAULT STATE IS SPECIFIED, IT SHALL BE ASSUMED THAT THE SYSTEM IS INTENDED TO OPERATE IN OCCUPIED MODE DURING COMMUNICATION FAILURE.
- CONTROLS HARDWARE AND END DEVICES EQUIPPED WITH LOCAL DISPLAYS SHALL BE MOUNTED SUCH THAT THE LOCAL DISPLAY IS FREE OF OBSTRUCTIONS AND IS LEGIBLE FROM A HEIGHT OF FIVE FEET ABOVE THE FLOOR.
- FOR THE PURPOSE OF CONTROL VALVE SELECTION, A NOMINAL PRESSURE DROP OF BETWEEN 3 TO 4 PSI SHALL BE USED TO CALCULATE THE TARGET FLOW COEFFICIENT (Cv) OF THE SELECTED VALVE.
- CONTROL VALVE SIZE (DIAMETER) SHALL NOT BE MORE THAN TWO STANDARD PIPE SIZES (DIAMETERS) SMALLER THAN THE INCOMING PIPE SIZE (DIAMETER).
- TWO POSITION CONTROL VALVES USED FOR ISOLATION PURPOSES SHALL BE OF THE SAME SIZE (DIAMETER) AS THE INCOMING PIPE.
- CONTROL VALVES SHALL BE SELECTED TO FACILITATE SUFFICIENT CONTROLLABILITY RELATIVE TO THE CONTROLLED LOAD WITH AT LEAST 75% OF THE TOTAL VALVE STROKE AVAILABLE AT NOMINAL SYSTEM PRESSURE.
- CONTROL VALVES AND ACTUATORS SHALL BE SELECTED WITH SUFFICIENT CLOSE OFF PRESSURE TO FACILITATE FULL VALVE CLOSURE AT MAXIMUM SYSTEM PRESSURE.
- FOR SYSTEMS EMPLOYING FLOATING POINT ACTUATORS, THE BAS SHALL BE PROGRAMMED TO EXECUTE A PERIODIC ACTUATOR CALIBRATION CYCLE TO ENSURE TIME BASED CONTROL SIGNALS RESULT IN THE INTENDED ACTUATOR POSITION.
- BAS CONTRACTOR SHALL COORDINATE WITH OWNER REGARDING SYSTEM SCHEDULES PRIOR TO INITIAL START-UP AND SET BASELINE SCHEDULES ACCORDING TO OWNER SPECIFIED OPERATIONAL PERIODS.
- BAS CONTRACTOR SHALL COORDINATE WITH MECHANICAL CONTRACTOR TO ENSURE THAT CONTROLS HARDWARE AND END DEVICES REQUIRING MECHANICAL INSTALLATION ARE MOUNTED IN THE APPROPRIATE LOCATIONS AND INSTALLED IN ACCORDANCE WITH THE RESPECTIVE DEVICE SPECIFICATIONS, MANUFACTURER INSTRUCTIONS, AND OWNER GUIDELINES.
- BAS CONTRACTOR SHALL PROVIDE SUFFICIENT ACCESS TO SYSTEM SETTINGS AND PROGRAMMING TO TEST & BALANCE CONTRACTOR TO FACILITATE ALL REQUIRED TEST & BALANCE FUNCTIONS AND OPERATIONS. IF SOFTWARE BEYOND THE STANDARD BAS INTERFACE OR CUSTOM HARDWARE NOT OTHERWISE FURNISHED TO OWNER IS REQUIRED TO FACILITATE TEST & BALANCE FUNCTIONS, THE BAS CONTRACTOR SHALL MAKE SAID SOFTWARE AND HARDWARE AVAILABLE TO TEST & BALANCE CONTRACTOR.
- BAS CONTRACTOR SHALL REVIEW COMMISSIONING SPECIFICATIONS, PROCEDURAL REQUIREMENTS, AND REPORTING REQUIREMENTS AND PROVIDE ADEQUATE SUPPORT TIME FOR EXECUTION OF SYSTEM COMMISSIONING.
- BAS COMMUNICATION WIRING LINKS SHALL BE CONFIGURED AS DAISY-CHAINS. STAR-PATTERN BAS COMMUNICATION WIRING SHALL NOT BE USED.
- WHERE BAS COMMUNICATION BETWEEN BUILDINGS IS TO BE ACHIEVED VIA OUTDOOR OR UNDERGROUND COMMUNICATION LINKS, MULTI-MODE FIBER OPTIC CABLE SHALL BE PROVIDED. COPPER COMMUNICATION WIRE SHALL NOT BE PROVIDED IN ANY OUTDOOR OR UNDERGROUND APPLICATIONS. PROVIDE TWO 1" CONTROLS CONDUITS TO ALL MECHANICAL ROOMS AND MEDIA CONVERTERS TO FACILITATE COPPER TO FIBER AND FIBER TO COPPER TRANSITIONS.
- WHERE BAS COMMUNICATION BETWEEN BUILDINGS IS TO BE ACHIEVED VIA IP PROTOCOL USING AN OWNER PROVIDED LOCAL AREA NETWORK, BAS CONTRACTOR SHALL COORDINATE WITH OWNER TO ENSURE THAT SUCH A CONFIGURATION IS ACCEPTABLE. INSTALLED SYSTEM COMPLIES WITH ALL OWNER IT SECURITY REQUIREMENTS, AND ALL REQUIRED IP ADDRESS ASSIGNMENTS ARE ACCOUNTED FOR AND REQUESTED IN A TIMELY MANNER TO FACILITATE SYSTEM START-UP.
- BAS CONTROL PANEL ENCLOSURES SHALL BE LABELED WITH THE UNIT TAG AND OR DESIGNATION OF THE ASSOCIATED EQUIPMENT OR SYSTEM. IF MULTIPLE BAS CONTROLLERS ARE INSTALLED IN A SHARED ENCLOSURE, INDIVIDUAL CONTROLLERS SHALL ALSO BE LABELED AS SUCH.
- CONTROL POINT WIRING TERMINATIONS SHALL BE LABELED SUCH THAT INDIVIDUAL WIRES CAN BE IDENTIFIED AS BEING ASSOCIATED WITH THE SPECIFIC CONTROL POINT AND SYSTEM THEY ARE TIED TO WITHOUT THE USE OF A SUPPLEMENTAL REFERENCE SOURCE. PLACING COPIES OF WIRING DIAGRAMS OR BAS SUBMITTAL DOCUMENTS INSIDE CONTROL PANEL ENCLOSURES SHALL NOT BE CONSIDERED AS CONSTITUTING SUFFICIENT POINT LABELING.
- TRANSFORMERS SERVING BAS CONTROLLERS SHALL BE SIZED TO ACCOMMODATE THE MAXIMUM VOLT-AMP (VA) DRAW OF THE CONTROLLER AND ANY DEVICES DIRECTLY POWERED BY THE CONTROLLER PLUS A 10% ALLOWANCE TO FACILITATE FUTURE ADDITIONS OR MODIFICATIONS.
- BAS CONTRACTOR SHALL SUBMIT LOG OF TRAININGS PROVIDED TO OWNER AND ENGINEER OF RECORD DETAILING TRAINING DATES & TIMES, TRAINERS, AND TRAINEES UPON PROJECT COMPLETION.



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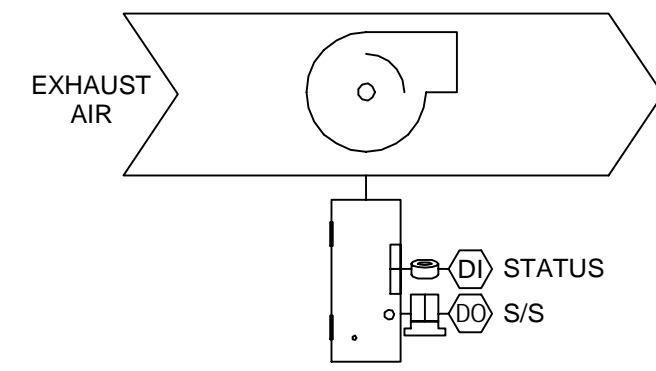
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CONTROLS - MECHANICAL

M501
100% CONSTRUCTION DOCUMENTS



GENERAL & TOILET EXHAUST FANS

SYSTEM DESCRIPTION - GENERAL & TOILET EXHAUST FANS

THE SYSTEM CONSISTS OF AN INLINE OR ROOF MOUNTED EXHAUST FAN DRAWING AIR DIRECTLY FROM THE ASSOCIATED SPACE TO FACILITATE PROPER BUILDING PRESSURIZATION.

SEQUENCE OF OPERATION

BUILDING AUTOMATION SYSTEM INTERFACE
 THE OPERATIONAL MODE OF THE EXHAUST FAN SHALL BE GOVERNED BY COMMANDS FROM THE BUILDING AUTOMATION SYSTEM (BAS) IN ACCORDANCE WITH USER DEFINED SCHEDULES AND SHALL MATCH THAT OF THE ASSOCIATED AIR HANDLING UNIT (AHU) AT ALL TIMES. VALID OPERATIONAL MODES SHALL BE AS FOLLOWS.

- OCCUPIED
- UNOCCUPIED
- OPTIMAL START
- UNOCCUPIED OVERRIDE
- MANUAL SHUTDOWN

IN THE EVENT OF A BAS COMMUNICATION FAILURE, THE EXHAUST FAN SHALL OPERATE IN ACCORDANCE WITH THE DEFAULT STATE OF THE ASSOCIATED AHU. IF, AT ANY TIME, A POSITIVE STATUS INDICATION FROM THE EXHAUST FAN IS PRESENT WITHOUT AN ACTIVE START COMMAND FROM THE BAS, A CORRESPONDING EXHAUST FAN IN HAND NOTIFICATION SHALL BE GENERATED.

OCCUPIED MODE
 WHEN THE ASSOCIATED AHU IS IN OCCUPIED MODE, THE EXHAUST FAN SHALL OPERATE CONTINUOUSLY WHENEVER A POSITIVE FAN STATUS INDICATION IS PRESENT FROM THE ASSOCIATED AHU SUPPLY FAN AND THE ACTIVE OUTSIDE AIRFLOW IS AT OR ABOVE THE MINIMUM SETTING. IF THE EXHAUST FAN FAILS TO START, OR FAILS DURING NORMAL OPERATION, A CORRESPONDING EXHAUST FAN FAILURE ALARM SHALL BE GENERATED.

UNOCCUPIED MODE
 WHEN THE ASSOCIATED AHU IS IN UNOCCUPIED MODE, THE EXHAUST FAN SHALL BE DISABLED.

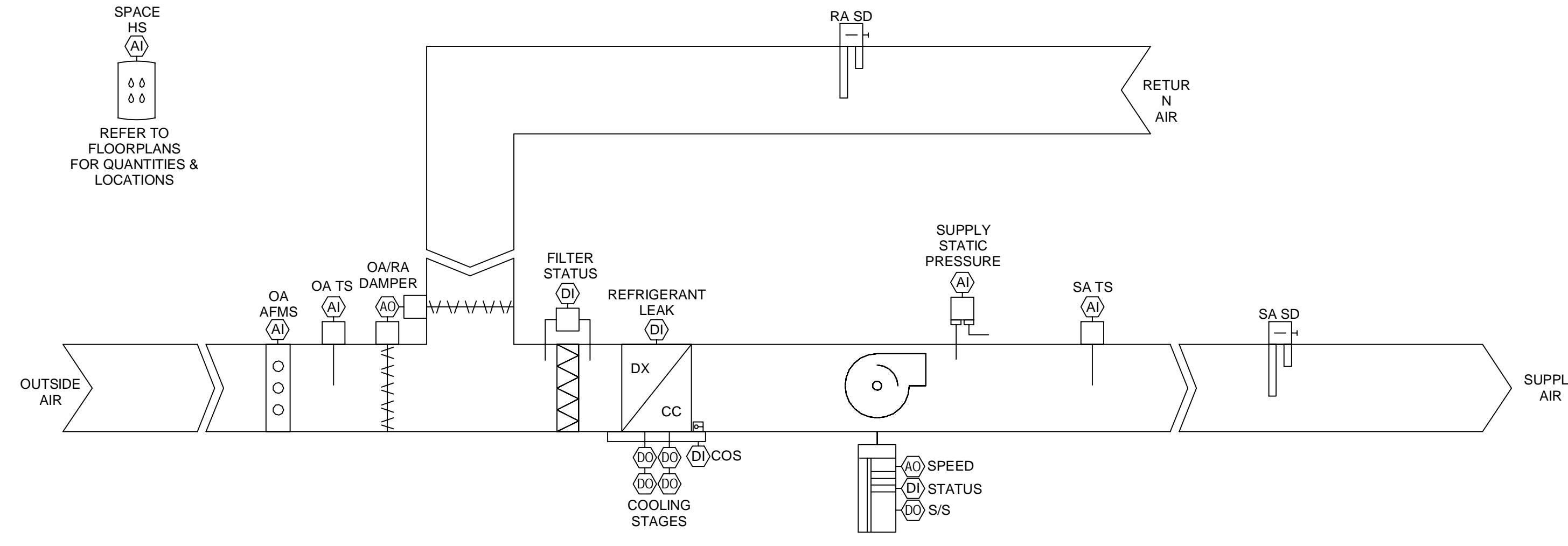
OPTIMAL START
 WHEN THE ASSOCIATED AHU IS IN OPTIMAL START MODE, THE EXHAUST FAN SHALL BE DISABLED.

UNOCCUPIED OVERRIDE MODE
 WHEN THE ASSOCIATED AHU IS IN UNOCCUPIED OVERRIDE MODE, THE EXHAUST FAN SHALL TEMPORARILY OPERATE IN THE OCCUPIED MODE UNTIL THE OVERRIDE EXPIRES OR IS CANCELED.

MANUAL SHUTDOWN MODE
 WHEN THE ASSOCIATED AHU IS IN MANUAL SHUTDOWN MODE, THE EXHAUST FANS SHALL BE DISABLED.

SYSTEM ALARMS & NOTIFICATIONS

- EXHAUST FAN FAILURE
- EXHAUST FAN IN HAND



PACKAGED MULTI-ZONE VARIABLE VOLUME ROOFTOP UNIT (RTU-1, RTU-2, RTU-3)

SYSTEM DESCRIPTION - PACKAGED MULTI-ZONE VARIABLE VOLUME ROOFTOP UNIT

THE SYSTEM CONSISTS OF A PACKAGED ROOFTOP UNIT EQUIPPED WITH INTEGRAL, MECHANICALLY LINKED, OUTSIDE AIR AND RETURN AIR DAMPERS, AN INTEGRAL PRE-FILTER RACK, MIXED AIR DIRECT EXPANSION COOLING COIL, AND SUPPLY FAN ARRAY IN A DRAW THROUGH CONFIGURATION. AN OUTSIDE AIRFLOW MEASURING STATION IS MOUNTED IN THE OUTSIDE AIR INTAKE SECTION. THE ROOFTOP UNIT SERVES CONDITIONED AIR TO VARIABLE VOLUME TERMINAL UNITS LOCATED IN THE ASSOCIATED SPACE. THE SUPPLY FAN ARRAY IS EQUIPPED WITH AN ADJUSTABLE FREQUENCY DRIVE TO FACILITATE VARIABLE VOLUME CONTROL IN RESPONSE TO SUPPLY STATIC PRESSURE VARIATIONS.

SEQUENCE OF OPERATION

BUILDING AUTOMATION SYSTEM INTERFACE
 THE ROOFTOP UNIT (RTU) SHALL OPERATE IN ACCORDANCE WITH ITS ONBOARD CONTROLS WITH ITS OPERATIONAL MODE AND SET POINTS GOVERNED BY COMMANDS FROM THE BUILDING AUTOMATION SYSTEM (BAS) BASED ON USER DEFINED SCHEDULES. VALID OPERATIONAL MODES SHALL BE AS FOLLOWS.

- OCCUPIED
- UNOCCUPIED
- OPTIMAL START
- UNOCCUPIED OVERRIDE
- MANUAL SHUTDOWN

IN THE EVENT OF A BAS COMMUNICATION FAILURE, THE SYSTEM SHALL TRANSITION TO ITS FACTORY PROGRAMMED DEFAULT OPERATIONAL STATE UNTIL COMMUNICATION IS RESTORED. ALL SET POINTS OUTLINED BELOW SHALL BE FULLY ADJUSTABLE VIA THE BAS USER INTERFACE.

OCCUPIED MODE
 DURING OCCUPIED OPERATION, THE SUPPLY FAN SHALL OPERATE CONTINUOUSLY AND THE OUTSIDE AIR DAMPER SHALL OPEN. DURING COOLING OPERATION, THE SUPPLY FAN SPEED SHALL MODULATE TO MAINTAIN SUPPLY STATIC PRESSURE AT SET POINT WHILE THE STAGES OF DX COOLING SHALL CYCLE TO MAINTAIN SUPPLY AIR TEMPERATURE AT SET POINT. 55°F. THE OUTSIDE AIR DAMPER POSITION SHALL MODULATE IN RESPONSE TO SUPPLY FAN SPEED VARIATIONS TO MAINTAIN VENTILATION AIRFLOW AT SET POINT.

UNOCCUPIED MODE
 DURING UNOCCUPIED OPERATION, THE RTU SHALL BE DISABLED. THE SUPPLY FAN AND DX COOLING STAGES SHALL BE ENABLED AS NEEDED AND SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE SEQUENCE ABOVE TO MAINTAIN SPACE TEMPERATURE AT FIXED UNOCCUPIED SET POINTS. SET VIA THE BAS. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED DURING UNOCCUPIED OPERATION.

OPTIMAL START
 THE BAS SHALL CALCULATE AN OPTIMAL START TIME FOR THE SYSTEM BASED ON THE SCHEDULED OCCUPIED TIME. THE OCCUPIED SPACE TEMPERATURE SET POINTS, AND THE AVERAGE DEVIATION FROM SET POINT USING A DEGREES F PER MINUTE FORMULA. THE ACTIVE DEGREES F PER MINUTE TARGET SHALL BE DYNAMICALLY RESET ON A DAILY BASIS BASED ON HISTORICAL OPTIMAL START TIMING.

PRE-COOL MODE
 DURING OPTIMAL START, IF THE AVERAGE SPACE TEMPERATURE IS ABOVE THE OCCUPIED SET POINT, THE SYSTEM SHALL ENTER PRE-COOL MODE. DURING PRE-COOL, THE SUPPLY FAN AND DX COOLING STAGES SHALL BE ENABLED AND SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE SEQUENCE ABOVE. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED WHEN THE AVERAGE SPACE TEMPERATURE REACHES OCCUPIED SET POINT, OR THE SCHEDULED OCCUPIED PERIOD BEGINS. THE SYSTEM SHALL TRANSITION TO OCCUPIED OPERATION.

UNOCCUPIED OVERRIDE MODE
 DURING UNOCCUPIED PERIODS, IF AN OCCUPANCY OVERRIDE IS INITIATED VIA ANY ASSOCIATED SPACE TEMPERATURE SENSOR, OR THROUGH THE BAS, THE SYSTEM SHALL TEMPORARILY OPERATE IN THE OCCUPIED MODE UNTIL THE OVERRIDE EXPIRES OR IS CANCELED. THE STANDARD UNOCCUPIED OVERRIDE TIME LIMIT SHALL BE ADJUSTABLE VIA THE BAS.

MANUAL SHUTDOWN MODE
 IF, AT ANY TIME, A MANUAL SHUTDOWN COMMAND IS INITIATED VIA THE BAS, THE RTU SHALL BE DISABLED. THE SYSTEM SHALL REMAIN IN THIS MODE OF OPERATION UNTIL THE SHUTDOWN COMMAND IS MANUALLY CLEARED VIA THE BAS.

SUPPLY FAN OPERATION
 THE SUPPLY FAN SHALL OPERATE CONTINUOUSLY DURING OCCUPIED OPERATION AND CYCLE ON AS NEEDED DURING UNOCCUPIED OPERATION AS DESCRIBED IN THE RESPECTIVE SEQUENCES ABOVE. THE BAS SHALL MONITOR THE OPERATIONAL STATUS OF THE SUPPLY FAN. IF THE SUPPLY FAN FAILS TO START OR FAILS DURING NORMAL OPERATION, A SUPPLY FAN FAILURE ALARM SHALL BE GENERATED.

HUMIDITY CONTROL
 DURING OCCUPIED OPERATION, IF SPACE RELATIVE HUMIDITY RISES ABOVE SET POINT 60%, THE BAS SHALL DYNAMICALLY RESET THE SUPPLY AIR TEMPERATURE SET POINT DOWNWARD BY 1°F EVERY FIVE MINUTES UNTIL ALL AVAILABLE STAGES OF DX COOLING ARE ENABLED. ONCE SPACE RELATIVE HUMIDITY FALLS BELOW SET POINT FOR A PERIOD OF FIVE MINUTES, NORMAL COOLING OPERATION SHALL RESUME. IF, DURING ANY ROLLING EIGHT HOUR PERIOD OF TIME, HUMIDITY CONTROL OPERATION IS TRIGGERED ON MORE THAN TWO OCCASIONS, AN EXCESSIVE HUMIDITY CONTROL OPERATION NOTIFICATION SHALL BE GENERATED.

FILTER MAINTENANCE SWITCH MONITORING
 IF THE FILTER MAINTENANCE SWITCH CLOSURES AT ANY TIME, A FILTER MAINTENANCE ALARM SHALL BE GENERATED. A MANUAL ACKNOWLEDGEMENT OF THE ALARM SHALL BE REQUIRED VIA THE BAS INTERFACE PRIOR TO ALARM CLEARANCE.

CONDENSATE OVERFLOW SWITCH MONITORING
 IF, AT ANY TIME, THE CONDENSATE OVERFLOW SWITCH IS TRIPPED, THE RTU SHALL BE DISABLED AND A CORRESPONDING ALARM SHALL BE GENERATED. A MANUAL ACKNOWLEDGEMENT OF THE ALARM, VIA THE BAS, SHALL BE REQUIRED PRIOR TO ALARM CLEARANCE.

EXHAUST FAN INTERLOCKS
 ASSOCIATED EXHAUST FANS SHALL BE INTERLOCKED WITH THE RTU VIA SOFTWARE SUCH THAT THEY ARE ENABLED WHENEVER THE SUPPLY FAN IS IN OPERATION AND THE OUTSIDE AIR DAMPER IS OPEN. EXHAUST FANS SHALL START ONLY WHEN THE OUTSIDE AIR FLOW HAS REACHED THE MINIMUM SETTING. EXHAUST FANS SHALL BE DISABLED DURING UNOCCUPIED AND OPTIMAL START OPERATION.

REFRIGERANT LEAK DETECTION
 IF, AT ANY TIME, THE RTU REFRIGERANT LEAK DETECTION CONTACT CLOSURES, A REFRIGERANT LEAK OPERATION ALARM SHALL BE GENERATED. WHEN AN ACTIVE REFRIGERANT LEAK INDICATION IS PRESENT, ALL ASSOCIATED VAV TERMINAL DAMPERS SHALL MOVE TO THE 100% OPEN POSITION AND THEIR ELECTRIC HEATERS SHALL BE DISABLED. ALL ASSOCIATED EXHAUST FANS SHALL BE ENABLED AND SHALL OPERATE CONTINUOUSLY. ONCE THE REFRIGERANT LEAK CONTACT OPENS, A MANUAL RESET VIA THE BAS SHALL BE REQUIRED TO RETURN THE SYSTEM TO NORMAL OPERATION.

SMOKE DETECTION
 IF PRODUCTS OF COMBUSTION ARE DETECTED IN THE UNIT SUPPLY OR RETURN AIR DUCT, THE RTU SHALL BE DISABLED VIA A HARDWIRED SIGNAL FROM THE FIRE ALARM SYSTEM.

ENERGY OPTIMIZATION ROUTINES

SUPPLY STATIC PRESSURE OPTIMIZATION
 DURING OCCUPIED OPERATION, THE SUPPLY STATIC PRESSURE SET POINT SHALL BE DYNAMICALLY RESET BASED ON ZONE COOLING DEMAND IN ORDER TO MAINTAIN THE CRITICAL ZONE. ZONE WITH DAMPER POSITION CLOSEST TO 100% OPEN. TERMINAL UNIT DAMPER IN A POSITION BETWEEN 80% AND 90% OPEN. MINIMUM AND MAXIMUM STATIC PRESSURE LIMITS, AS SET BY THE TEST & BALANCE CONTRACTOR, SHALL BE ENFORCED AT ALL TIMES. THE BAS SHALL CONTINUOUSLY IDENTIFY AND DISPLAY THE ACTIVE CRITICAL ZONE AND ALLOW FOR SYSTEM OPERATORS TO EXCLUDE ANY ZONE FROM THE OPTIMIZATION ROUTINE.

OPERATIONAL REDUNDANCY ROUTINES

SUPPLY FAN MINIMUM TURNDOWN CONTROL
 THE BAS SHALL STORE THE MINIMUM OPERATIONAL AIRFLOW OF THE SUPPLY FAN IN ACCORDANCE WITH MANUFACTURER SPECIFICATIONS. IN THE EVENT THAT THE SUM TOTAL OF ACTIVE AIRFLOW SET POINTS OF ASSOCIATED VARIABLE VOLUME TERMINAL UNITS IS BELOW THE MINIMUM OPERATIONAL AIRFLOW, THE BAS SHALL ENABLE INACTIVE TERMINAL UNITS AND/OR INCREASE ACTIVE AIRFLOW SET POINTS OF DESIGNATED TERMINAL UNITS TO ENSURE MINIMUM SUPPLY FAN AIRFLOW IS MAINTAINED. THE BAS SHALL ALLOW FOR SYSTEM OPERATORS TO DESIGNATE SPECIFIC TERMINAL UNITS TO FACILITATE THIS FUNCTIONALITY.

SYSTEM ALARMS & NOTIFICATIONS

- BAS COMMUNICATION FAILURE
- SUPPLY FAN FAILURE
- EXCESSIVE HUMIDITY CONTROL OPERATION
- FILTER MAINTENANCE REQUIRED
- CONDENSATE OVERFLOW SHUTDOWN
- REFRIGERANT LEAK OPERATION ACTIVE
- RTU GENERAL ALARMS (BACnet)

INSTALLATION & START-UP NOTES

- THE BAS CONTRACTOR SHALL COORDINATE WITH THE EQUIPMENT MANUFACTURER REGARDING THE DEFAULT SETTINGS OF THE RTU DURING COMMUNICATION FAILURE AND CONFIGURE THE OPERATION OF ASSOCIATED SYSTEMS ACCORDINGLY. DEFAULT OPERATIONAL SETTINGS OF THE RTU SHALL BE DISPLAYED ON THE ASSOCIATED BAS GRAPHICS PAGE FOR REFERENCE.
- OUTSIDE AIR DAMPER POSITION LIMITS SHALL BE SET BY THE TEST & BALANCE CONTRACTOR.
- INITIAL BASELINE SUPPLY DUCT STATIC PRESSURE SET POINT SHALL BE 1.5 IN. W.C. FINAL BASELINE SUPPLY DUCT STATIC PRESSURE SET POINT SHALL BE SET BY THE TEST & BALANCE CONTRACTOR.
- RTU ECONOMIZER FUNCTION SHALL BE DISABLED VIA BAS COMMAND OR LOCAL COMMAND. DAMPERS SHALL FACILITATE VENTILATION CONTROL ONLY.
- REFRIGERANT LEAK DETECTION SEQUENCE IS BASED ON BOD RTU FUNCTIONALITY. BAS CONTRACTOR SHALL COORDINATE WITH RTU MANUFACTURER AND PROVIDE ALL HARDWARE, WIRING, AND SOFTWARE AS NEEDED TO MONITOR AND DISPLAY THE ACTIVE REFRIGERANT LEAK STATUS OF THE RTU.



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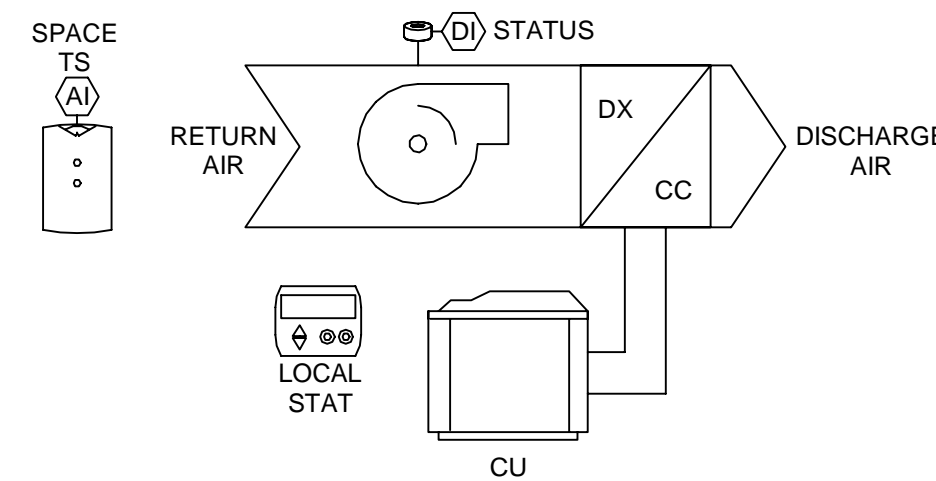
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COMM. NO.: 2024903
 ISSUE DATE: 12/06/2024
 DRAWN BY: NJ

CONTROLS - MECHANICAL

M502

100% CONSTRUCTION DOCUMENTS



STANDALONE SPLIT/DUCTLESS DX AIR CONDITIONER (DFC/DCU-1, DFC/DCU-2)

SYSTEM DESCRIPTION - STANDALONE SPLIT/DUCTLESS DX AIR CONDITIONER

THE SYSTEM CONSISTS OF A SPLIT OR DUCTLESS DIRECT EXPANSION (DX) AIR CONDITIONING UNIT. THE UNIT SERVES CONDITIONED AIR TO THE ASSOCIATED SPACE IN ACCORDANCE WITH COMMANDS FROM A LOCAL HARDWIRED THERMOSTAT AND MANUALLY ENTERED SET POINTS.

SEQUENCE OF OPERATION

BUILDING AUTOMATION SYSTEM INTERFACE
THE DX UNIT SHALL OPERATE INDEPENDENT OF BUILDING AUTOMATION SYSTEM (BAS) SCHEDULES OR COMMANDS. THE BAS SHALL MONITOR THE OPERATIONAL STATUS OF THE UNIT AND THE TEMPERATURE IN THE ASSOCIATED SPACE TO FACILITATE VISIBILITY AND ALARMING FUNCTIONALITY FOR SYSTEM OPERATORS.

SYSTEM MONITORING
ON A 24/7 BASIS, THE BAS SHALL DISPLAY THE OPERATIONAL STATUS OF THE UNIT SUPPLY FAN IF, AT ANY TIME, THE SPACE TEMPERATURE REMAINS OUTSIDE THE USER DEFINED OPERATIONAL RANGE FOR A PERIOD OF FIVE CONSECUTIVE MINUTES, A CORRESPONDING SPACE TEMPERATURE ALARM SHALL BE GENERATED.

SYSTEM ALARMS & NOTIFICATIONS

- SPACE TEMPERATURE OUT OF RANGE - HIGH
- SPACE TEMPERATURE OUT OF RANGE - LOW

STANDARD BAS TREND LOGGING & DATA STORAGE

THE BAS SHALL LOG TREND DATA FOR THE FOLLOWING SYSTEM POINTS ON A FIFTEEN MINUTE INTERVAL BASIS AND STORE THE DATA FOR AT LEAST ONE WEEK ON A ROLLING WINDOW OF TIME TO FACILITATE SYSTEM SERVICE AND TROUBLESHOOTING. THE POINTS LISTED BELOW REPRESENT THE MINIMUM TRENDING REQUIREMENTS FOR EACH HVAC SYSTEM. REFER TO SPECIFICATION SECTION 23.09.23 FOR FURTHER TRENDING AND DATA STORAGE REQUIREMENTS.

SINGLE DUCT VAV TERMINAL UNITS

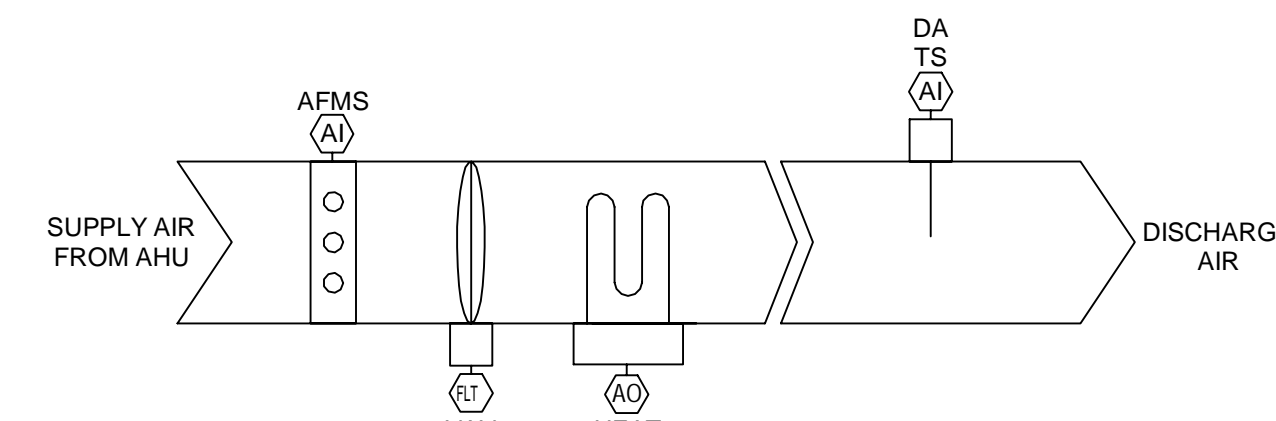
- SPACE TEMPERATURE SET POINT
- SPACE TEMPERATURE
- DISCHARGE AIR TEMPERATURE
- AIRFLOW RATE SET POINT
- AIRFLOW RATE

MULTI-ZONE VAV PACKAGED ROOF-TOP UNITS

- SUPPLY AIR TEMPERATURE SET POINT
- SUPPLY AIR TEMPERATURE
- DX COOLING STAGING COMMAND(S)
- SUPPLY STATIC PRESSURE SET POINT
- SUPPLY STATIC PRESSURE
- SUPPLY FAN SPEED COMMAND
- SPACE RELATIVE HUMIDITY
- OUTSIDE AIRFLOW RATE MINIMUM SET POINT
- OUTSIDE AIRFLOW RATE

EXHAUST FANS

- FAN STATUS



SINGLE DUCT VARIABLE VOLUME REHEAT TERMINAL UNIT (REFER TO SCHEDULES FOR UNIT TAGS)

SYSTEM DESCRIPTION - SINGLE DUCT VARIABLE VOLUME RE-HEAT TERMINAL UNIT

THE SYSTEM CONSISTS OF A SINGLE DUCT TERMINAL UNIT EQUIPPED WITH AN INTEGRAL CONTROL DAMPER, AIRFLOW MEASURING STATION, AND ELECTRIC HEATER. THE TERMINAL UNIT SERVES AIR, CONDITIONED BY THE ASSOCIATED AIR HANDLING UNIT, DIRECTLY TO THE ASSOCIATED SPACE. THE AIRFLOW MEASURING STATION FACILITATES PRESSURE INDEPENDENT OPERATION OF THE TERMINAL UNIT DAMPER IN RESPONSE TO SPACE TEMPERATURE VARIATIONS. THE ELECTRIC HEATER SERVES AS THE PRIMARY SOURCE OF HEATING FOR THE SPACE.

SEQUENCE OF OPERATION

BUILDING AUTOMATION SYSTEM INTERFACE
THE OPERATIONAL MODE OF THE VARIABLE VOLUME TERMINAL UNIT (VAV) SHALL BE GOVERNED BY COMMANDS FROM THE BUILDING AUTOMATION SYSTEM (BAS) IN ACCORDANCE WITH USER DEFINED SCHEDULES. VALID OPERATIONAL MODES SHALL BE AS FOLLOWS.

- OCCUPIED
- UNOCCUPIED
- UNOCCUPIED OVERRIDE
- OPTIMAL START
- MANUAL SHUTDOWN

IN THE EVENT OF A BAS COMMUNICATION FAILURE, THE SYSTEM SHALL DEFAULT TO OCCUPIED MODE. ALL SET POINTS OUTLINED BELOW SHALL BE FULLY ADJUSTABLE VIA THE BAS USER INTERFACE.

OCCUPIED MODE
DURING OCCUPIED PERIODS, THE VAV CONTROL DAMPER POSITION SHALL MODULATE TO MAINTAIN THE ACTIVE AIRFLOW AT SET POINT. AIRFLOW SET POINT SHALL BE CALCULATED AND DYNAMICALLY RESET BY THE BAS BASED ON THE ACTIVE DEVIATION BETWEEN SPACE TEMPERATURE AND SPACE TEMPERATURE SET POINT TO ENSURE THE COOLING CAPACITY OF THE VAV IS SUFFICIENT TO MAINTAIN SPACE TEMPERATURE AT THE ACTIVE SET POINT. DAMPER OPERATION SHALL BE GOVERNED BY MINIMUM AND MAXIMUM AIRFLOW VALUES. IF THE SYSTEM IS OPERATING AT ITS MINIMUM AIRFLOW SETTING AND SPACE TEMPERATURE FALLS 2° F BELOW THE ACTIVE SET POINT, RE-HEAT SHALL BE ENABLED. ONCE RE-HEAT IS ENABLED, THE SYSTEM SHALL OPERATE AT A CONSTANT HEATING AIRFLOW AND THE ELECTRIC HEATER SHALL STAGE OR MODULATE TO MAINTAIN SPACE TEMPERATURE AT SET POINT. IF THE SPACE TEMPERATURE SENSOR FAILS, THE VAV SHALL OPERATE AT ITS MINIMUM AIRFLOW SETTING, RE-HEAT SHALL BE DISABLED, AND A SPACE TEMPERATURE SENSOR FAILURE ALARM SHALL BE GENERATED.

UNOCCUPIED MODE
DURING UNOCCUPIED PERIODS, THE VAV SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE TO MAINTAIN SPACE TEMPERATURE AT A FIXED UNOCCUPIED SET POINT SET VIA THE BAS. IF THE SPACE TEMPERATURE SENSOR FAILS, THE VAV CONTROL DAMPER SHALL FULLY CLOSE, RE-HEAT SHALL BE DISABLED, AND A SPACE TEMPERATURE SENSOR FAILURE ALARM SHALL BE GENERATED.

UNOCCUPIED OVERRIDE MODE
DURING UNOCCUPIED PERIODS, IF AN OCCUPANCY OVERRIDE IS INITIATED VIA THE ASSOCIATED SPACE TEMPERATURE SENSOR, OR THROUGH THE BAS, THE SYSTEM SHALL TEMPORARILY OPERATE IN THE OCCUPIED MODE UNTIL THE OVERRIDE EXPIRES OR IS CANCELLED. THE STANDARD UNOCCUPIED OVERRIDE TIME LIMIT SHALL BE ADJUSTABLE VIA THE BAS.

OPTIMAL START
WHEN THE ASSOCIATED AIR HANDLING UNIT IS IN PRE-COOL MODE, THE VAV SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE TO MAINTAIN SPACE TEMPERATURE AT THE ACTIVE SET POINT. WHEN THE ASSOCIATED AIR HANDLING UNIT IS IN PRE-HEAT MODE, THE VAV SHALL OPERATE AT ITS HEATING AIRFLOW SETTING AND THE ELECTRIC HEATER SHALL STAGE OR MODULATE TO MAINTAIN SPACE TEMPERATURE AT SET POINT UNTIL PRE-HEAT IS TERMINATED OR THE OCCUPIED PERIOD BEGINS.

MANUAL SHUTDOWN MODE
IF, AT ANY TIME, A MANUAL SHUTDOWN COMMAND IS INITIATED VIA THE BAS, THE VAV CONTROL DAMPER SHALL FULLY CLOSE AND RE-HEAT SHALL BE DISABLED. THE SYSTEM SHALL REMAIN IN THIS MODE OF OPERATION UNTIL THE SHUTDOWN COMMAND IS MANUALLY CLEARED VIA THE BAS.

OPERATIONAL REDUNDANCY ROUTINES

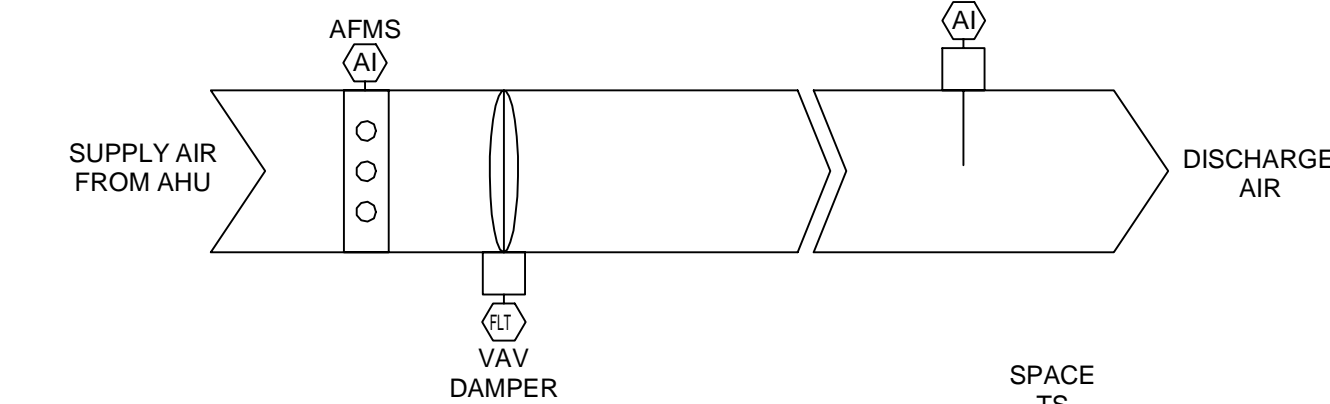
PRESSURE DEPENDENT OPERATION
IF THE AIRFLOW MEASURING STATION FAILS OR THE ACTIVE AIRFLOW READING FALLS TO 10% OF THE NOMINAL AIRFLOW OF THE VAV OR BELOW, THE SYSTEM SHALL TRANSITION TO PRESSURE DEPENDENT OPERATION WHEREBY THE VAV DAMPER POSITION SHALL MODULATE TO MAINTAIN SPACE TEMPERATURE AT SET POINT DIRECTLY IN LIEU OF MAINTAINING AIRFLOW AT SET POINT. WHEN SUCH A CONDITION IS PRESENT, A PRESSURE DEPENDENT MODE NOTIFICATION SHALL BE GENERATED BY THE BAS.

SYSTEM ALARMS & NOTIFICATIONS

- BAS COMMUNICATION FAILURE
- DISCHARGE AIR TEMPERATURE SENSOR FAILURE
- SPACE TEMPERATURE SENSOR FAILURE
- PRESSURE DEPENDENT MODE ENABLED

INSTALLATION & START-UP NOTES

- MINIMUM & MAXIMUM AIRFLOW VALUES AND NECESSARY AIRFLOW MEASUREMENT OFFSETS SHALL BE SET BY TEST & BALANCE CONTRACTOR.
- MINIMUM AIRFLOW SETTINGS OF 0 CFM SHALL NOT BE ACCEPTABLE FOR OCCUPIED SPACES.
- HEATING AIRFLOW VALUE SHALL BE SET BY THE TEST & BALANCE CONTRACTOR BASED ON THE SPECIFICATIONS OF THE INSTALLED ELECTRIC HEATER.



SINGLE DUCT VARIABLE VOLUME COOLING ONLY TERMINAL UNIT (REFER TO SCHEDULES FOR UNIT TAGS)

SYSTEM DESCRIPTION - SINGLE DUCT VARIABLE VOLUME COOLING ONLY TERMINAL UNIT

THE SYSTEM CONSISTS OF A SINGLE DUCT TERMINAL UNIT EQUIPPED WITH AN INTEGRAL CONTROL DAMPER AND AIRFLOW MEASURING STATION. THE TERMINAL UNIT SERVES AIR, CONDITIONED BY THE ASSOCIATED AIR HANDLING UNIT, DIRECTLY TO THE ASSOCIATED SPACE. THE AIRFLOW MEASURING STATION FACILITATES PRESSURE INDEPENDENT OPERATION OF THE TERMINAL UNIT DAMPER IN RESPONSE TO SPACE TEMPERATURE VARIATIONS.

SEQUENCE OF OPERATION

BUILDING AUTOMATION SYSTEM INTERFACE
THE OPERATIONAL MODE OF THE VARIABLE VOLUME TERMINAL UNIT (VAV) SHALL BE GOVERNED BY COMMANDS FROM THE BUILDING AUTOMATION SYSTEM (BAS) IN ACCORDANCE WITH USER DEFINED SCHEDULES. VALID OPERATIONAL MODES SHALL BE AS FOLLOWS.

- OCCUPIED
- UNOCCUPIED
- UNOCCUPIED OVERRIDE
- OPTIMAL START
- MANUAL SHUTDOWN

IN THE EVENT OF A BAS COMMUNICATION FAILURE, THE SYSTEM SHALL DEFAULT TO OCCUPIED MODE. ALL SET POINTS OUTLINED BELOW SHALL BE FULLY ADJUSTABLE VIA THE BAS USER INTERFACE.

OCCUPIED MODE
DURING OCCUPIED PERIODS, THE VAV CONTROL DAMPER POSITION SHALL MODULATE TO MAINTAIN THE ACTIVE AIRFLOW AT SET POINT. AIRFLOW SET POINT SHALL BE CALCULATED AND DYNAMICALLY RESET BY THE BAS BASED ON THE ACTIVE DEVIATION BETWEEN SPACE TEMPERATURE AND SPACE TEMPERATURE SET POINT TO ENSURE THE COOLING CAPACITY OF THE VAV IS SUFFICIENT TO MAINTAIN SPACE TEMPERATURE AT THE ACTIVE SET POINT. DAMPER OPERATION SHALL BE GOVERNED BY MINIMUM AND MAXIMUM AIRFLOW VALUES. IF THE SPACE TEMPERATURE SENSOR FAILS, THE VAV SHALL OPERATE AT ITS MINIMUM AIRFLOW SETTING AND A SPACE TEMPERATURE SENSOR FAILURE ALARM SHALL BE GENERATED.

UNOCCUPIED MODE
DURING UNOCCUPIED PERIODS, THE VAV SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE SEQUENCE ABOVE TO MAINTAIN SPACE TEMPERATURE AT A FIXED UNOCCUPIED SET POINT SET VIA THE BAS. IF THE SPACE TEMPERATURE SENSOR FAILS, THE VAV CONTROL DAMPER SHALL FULLY CLOSE AND A SPACE TEMPERATURE SENSOR FAILURE ALARM SHALL BE GENERATED.

UNOCCUPIED OVERRIDE MODE
DURING UNOCCUPIED PERIODS, IF AN OCCUPANCY OVERRIDE IS INITIATED VIA THE ASSOCIATED SPACE TEMPERATURE SENSOR, OR THROUGH THE BAS, THE SYSTEM SHALL TEMPORARILY OPERATE IN THE OCCUPIED MODE UNTIL THE OVERRIDE EXPIRES OR IS CANCELLED. THE STANDARD UNOCCUPIED OVERRIDE TIME LIMIT SHALL BE ADJUSTABLE VIA THE BAS.

OPTIMAL START
WHEN THE ASSOCIATED AIR HANDLING UNIT IS IN PRE-COOL MODE, THE VAV SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE SEQUENCE ABOVE TO MAINTAIN SPACE TEMPERATURE AT THE ACTIVE SET POINT. WHEN THE ASSOCIATED AIR HANDLING UNIT IS IN PRE-HEAT MODE, THE VAV SHALL OPERATE AT ITS MINIMUM AIRFLOW SETTING UNTIL PRE-HEAT IS TERMINATED OR THE OCCUPIED PERIOD BEGINS.

MANUAL SHUTDOWN MODE
IF, AT ANY TIME, A MANUAL SHUTDOWN COMMAND IS INITIATED VIA THE BAS, THE VAV CONTROL DAMPER SHALL FULLY CLOSE. THE SYSTEM SHALL REMAIN IN THIS MODE OF OPERATION UNTIL THE SHUTDOWN COMMAND IS MANUALLY CLEARED VIA THE BAS.

OPERATIONAL REDUNDANCY ROUTINES

PRESSURE DEPENDENT OPERATION
IF THE AIRFLOW MEASURING STATION FAILS OR THE ACTIVE AIRFLOW READING FALLS TO 10% OF THE NOMINAL AIRFLOW OF THE VAV OR BELOW, THE SYSTEM SHALL TRANSITION TO PRESSURE DEPENDENT OPERATION WHEREBY THE VAV DAMPER POSITION SHALL MODULATE TO MAINTAIN SPACE TEMPERATURE AT SET POINT DIRECTLY IN LIEU OF MAINTAINING AIRFLOW AT SET POINT. WHEN SUCH A CONDITION IS PRESENT, A PRESSURE DEPENDENT MODE NOTIFICATION SHALL BE GENERATED BY THE BAS.

SYSTEM ALARMS & NOTIFICATIONS

- BAS COMMUNICATION FAILURE
- DISCHARGE AIR TEMPERATURE SENSOR FAILURE
- SPACE TEMPERATURE SENSOR FAILURE
- PRESSURE DEPENDENT MODE ENABLED

INSTALLATION & START-UP NOTES

- MINIMUM & MAXIMUM AIRFLOW VALUES AND NECESSARY AIRFLOW MEASUREMENT OFFSETS SHALL BE SET BY TEST & BALANCE CONTRACTOR.
- MINIMUM AIRFLOW SETTINGS OF 0 CFM SHALL NOT BE ACCEPTABLE FOR OCCUPIED SPACES.



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UCP OSCEOLA CAMPUS

PROJECT LOCATION:
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MPE JOB #: 2024-147

| REVISIONS | | |
|-----------|-------------|------|
| MARK | DESCRIPTION | DATE |
| | | |

COMM. NO.: 2024903
ISSUE DATE: 12/06/2024
DRAWN BY: NJ

CONTROLS - MECHANICAL

M503

PACKAGED DX RTU SCHEDULE

| PLAN MARK | SERVING | CONFIGURATION | GENERAL DATA | | SUPPLY FAN DATA | | | | | | | | | | COOLING COIL DATA | | | | | | ELECTRIC HEATER DATA | | | | | COMPRESSOR DATA | | | | | UNIT ELECTRIC DATA | | | | | SELECTION BASED ON | | REMARKS | | |
|-----------|---------------|---------------|-------------------------|------------------------|-----------------|-------|-----|--------|--------------|-----------------------|------------------------|------------------|------------------|---------|-------------------|-----------------|--------------|--------------|----------------------|-------------------------|----------------------|-----------|----|------|-----------|-----------------|-----------|----------|-------------------------|----------|--------------------|-----|-----|------|---------------------------------------------|--------------------|--------------|---------|-----|---------------------------------------------------|
| | | | NOMINAL CAPACITY (TONS) | INSTALLED WEIGHT (LBS) | TOTAL | OA | EA | DCV OA | MIN. AIRFLOW | OPERATION (CV or VAV) | DRIVE (BELT OR DIRECT) | E.S.P. (IN. H2O) | T.S.P. (IN. H2O) | FAN RPM | NO. OF FANS | MOTOR HP (EACH) | E.A.T. °F DB | L.A.T. °F WB | TOTAL CAPACITY (MBH) | SENSIBLE CAPACITY (MBH) | EER | IEER/SEER | KW | MBH | E.A.T. °F | L.A.T. °F | NO. STEPS | QUANTITY | STEPS/RANGE OF CAPACITY | BI-POLAR | VOLT | PH | MCA | MOCP | APPROX. CURB EXTERIOR DIMENSIONS (L"xW"xH") | MANUF. | MODEL | | | |
| RTU-1 | AREA A (WEST) | DRAW THROUGH | 50 | 5,110 | 11,635 | 2,005 | N/A | N/A | 4,300 | VAV | DIRECT | 2.5 | 3.5 | 1,008 | 1 | 15 | 80.9 | 68.9 | 54.1 | 53.9 | 550.0 | 336.0 | 10 | 14.6 | N/A | N/A | N/A | N/A | N/A | 4 | 6/10-100% | YES | 208 | 3 | 230 | 250 | 216"x94"x79" | CARRIER | 50K | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 |
| RTU-2 | AREA A (EAST) | DRAW THROUGH | 60 | 6,911 | 12,020 | 1,975 | N/A | N/A | 5,100 | VAV | DIRECT | 2.5 | 3.3 | 898 | 1 | 20 | 80.8 | 68.8 | 52.6 | 51.7 | 632.0 | 369.5 | 10 | 15 | N/A | N/A | N/A | N/A | N/A | 4 | 6/10-100% | YES | 208 | 3 | 282 | 300 | 312"x94"x79" | CARRIER | 50K | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 |
| RTU-3 | AREA B | DRAW THROUGH | 35 | 3,895 | 7,765 | 1,055 | N/A | N/A | 3,400 | VAV | DIRECT | 2.5 | 3.5 | 963 | 1 | 10 | 80.3 | 68.5 | 54.4 | 54.0 | 353.0 | 216.0 | 10 | 14.6 | N/A | N/A | N/A | N/A | N/A | 2 | 3/20-100% | YES | 208 | 3 | 159 | 200 | 166"x94"x79" | CARRIER | 50K | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 |

- REMARKS:
- PROVIDE SINGLE POINT POWER CONNECTION WITH FACTORY DISCONNECT.
 - PROVIDE FACTORY-MOUNTED UNIT CONTROLLER INTEGRAL TO UNIT.
 - PROVIDE WITH FACTORY MOUNTED BACNET INTERFACE AND ON BOARD CONTROLS FOR MULT-ZONE VAV OPERATION.
 - PROVIDE WITH 2" MERV 8 FILTERS, INCLUDE THREE (3) SETS - ONE FOR START-UP, ONE FOR T&B, AND ONE FOR TURNOVER.
 - ALL FAN MOTORS SHALL BE PREMIUM EFFICIENCY.
 - COMPRESSOR/CONDENSER PERFORMANCE BASED ON 98°F CONDENSER ENTERING AIR TEMPERATURE.
 - DOUBLE WALL CONSTRUCTION MINIMUM R-6 DOWNSTREAM OF COOLING COIL, R-4.2 UPSTREAM OF COOLING COIL.
 - PROVIDE FACTORY MOUNTED OUTSIDE AIRFLOW MEASURING STATION.
 - PROVIDE VARIABLE SPEED COMPRESSOR FOR FIRST STAGE OF DX COOLING FOR UNIT TURNDOWN.
 - PROVIDE FACTORY ECONOMIZER WITH MOTORIZED OUTSIDE AIR AND RETURN AIR DAMPER.
 - PROVIDE FACTORY MOUNTED AFD FOR VAV OPERATION.
 - PROVIDE WITH ECM CONDENSER FANS.
 - PROVIDE HURRICANE RATED MINIMUM 24" TALL FULL PERIMETER EQUIPMENT ROOF CURB.
 - PROVIDE BIPOLAR IONIZATION IN THE RTU, WITH ION DETECTOR, BY CONTRACTOR NOT RTU MANUFACTURER.
 - PROVIDE FACTORY REFRIGERANT LEAK DETECTION SYSTEM WITH PRE-PROGRAMMED MITIGATION FUNCTIONS.

GRAVITY VENTILATOR SCHEDULE

| PLAN MARK | SERVING | DESIGN CFM | ASSEMBLY S.P. (IN. H2O) | THROAT VELOCITY (FT/MIN) | TYPE | | UNIT LENGTH (IN) | UNIT WIDTH (IN) | THROAT OPENING DIM. (IN.) | THROAT AREA (SQ.FT.) | APPROX. CURB DIM. (IN.) | APPROX. BLDG. OPENING DIM. (IN.) | APPROX. WEIGHT (LBS) | SELECTION BASED ON | | REMARKS |
|-----------|------------|------------|-------------------------|--------------------------|--------|--------|------------------|-----------------|---------------------------|----------------------|-------------------------|----------------------------------|----------------------|--------------------|-------|------------|
| | | | | | INTAKE | RELIEF | | | | | | | | MANUFACTURER | MODEL | |
| GRV-1 | 148 TOILET | 100 | 0.012 | 225 | X | | 27 | 22 | 8" x 8" | 0.44 | 14" x 14" | 10.5" x 10.5" | 37 | GREENHECK | FGR | 1, 2, 3, 4 |

REMARKS:

- PROVIDE WITH FACTORY 1/2" ALUMINUM MESH BIRD SCREEN
- PROVIDE WITH COUNTER-BALANCED GRAVITY BACKDRAFT DAMPER
- PROVIDE ROOF CURB
- CERTIFIED HIGH WIND RESISTANT FAN AND CURB ASSEMBLY. PROVIDE FLORIDA PRODUCT APPROVAL. CURB AND FAN ASSEMBLY SHALL BE CERTIFIED FOR USE WITHOUT THE USE OF ADDITIONAL CABLE OR GUY-WIRE RESTRAINTS, WHEN CURB IS ANCHORED TO ROOF AND FAN ANCHORED TO CURB IN ACCORDANCE WITH MANUFACTURER'S CERTIFIED INSTALLATION INSTRUCTIONS.

IAQ Calculations - Bi-Polar Ionization

| AHU # | UNIT SUPPLY AIR (CFM) | VRP METHOD OA (CFM) | VRP METHOD CO2 (PPM) | IAQ METHOD OA (CFM) | IAQ METHOD CO2 (PPM) | APPROX. TONS REDUCED |
|--------|-----------------------|---------------------|----------------------|---------------------|----------------------|----------------------|
| RTU-1 | 11,635 | 2,993 | 737 | 2,005 | 905 | 6.9 |
| RTU-2 | 12,020 | 2,655 | 2,655 | 1,975 | 671 | 4.7 |
| RTU-3 | 7,765 | 1,688 | 763 | 1,055 | 982 | 4.4 |
| TOTAL: | | | | | | 16 |

NOTES:

- CO2 CALCULATIONS BASED ON GPS (GLOBAL PLASMA SOLUTIONS) PRODUCTS SOFTWARE USING ASHRAE 62.1-2019 IAQ METHOD.
- ASHRAE 62.1-2019 MAXIMUM SPACE CO2 LEVEL IS 5000 PPM
- VRP - VENTILATION RATE PROCEDURE
- IAQ - INDOOR AIR QUALITY
- DCV - DEMAND CONTROL VENTILATION

VAV TERMINAL BOX WITH AND WITHOUT ELECTRIC HEATING COIL SCHEDULE FOR:

| UNIT DESIGNATION | SERVING | AIR DATA | | | | | | | | | | ELECTRIC HEATING COIL | | | | | | | | | | SELECTION BASED ON | | REMARKS |
|------------------|---------------------|-----------|-------------|------------|------------------|------|----------------|-------------|--------|--------|---------|-----------------------|---------------|-------|-------|---------|------------|--------------|-------|-----------------|-----|--------------------|--|---------|
| | | TOTAL CFM | PRIMARY AIR | | | | | AIRSIDE | | | | | CAPACITY BTUH | KW | VOLTS | PHASE | STEPS/CTRL | MANUFACTURER | MODEL | INLET SIZE (IN) | | | | |
| | | | MAX CFM | OA MIN CFM | MIN BOX FLOW CFM | °F | DELTA P IN H2O | HEATING CFM | EAT °F | LAT °F | | | | | | | | | | | | | | |
| VAV-1-1 | EV ROOMS (A,B,C) | 365 | 365 | 60 | 125 | 54.0 | 0.1 | 182.5 | 54.0 | 88.5 | 6826 | 2 | 208 | 1 | 2 | CARRIER | 35E | 6 | 1 | 2 | --- | | | |
| VAV-1-2 | THERAPY GYM | 1460 | 1460 | 250 | 490 | 54.0 | 0.1 | 730 | 54.0 | 84.2 | 23891 | 7 | 208 | 1 | 2 | CARRIER | 35E | 12 | 1 | 2 | --- | | | |
| VAV-1-3 | EV ROOMS (D,E,F) | 260 | 260 | 45 | 90 | 54.0 | 0.21 | 130 | 54.0 | 90.3 | 5119.5 | 1.5 | 208 | 1 | 2 | CARRIER | 35E | 5 | 1 | 2 | --- | | | |
| VAV-1-4 | PRE-SCH | 655 | 655 | 120 | 220 | 54.0 | 0.1 | 327.5 | 54.0 | 82.8 | 10239 | 3 | 208 | 1 | 2 | CARRIER | 35E | 8 | 1 | 2 | --- | | | |
| VAV-1-5 | PRE-SCH | 720 | 720 | 125 | 240 | 54.0 | 0.17 | 360 | 54.0 | 84.6 | 11945.5 | 3.5 | 208 | 1 | 2 | CARRIER | 35E | 8 | 1 | 2 | --- | | | |
| VAV-1-6 | PRE-K | 730 | 730 | 125 | 245 | 54.0 | 0.17 | 365 | 54.0 | 84.2 | 11945.5 | 3.5 | 208 | 1 | 2 | CARRIER | 35E | 8 | 1 | 2 | --- | | | |
| VAV-1-7 | PRE-K | 795 | 795 | 135 | 265 | 54.0 | 0.17 | 397.5 | 54.0 | 85.7 | 13652 | 4 | 208 | 1 | 2 | CARRIER | 35E | 8 | 1 | 2 | --- | | | |
| VAV-1-8 | LOBBY | 990 | 990 | 165 | 330 | 54.0 | 0.1 | 495 | 54.0 | 85.8 | 17065 | 5 | 208 | 1 | 2 | CARRIER | 35E | 10 | 1 | 2 | --- | | | |
| VAV-1-9 | CONFERENCE | 400 | 400 | 65 | 135 | 54.0 | 0.1 | 200 | 54.0 | 85.5 | 6826 | 2 | 208 | 1 | 2 | CARRIER | 35E | 6 | 1 | 2 | --- | | | |
| VAV-1-10 | RECEPTION WORKROOMS | 125 | 125 | 25 | 75 | 54.0 | 0.1 | 90 | 54.0 | 89.0 | 3413 | 1 | 120 | 1 | 2 | CARRIER | 35E | 4 | 1 | 2 | --- | | | |
| VAV-1-11 | CLINIC | 140 | 140 | 25 | 75 | 54.0 | 0.1 | 90 | 54.0 | 89.0 | 3413 | 1 | 120 | 1 | 2 | CARRIER | 35E | 4 | 1 | 2 | --- | | | |
| VAV-1-12 | OFFICES | 130 | 130 | 25 | 75 | 54.0 | 0.1 | 90 | 54.0 | 89.0 | 3413 | 1 | 120 | 1 | 2 | CARRIER | 35E | 4 | 1 | 2 | --- | | | |
| VAV-1-13 | OFFICES | 150 | 150 | 25 | 75 | 54.0 | 0.1 | 90 | 54.0 | 89.0 | 3413 | 1 | 120 | 1 | 2 | CARRIER | 35E | 4 | 1 | 2 | --- | | | |
| VAV-1-14 | OFFICES | 130 | 130 | 25 | 75 | 54.0 | 0.1 | 90 | 54.0 | 89.0 | 3413 | 1 | 120 | 1 | 2 | CARRIER | 35E | 4 | 1 | 2 | --- | | | |
| VAV-1-15 | BREAKROOM | 95 | 95 | 25 | 75 | 54.0 | 0.05 | 90 | 54.0 | 89.0 | 3413 | 1 | 120 | 1 | 2 | CARRIER | 35E | 4 | 1 | 2 | --- | | | |
| VAV-1-16 | CORRIDOR | 375 | 375 | 65 | 125 | 54.0 | 0.1 | 187.5 | 54.0 | 87.6 | 6826 | 2 | 208 | 1 | 2 | CARRIER | 35E | 6 | 1 | 2 | --- | | | |
| VAV-1-17 | CORRIDOR | 400 | 400 | 65 | 135 | 54.0 | 0.1 | 200 | 54.0 | 85.5 | 6826 | 2 | 208 | 1 | 2 | CARRIER | 35E | 6 | 1 | 2 | --- | | | |
| VAV-1-18 | LR PRE-K | 610 | 610 | 100 | 205 | 54.0 | 0.1 | 305 | 54.0 | 84.9 | 10239 | 3 | 208 | 1 | 2 | CARRIER | 35E | 8 | 1 | 2 | --- | | | |
| VAV-1-19 | LR K-2 | 540 | 540 | 100 | 180 | 54.0 | 0.1 | 270 | 54.0 | 83.1 | 8532.5 | 2.5 | 208 | 1 | 2 | CARRIER | 35E | 8 | 1 | 2 | --- | | | |
| VAV-1-20 | LR 3-5 | 465 | 465 | 80 | 155 | 54.0 | 0.1 | 232.5 | 54.0 | 87.8 | 8532.5 | 2.5 | 208 | 1 | 2 | CARRIER | 35E | 8 | 1 | 2 | --- | | | |
| VAV-1-21 | TODD 1 | 620 | 620 | 105 | 210 | 54.0 | 0.1 | 310 | 54.0 | 84.4 | 10239 | 3 | 208 | 1 | 2 | CARRIER | 35E | 8 | 1 | 2 | --- | | | |
| VAV-1-22 | TODD 2 | 550 | 550 | 100 | 185 | 54.0 | 0.1 | 275 | 54.0 | 88.3 | 10239 | 3 | 208 | 1 | 2 | CARRIER | 35E | 8 | 1 | 2 | --- | | | |
| VAV-1-23 | KINDER | 830 | 830 | 150 | 280 | 54.0 | 0.1 | 415 | 54.0 | 84.3 | 13652 | 4 | 208 | 1 | 2 | CARRIER | 35E | 10 | 1 | 2 | --- | | | |
| VAV-1-24 | ELECTRICAL | 100 | 100 | 50 | 75 | 54.0 | 0.05 | ----- | ----- | ----- | ----- | ----- | 120 | ----- | ----- | CARRIER | 35E | 4 | 1 | --- | 3 | | | |
| VAV-2-1 | KITCHEN | 530 | 530 | 85 | 180 | 54.0 | 0.1 | 265 | 54.0 | 83.7 | 8532.5 | 2.5 | 208 | 1 | 2 | CARRIER | 35E | 8 | 1 | 2 | --- | | | |
| VAV-2-2 | RESTROOMS | 170 | 170 | 25 | 75 | 54.0 | 0.01 | 90 | 54.0 | 89.0 | 3413 | 1 | 120 | 1 | 2 | CARRIER | 35E | 4 | 1 | 2 | --- | | | |
| VAV-2-3 | 3RD GRADE | 855 | 855 | 140 | 285 | 54.0 | 0.1 | 427.5 | 54.0 | 83.4 | 13652 | 4 | 208 | 1 | 2 | CARRIER | 35E | 10 | 1 | 2 | --- | | | |
| VAV-2-4 | 3RD/4TH GRADE | 855 | 855 | 140 | 285 | 54.0 | 0.1 | 427.5 | 54.0 | 83.4 | 13652 | 4 | 208 | 1 | 2 | CARRIER | 35E | 10 | 1 | 2 | --- | | | |
| VAV-2-5 | 5TH/6TH GRADE | 815 | 815 | 135 | 275 | 54.0 | 0.1 | 407.5 | 54.0 | 84.9 | 13652 | 4 | 208 | 1 | 2 | CARRIER | 35E | 10 | 1 | 2 | --- | | | |
| VAV-2-6 | 6TH GRADE | 990 | 990 | 165 | 330 | 54.0 | 0.1 | 495 | 54.0 | 85.8 | 17065 | 5 | 208 | 1 | 2 | CARRIER | 35E | 10 | 1 | 2 | --- | | | |
| VAV-2-7 | CORRIDOR | 540 | 540 | 85 | 180 | 54.0 | 0.1 | 270 | 54.0 | 83.1 | 8532.5 | 2.5 | 208 | 1 | 2 | CARRIER | 35E | 8 | 1 | 2 | --- | | | |
| VAV-2-8 | KINDER | 835 | 835 | 135 | 280 | 54.0 | 0.1 | 417.5 | 54.0 | 84.1 | 13652 | 4 | 208 | 1 | 2 | CARRIER | 35E | 10 | 1 | 2 | --- | | | |
| VAV-2-9 | 1ST GRADE | 735 | 735 | 125 | 245 | 54.0 | 0.17 | 367.5 | 54.0 | 84.0 | 11945.5 | 3.5 | 208 | 1 | 2 | CARRIER | 35E | 8 | 1 | 2 | --- | | | |
| VAV-2-10 | 1ST GRADE | 800 | 800 | 130 | 270 | 54.0 | 0.17 | 400 | 54.0 | 85.5 | 13652 | 4 | 208 | 1 | 2 | CARRIER | 35E | 8 | 1 | 2 | --- | | | |
| VAV-2-11 | 2ND GRADE | 760 | 760 | 125 | 255 | 54.0 | 0.17 | 380 | 54.0 | 83.0 | 11945.5 | 3.5 | 208 | 1 | 2 | CARRIER | 35E | 8 | 1 | 2 | --- | | | |
| VAV-2-12 | 2ND GRADE | 940 | 940 | 155 | 315 | 54.0 | 0.1 | 470 | 54.0 | 84.1 | 15358.5 | 4.5 | 208 | 1 | 2 | CARRIER | 35E | 10 | 1 | 2 | --- | | | |
| VAV-2-13 | MULTIPURPOSE (N) | 1185 | 1185 | 195 | 395 | 54.0 | 0.17 | 592.5 | 54.0 | 85.9 | 20476 | 6 | 208 | 1 | 2 | CARRIER | 35E | 10 | 1 | 2 | --- | | | |
| VAV-2-14 | MULTIPURPOSE (S) | 790 | 790 | 135 | 265 | 54.0 | 0.17 | 395 | 54.0 | 85.9 | 13652 | 4 | 208 | 1 | 2 | CARRIER | 35E | 8 | 1 | 2 | --- | | | |
| VAV-2-15 | OFFICES | 300 | 300 | 50 | 100 | 54.0 | 0.21 | 150 | 54.0 | 85.5 | 5119.5 | 1.5 | 208 | 1 | 2 | CARRIER | 35E | 5 | 1 | 2 | --- | | | |
| VAV-2-16 | CORRIDOR | 240 | 240 | 50 | 80 | 54.0 | 0.1 | 120 | 54.0 | 93.3 | 5119.5 | 1.5 | 208 | 1 | 2 | CARRIER | 35E | 5 | 1 | 2 | --- | | | |
| VAV-2-17 | CORRIDOR | 585 | 585 | 100 | 195 | 54.0 | 0.1 | 292.5 | 54.0 | 86.3 | 10239 | 3 | 208 | 1 | 2 | CARRIER | 35E | 8 | 1 | 2 | --- | | | |
| VAV-2-18 | ELECTRICAL | 95 | 95 | 50 | 75 | 54.0 | 0.05 | ----- | ----- | ----- | ----- | ----- | 120 | ----- | ----- | CARRIER | 35E | 4 | 1 | --- | 3 | | | |
| VAV-3-1 | THERAPY GYM | | | | | | | | | | | | | | | | | | | | | | | |

GRILLE, REGISTER AND DIFFUSER SCHEDULE:

| UNIT NO. | TYPE | | | SERVICE | | | MOUNTING DATA | | | CONSTRUCTION DATA | | | | | | | SELECTION BASED ON: | | REMARKS | | | | |
|----------|------|---|---|---------|----|----|---------------|------|------|-------------------|-------|--------------------------|----------|-----------|-----|-----|---------------------|--------------|---------|-------|-------|--------|---------|
| | G | R | D | SA | RA | EA | CEILING | DUCT | WALL | | SHAPE | MATERIAL | COLOR | PATTERN | | | | MANUFACTURER | | MODEL | | | |
| | | | | | | | | | HIGH | LOW | | | | 1-W | 2-W | 3-W | 4-W | | | | E/R | | |
| G-1 | | | X | X | | | | | | X | | SQUARE - 24x24 | ALUMINUM | OFF-WHITE | | | X | | | | TITUS | TMS-AA | 1,2,3,4 |
| G-2 | | | X | X | | | | | | X | | SQUARE - 12x12 | ALUMINUM | OFF-WHITE | | | X | X | X | | TITUS | TMS-AA | 1,2,3,4 |
| G-3 | X | | | | | X | X | X | | X | | SQUARE - 24x24 | ALUMINUM | OFF-WHITE | | | | | X | | TITUS | 50F | 1,2,3,4 |
| G-4 | X | | | | | X | X | X | | X | | SQUARE - 12x12 | ALUMINUM | OFF-WHITE | | | | | X | | TITUS | 50F | 1,2,3,4 |
| G-5 | | | X | X | | | | | | X | | LINEAR DIFFUSER - 3 SLOT | ALUMINUM | OFF-WHITE | X | X | | | | | TITUS | ML-39 | 1,2,4,5 |
| G-6 | | | X | X | | | | | | X | | LINEAR DIFFUSER - 5 SLOT | ALUMINUM | OFF-WHITE | X | X | | | | | TITUS | ML-39 | 1,2,4,5 |
| G-7 | | | X | X | | | | | | X | | LINEAR DIFFUSER - 7 SLOT | ALUMINUM | OFF-WHITE | X | X | | | | | TITUS | ML-39 | 1,2,4,5 |
| G-8 | X | | | | | X | | | | X | | LINEAR REGISTER - 4 SLOT | ALUMINUM | OFF-WHITE | X | X | | | | | TITUS | MLR-39 | 1,2,4,5 |
| G-9 | X | | | | | X | | | | X | | RECTANGULAR | ALUMINUM | OFF-WHITE | | | | | | X | TITUS | 300FL | 1,2,4 |
| G-10 | X | | | | | X | X | X | | X | | RECTANGULAR | ALUMINUM | OFF-WHITE | | | | | | X | TITUS | 350FL | 1,2,4 |

- NOTES:
- COORDINATE AND CONFIRM FINAL DIFFUSER/GRILLE/REGISTER COLOR WITH ARCHITECTURAL PLANS PRIOR TO PURCHASE.
 - PROVIDE RECT-ROUND, ROUND-ROUND, OR RECT-RECT TRANSITION AS REQUIRED.
 - PROVIDE OPPOSED BLADE DAMPER FOR ALL LOCATIONS ABOVE HARD CEILINGS.
 - IN 24" X 12" LAY-IN APPLICATIONS, PROVIDE EXTRA 24" T-BAR IN CEILING GRID.
 - COORDINATE MOUNTING STYLE WITH ARCHITECTURAL REFLECTED CEILING PLAN. SURFACE MOUNT IN SHEETROCK CEILINGSLAY-IN MOUNT IN LAY-IN CEILINGS.
 - PROVIDE 4" LENGTH LINEAR SLOT DIFFUSER/REGISTER UNLESS OTHERWISE NOTED ON PLANS. ALIGN DIFFUSER/REGISTER WITH 4" LENGTH ACOUSTICAL WALL PANEL.
 - PROVIDE 4" LENGTH DIFFUSER WITH 1/4" THICK BARS, 15" DEFLECTION, AND 12" SPACING WIDTH. ALIGN DIFFUSER WITH 4" LENGTH ACOUSTICAL WALL PANEL.

SPLIT SYSTEM AIR HANDLING UNIT SCHEDULE:

| UNIT NO. | SERVING | FAN DATA | | | | MOTOR DATA | | | | UNIT ELECTRICAL DATA | | | | SELECTION BASED ON | | REMARKS | |
|----------|---------------|-----------|-----------------|-----------------------|-------------|------------|-------|------|------|----------------------|------|------|---------|--------------------|---------|--------------|--------------|
| | | TOTAL CFM | OUTSIDE AIR CFM | EXT. STATIC P. IN H20 | REFRIG TYPE | WATTS | SPEED | VOLT | PH | SEER @ AHRI | VOLT | PH | FAN FLA | MCA | MOCP | | MANUFACTURER |
| DFU-1 | 120 - SYSTEMS | 250 | N/A | N/A | 13 | HIGH | 208 | 1 | 21.7 | 208 | 1 | 0.40 | 0.19 | N/A | CARRIER | 40MHHAQ09XA3 | 1, 2, 4 |

- REMARKS:
- 100' MAX TOTAL LINE LENGTH, 50' MAX LIFT/DROP, INDOOR UNIT POWERED FROM OUTDOOR UNIT.
 - INDOOR UNIT POWERED FROM OUTDOOR UNIT.
 - PROVIDE WIRELESS REMOTE CONTROL.
 - PROVIDE 7-DAY PROGRAMMABLE THERMOSTAT.
 - PROVIDE 7-DAY PROGRAMMABLE THERMOSTAT WITH LOCAL PASSWORD LOCKOUT.
 - PROVIDE PAC-US44CN-1 THERMOSTATIC ADAPTOR BOARD OR EQUIVALENT.

SPLIT SYSTEM AIR COOLED CONDENSING UNIT SCHEDULE:

| UNIT NO. | SERVING | UNIT DATA | | FAN MOTOR | | | | COMPRESSOR DATA | | | | UNIT ELECTRIC DATA | | | | SELECTION BASED ON | | REMARKS | | | | | |
|----------|---------------|-----------|------|-------------|-------------|-----|------|-----------------|----|-----|-------|--------------------|----|-----|-----|--------------------|----|---------|---------|-----|---------|--------------|---------|
| | | NOM CAP | SEER | COND. EAT F | REFRIG TYPE | NO. | HP | VOLT | PH | QTY | STEPS | VOLT | PH | RLA | LRA | VOLT | PH | | FAN FLA | MCA | MOCP | MANUFACTURER | MODEL |
| DCU-1 | 120 - SYSTEMS | 0.75 | 21.7 | 95 | R-454 | 1 | 0.05 | 208 | 1 | 1 | 1 | 208 | 1 | 6 | N/A | 208 | 1 | 0.8 | 12 | 15 | CARRIER | 38MHRG09AA3 | 1, 2, 3 |

- REMARKS:
- LINE LENGTHS TO AHU SHALL NOT EXCEED MANUFACTURER'S MAXIMUM LENGTH.
 - PROVIDE UNIT WITH ALL MANUFACTURER'S RECOMMENDED REFRIGERANT SPECIALTIES.
 - SIZE REFRIGERANT PIPING IN STRICT ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS FOR INSTALL CONDENSING UNIT.

SPLIT SYSTEM AIR HANDLING UNIT SCHEDULE:

| UNIT NO. | SERVING | FAN DATA | | MOTOR DATA | | | | COOLING COIL DATA | | | | UNIT ELECTRICAL DATA | | | | SELECTION BASED ON | | REMARKS | | |
|----------|--------------------------|-----------|-----------------------|------------|------|------|----|-------------------|-------|------------|------|----------------------|-----|-----|------|--------------------|-------|---------|-----------|---------|
| | | TOTAL CFM | EXT. STATIC P. IN H20 | HP | RPM | VOLT | PH | EAT F | LAT F | SEER @ ARI | VOLT | PH | FLA | MCA | MOCP | MANUFACTURER | MODEL | | | |
| DFU-2 | 147/148 - STORAGE TOILET | 400 | 0.2 | 0.18 | 1350 | 208 | 1 | 81.2 | 69.06 | 52 | - | 19.5 | 208 | 1 | 1.11 | 1.11 | - | CARRIER | 40MBQ12-3 | 1, 2, 4 |

- REMARKS:
- PROVIDE SINGLE POINT POWER.
 - PROVIDE 7 DAY PROGRAMMABLE THERMOSTAT.
 - PROVIDE 7 DAY PROGRAMMABLE THERMOSTAT WITH PASSWORD LOCKOUT.
 - LINE LENGTHS TO CU SHALL NOT EXCEED MANUFACTURER'S MAXIMUM LENGTH.

SPLIT SYSTEM CONDENSING UNIT SCHEDULE:

| UNIT NO. | SERVING | UNIT DATA | | | FAN MOTOR | | | | COMPRESSOR DATA | | | | UNIT ELECTRICAL DATA | | | | SELECTION BASED ON | | REMARKS | | |
|----------|--------------------------|--------------|-------------|-----|-----------|------|----|-----|-----------------|-------|------|----|----------------------|----------|------|----|--------------------|------|---------|--------------|-------|
| | | CAPACITY MBH | COND. EAT F | NO. | HP (EACH) | VOLT | PH | FLA | QUANTITY | STEPS | VOLT | PH | RLA (ea) | LRA (ea) | VOLT | PH | MCA | MOCP | | MANUFACTURER | MODEL |
| DCU-2 | 147/148 - STORAGE/TOILET | 12 | 95 | 1 | 0.05 | 208 | 1 | - | 1 | 1 | 208 | 1 | 8.5 | - | 208 | 1 | 15 | 15 | CARRIER | 38MAQ | 1 |

- REMARKS:
- LINE LENGTHS TO AHU SHALL NOT EXCEED MANUFACTURER'S MAXIMUM LENGTH.

Duct & Pipe Construction & Insulation Requirements Schedule

| Service | Thickness | Type | Notes |
|------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Supply Air Ducts | | | |
| From AHU's connection to 50 feet downstream on supply side for all air handling unit systems: | 1" internally lined Installed R-6 | with perforated inner liner and mylar film separating insulation from air stream | Double Wall Duct |
| After 50 feet downstream of AHU on supply side for all air handling units: | Installed R-6 | Concealed - 2" thick external wrap Exposed - 1-1/2" rigid board with corner angles. | |
| Downstream of VAV terminals: | Installed R-6 | Concealed - 2" thick external wrap Exposed - 1-1/2" rigid board with corner angles. | |
| All low pressure exposed ductwork in public areas: | 1" internally lined Installed R-6 | with perforated inner liner and mylar film separating insulation from air stream | Double Wall Duct |
| Ducts located outdoors or in soffit exposed to weather: | Installed R-8 | Exposed: Rigid fiberglass with corner angles with outer weatherproof sheet metal jacket sealed with Flex-Clad 400 as manufactured by MFM Building Products Corp. Concealed: .75# density blanket | |
| AC Unit to Terminal - Balance of ductwork to terminal 50 deg air system: | Installed R-6 | Exposed: 2" rigid fiberglass with corner angles Concealed: 2" with .75# density blanket | |
| AC Unit to Terminal - Balance of ductwork to terminal exposed 50 deg air system: | Installed R-6 | Exposed: 2" rigid fiberglass with corner angles. Concealed: .75# density blanket. | |
| Terminal to Outlet: | Installed R-6 | .75# density blanket. | |
| Fire Dampers and reheat coils in internally insulated duct: | 1" internally lined Installed R-4.2 | Exposed: 1" rigid fiberglass with corner angles. Concealed: Installed R-6 with .75# density blanket. | |
| Return Air Ducts | | | |
| From AHU connection to 50 feet upstream on return side for all air handling unit systems | 1" internally lined Installed R-4.2 | with perforated inner liner and mylar film separating insulation from air stream | Double Wall Duct |
| All other return air ductwork: | Installed R-4.2 | Concealed - 2" thick external wrap - 1-1/2" rigid board with corner angles | Exposed |
| Transfer Air Ducts | | | |
| All transfer ducts: | Installed R-4.2 | 1-1/2" .75# density blanket. Mechanical Space or Exposed: 1" rigid fiberglass with corner angles. | |
| Exhaust Air Ducts | | | |
| All general restroom exhaust ducts: | | Not Required, except for within 10' from discharge opening. Mechanical Space or Exposed: 2" thick external wrap Exposed - 1-1/2" rigid board with corner angles | |
| Refrigerant Piping | | | |
| RS (Suction) (Temp < 40 deg F): | | Up to 3/4": 3/4" Closed Cell Elast. 1" thru 8": 1-1/2" Foamglas | with Aluminum Jacket |
| RL (Temp 90 - 130 deg F): | | Up to 2": Not Required 2-1/2" thru 4": Not Required 5" thru 8": 1-1/2" Foamglas | with Aluminum Jacket |
| RHG (Temp 90 - 150 deg F): | | Up to 2": 3/4" Closed Cell Elast. 2-1/2" thru 4": 1" Closed Cell Elast. 5" thru 8": 1-1/2" Foamglas | with Aluminum Jacket |
| Rupture Disk Piping | | Size per manufacturers & ASHRAE 15 recommendations | Schedule 40 Black Steel - primed and painted black |
| EQUIPMENT & MISCELLANEOUS INSULATION REQUIREMENTS | | | |
| Domestic Water (Outdoor): | 1" | Closed Cell Elastomeric | with Aluminum Jacket |
| REMARKS: | | | |
| Refer to specification section 23-07-00 for more details and information | | | |
| Duct System Construction & Sealing must meet or exceed the 8th Edition of the FBC 2023 - Energy Conservation Code Table C403.2.9.2 | | | |
| Insulation must meet or exceed the 8th Edition of the FBC 2023 - Energy Conservation Code Tables C403.2.9.1 and C403.2.10 | | | |
| Insulation must meet or exceed 8th Edition of the FBC 2023 - Mechanical Code sections 604.1 through 604.13 | | | |
| Insulation must meet or exceed ASHRAE 90.1-2019, Tables 6.8.2, 6.8.3-1, and 6.8.3-2 | | | |



UCP OF CENTRAL FLORIDA
4780 DATA COURT, ORLANDO, FL 32817

UCP OSCEOLA CAMPUS

PROJECT LOCATION:

WEST OAK STREET, KISSIMMEE, FL



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Suite 300
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MPE JOB #: 2024-147

| REVISIONS | | |
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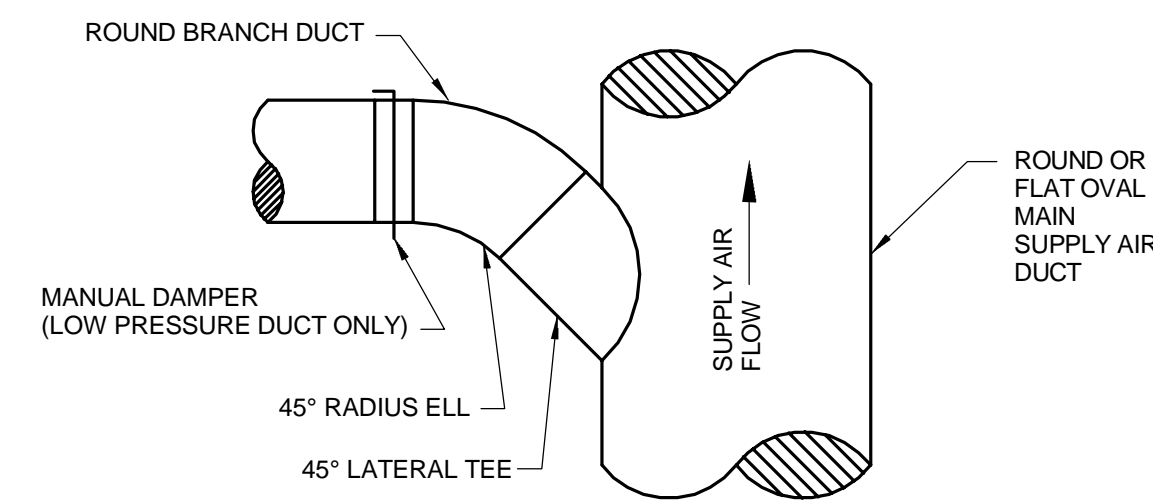
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MECHANICAL SCHEDULES

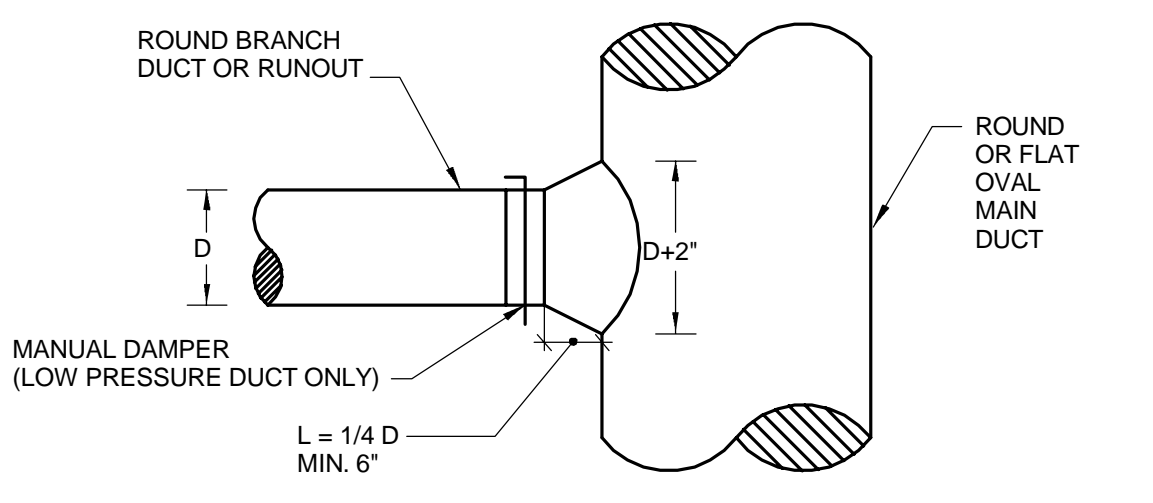
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100% CONSTRUCTION DOCUMENTS

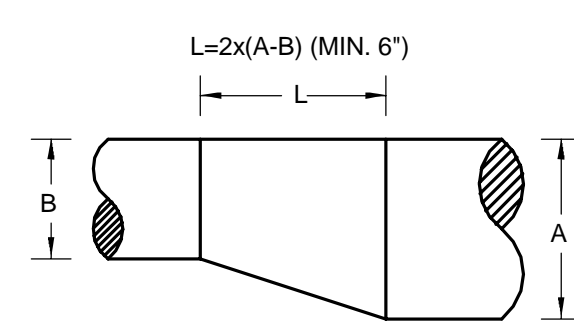
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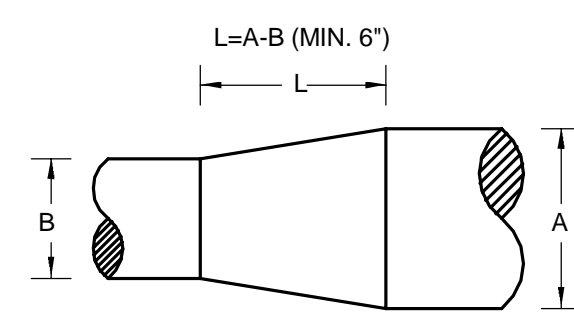
TYPICAL ROUND BRANCH FROM ROUND/FLAT OVAL DUCT - 45° LATERAL



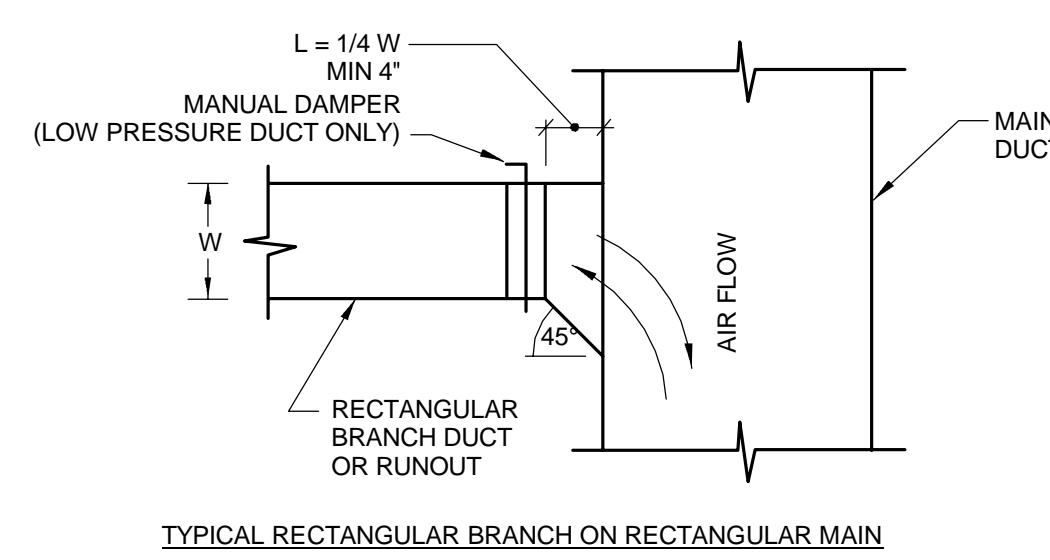
TYPICAL ROUND BRANCH FROM ROUND/FLAT OVAL DUCT - CONICAL



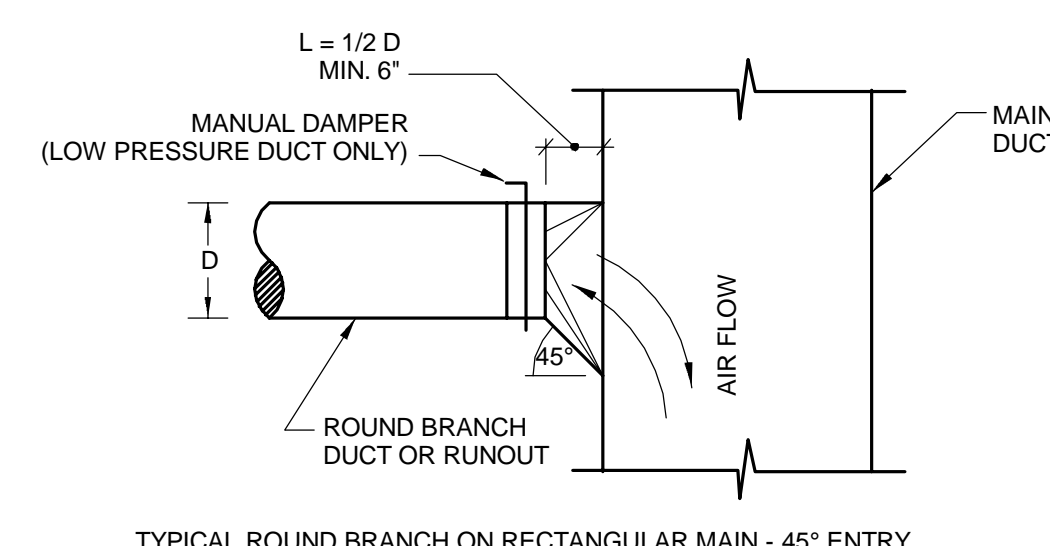
TYPICAL ROUND DUCT ECCENTRIC TRANSITION



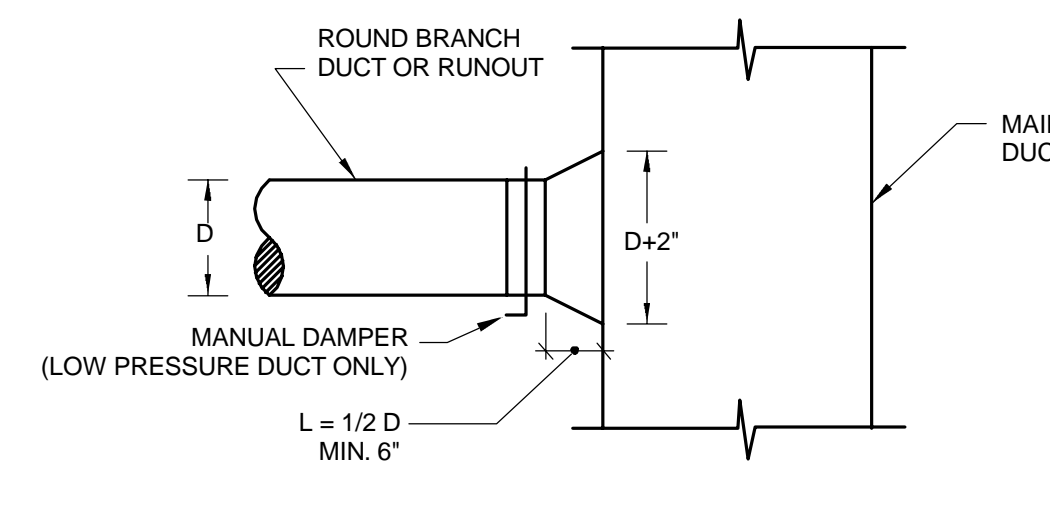
TYPICAL ROUND DUCT CONCENTRIC TRANSITION



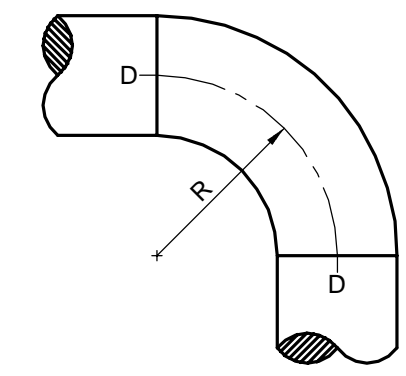
TYPICAL RECTANGULAR BRANCH ON RECTANGULAR MAIN



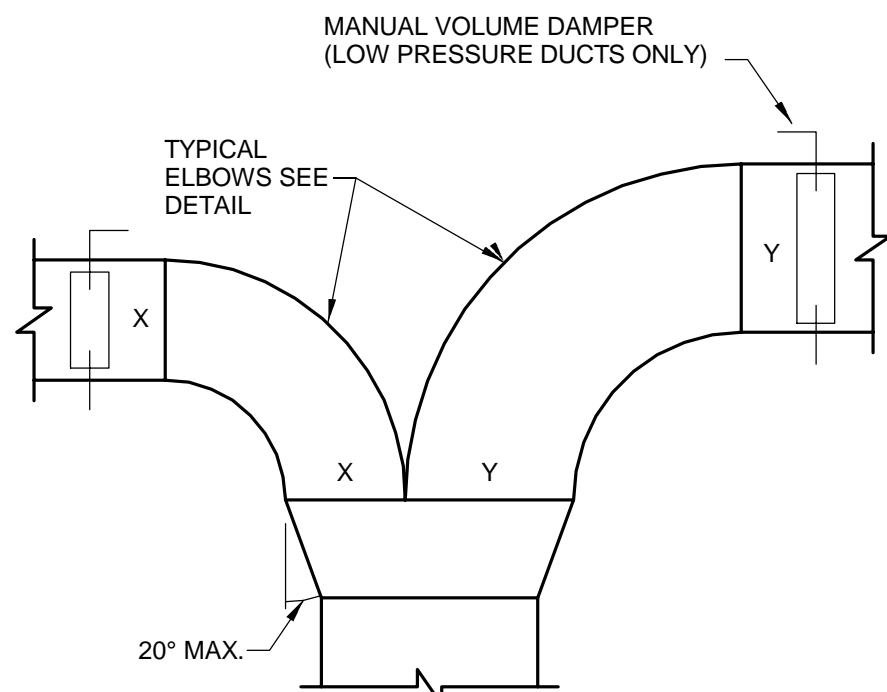
TYPICAL ROUND BRANCH ON RECTANGULAR MAIN - 45° ENTRY



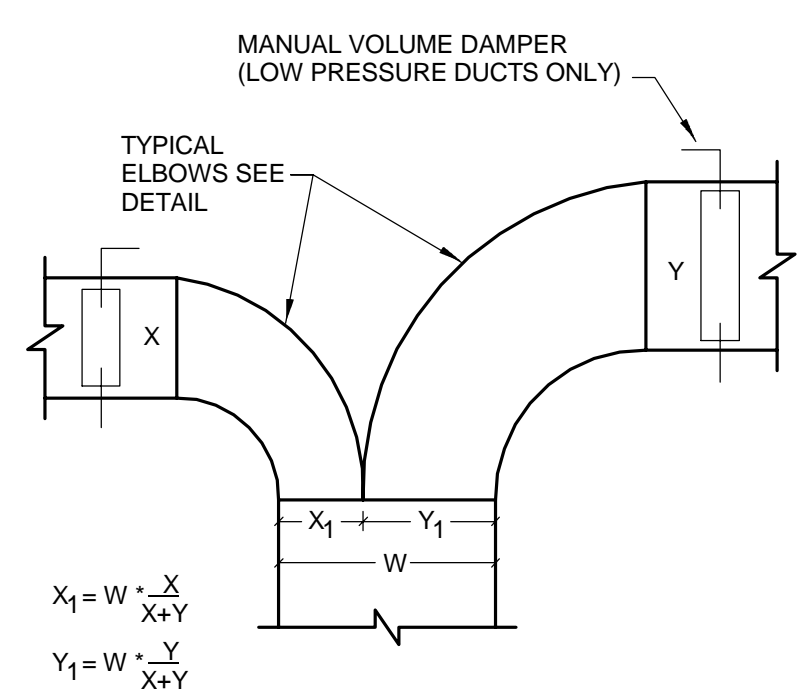
TYPICAL ROUND BRANCH ON RECTANGULAR MAIN - CONICAL



TYPICAL RADIUS ELLS SHALL BE USED IN ALL LOCATIONS WHERE SPACE PERMITS

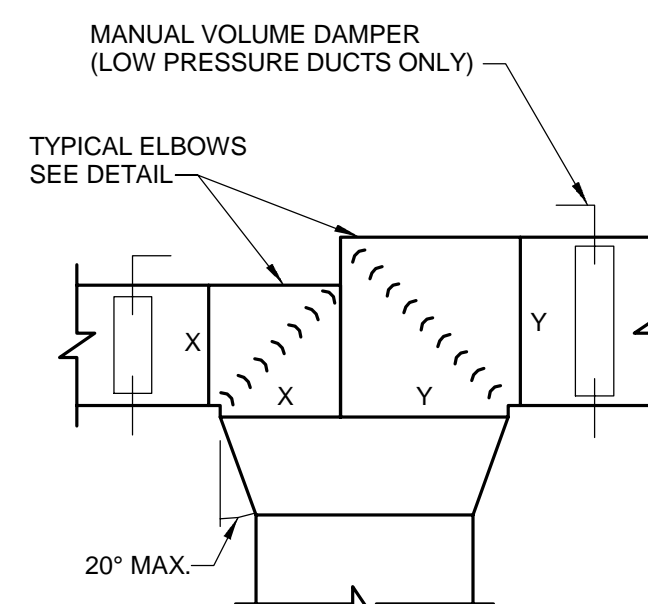


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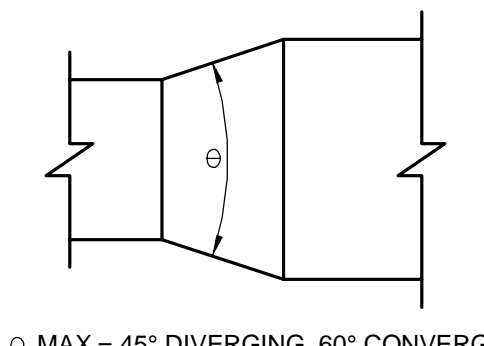


TRANSITION

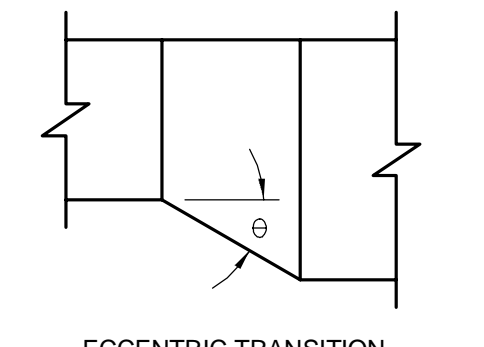
TYPICAL RADIUS ELLS RECTANGULAR DUCT TEES



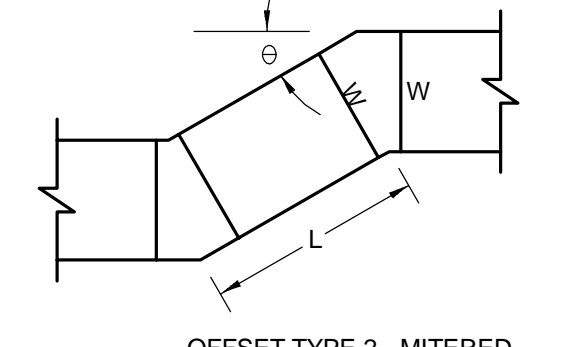
TYPICAL MITERED RECTANGULAR DUCT TEE



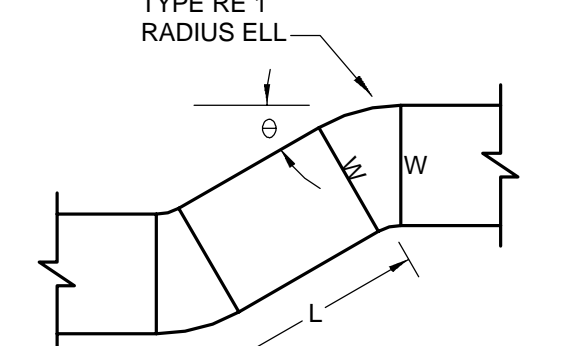
TYPICAL RECTANGULAR DUCT CONCENTRIC TRANSITION



TYPICAL RECTANGULAR DUCT ECCENTRIC TRANSITION

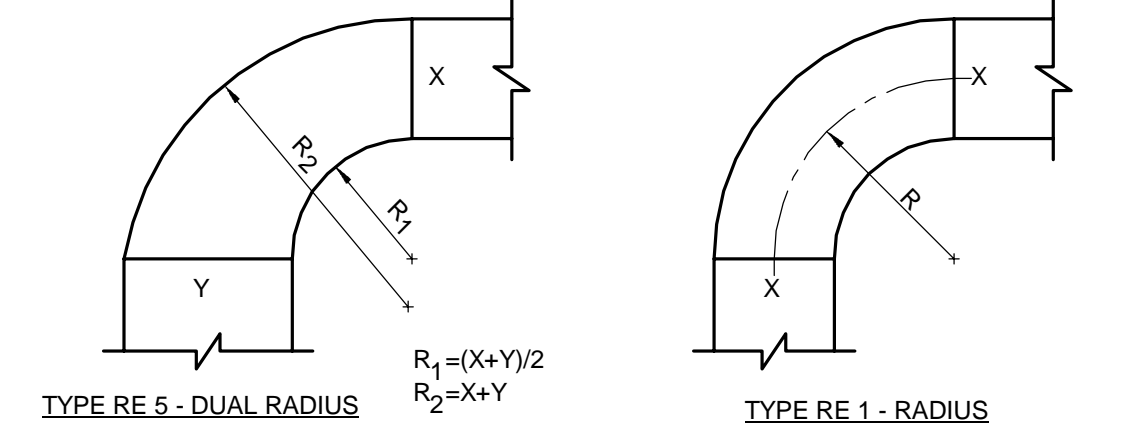


- FOR L<W, MAX ANGLE 15°
- FOR W<L<2W, MAX ANGLE 30°
- FOR 2W<L<3W, MAX ANGLE 45°
- FOR L<3W, NO ANGLE RESTRICTION (STANDARD ELBOWS GOVERN)



TYPE RE 1 RADIUS ELL

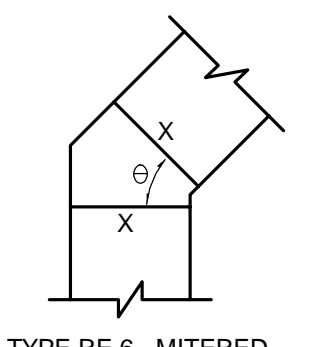
TYPICAL RECTANGULAR DUCT OFFSETS (NOTE: OFFSET TYPE 1 NOT PERMITTED)



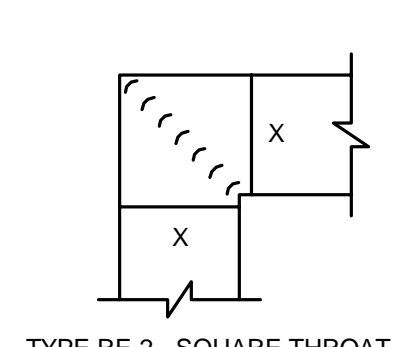
TYPICAL RADIUS ELLS SHALL BE USED IN ALL LOCATIONS WHERE SPACE PERMITS

- NOT RESTRICTED TO 90° - USE FOR ALL ANGLES
- LONG RADIUS (>1500 FPS); CENTERLINE RADIUS (R)=2(X)
- STANDARD (1000-1500 FPS); CENTERLINE RADIUS (R)=1.5(X)
- SHORT RADIUS (<1000 FPS); CENTERLINE RADIUS (R)=X

TYPICAL RADIUS ELLS RECTANGULAR DUCT ELBOWS



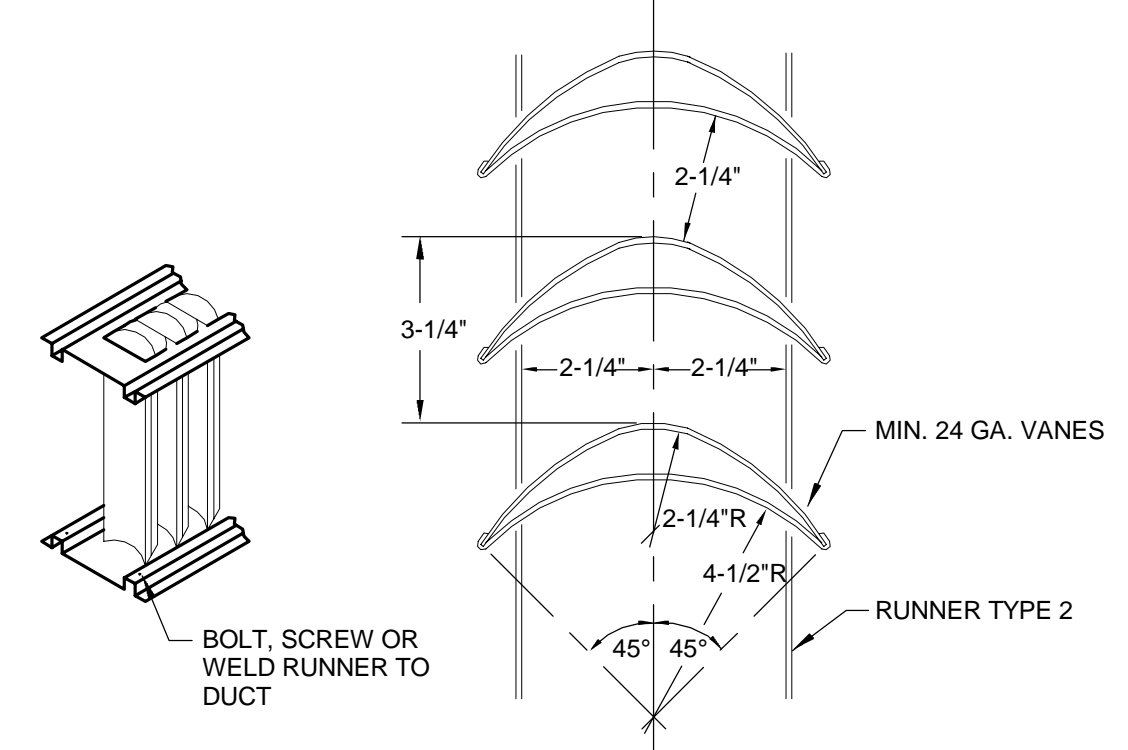
TYPE RE 6 - MITERED



TYPE RE 2 - SQUARE THROAT

- FOR USE ONLY WHERE SPACE DOES NOT PERMIT USE OF A RADIUS ELL.
- PROVIDE "LARGE" DOUBLE THICKNESS VANES PER SMACNA DUCT CONSTRUCTION STANDARD. VANES SHALL BE UTILIZED IN ALL 90° MITERED ELLS WHEN VELOCITY EXCEEDS 50 FPS
- FOR VERY LOW VELOCITY (<750 FPS) VANES MAY BE OMITTED.
- MITERED ELLS GREATER THAN 45° SHALL HAVE EQUAL ENTRY AND EXIT DIMENSIONS.

TYPICAL MITERED RECTANGULAR DUCT ELBOWS

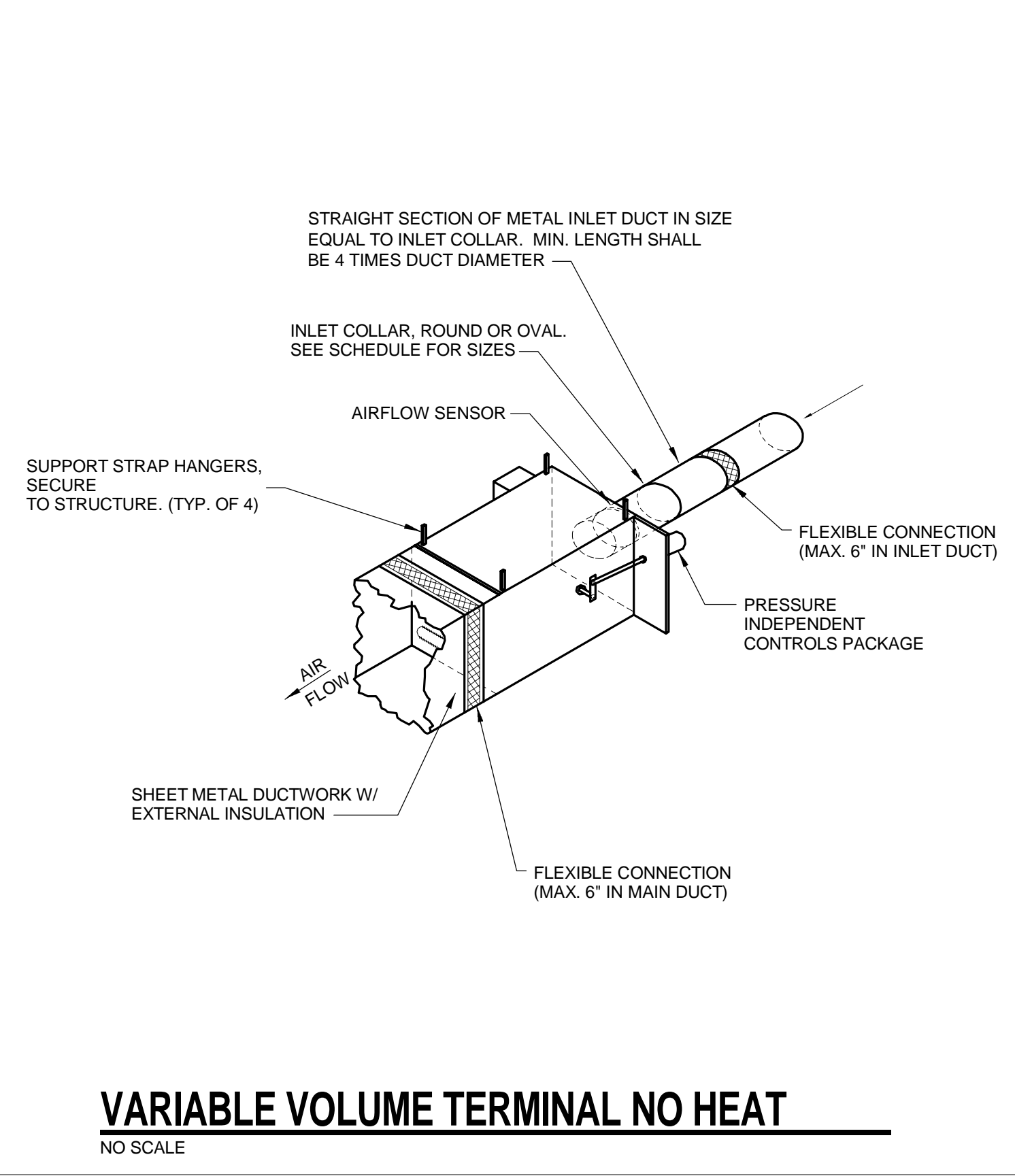


- ALL TURNING VANES SHALL BE "LARGE DOUBLE THICKNESS" TYPE PER SMACNA DUCT CONSTRUCTION STANDARDS. SINGLE THICKNESS AND "SMALL" DOUBLE THICKNESS SHALL NOT BE USED.

TURNING VANES FOR RECTANGULAR DUCT MITERED ELLS

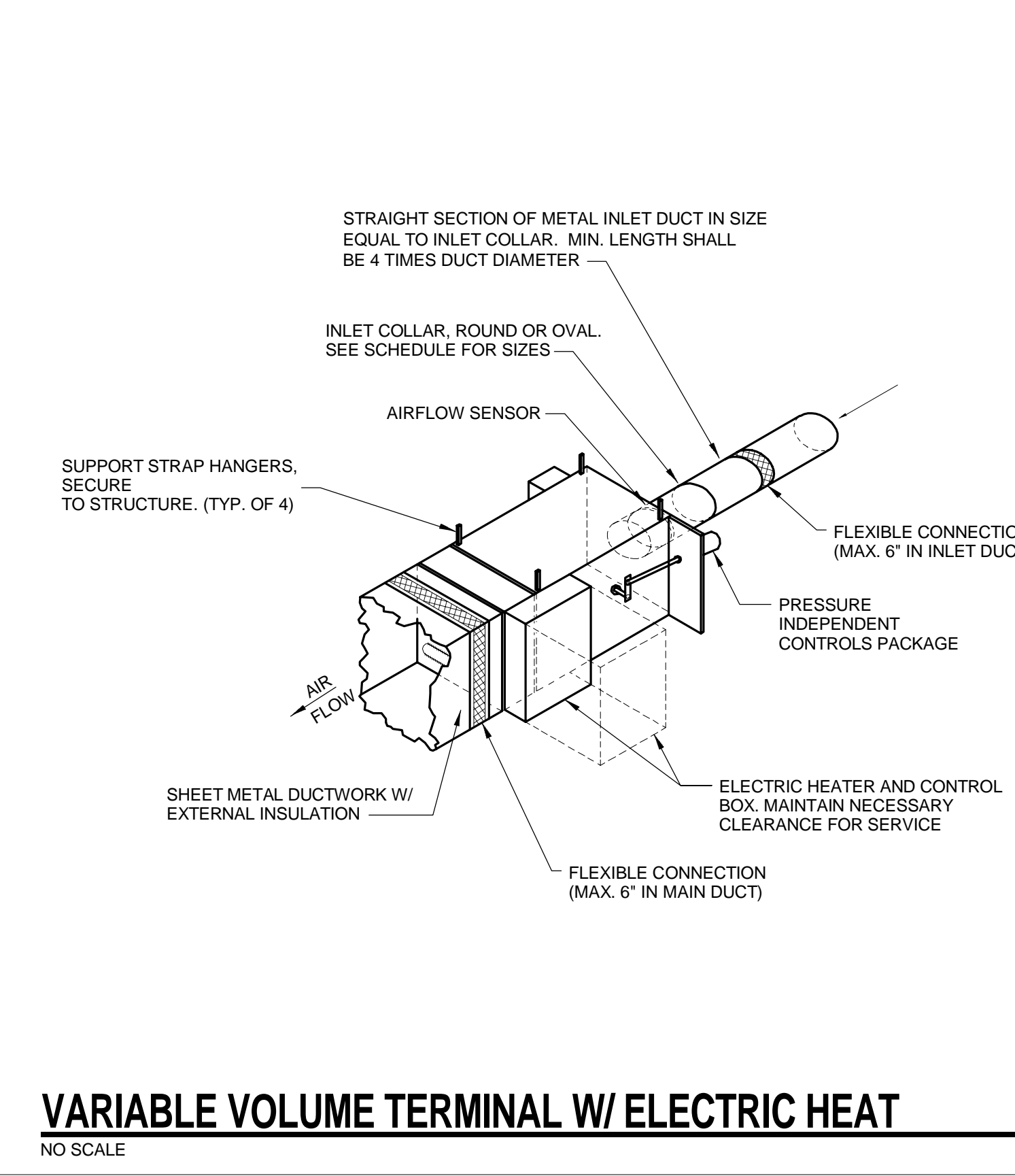
TYPICAL DUCT FITTING CONSTRUCTION

NO SCALE



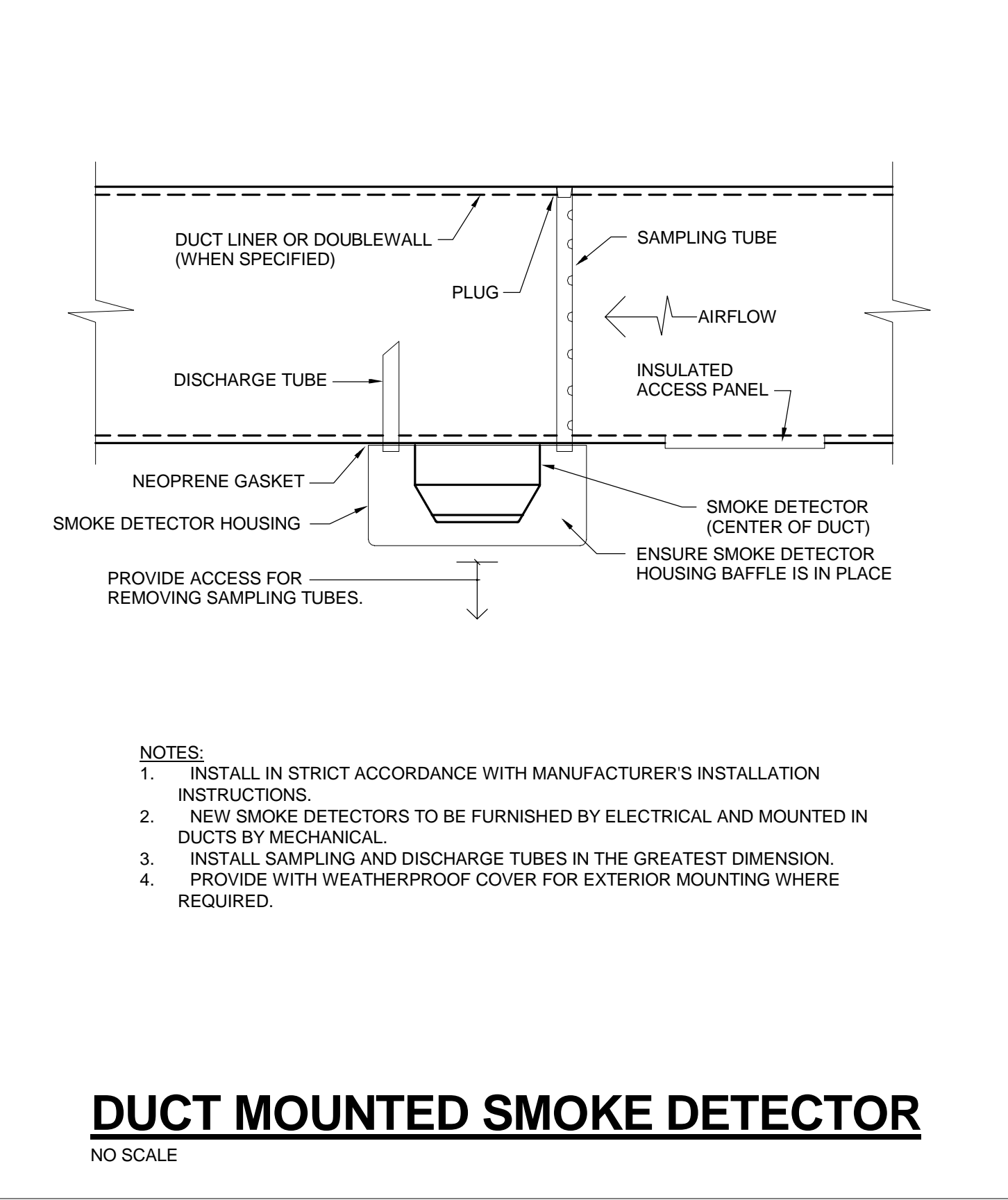
VARIABLE VOLUME TERMINAL NO HEAT

NO SCALE



VARIABLE VOLUME TERMINAL W/ ELECTRIC HEAT

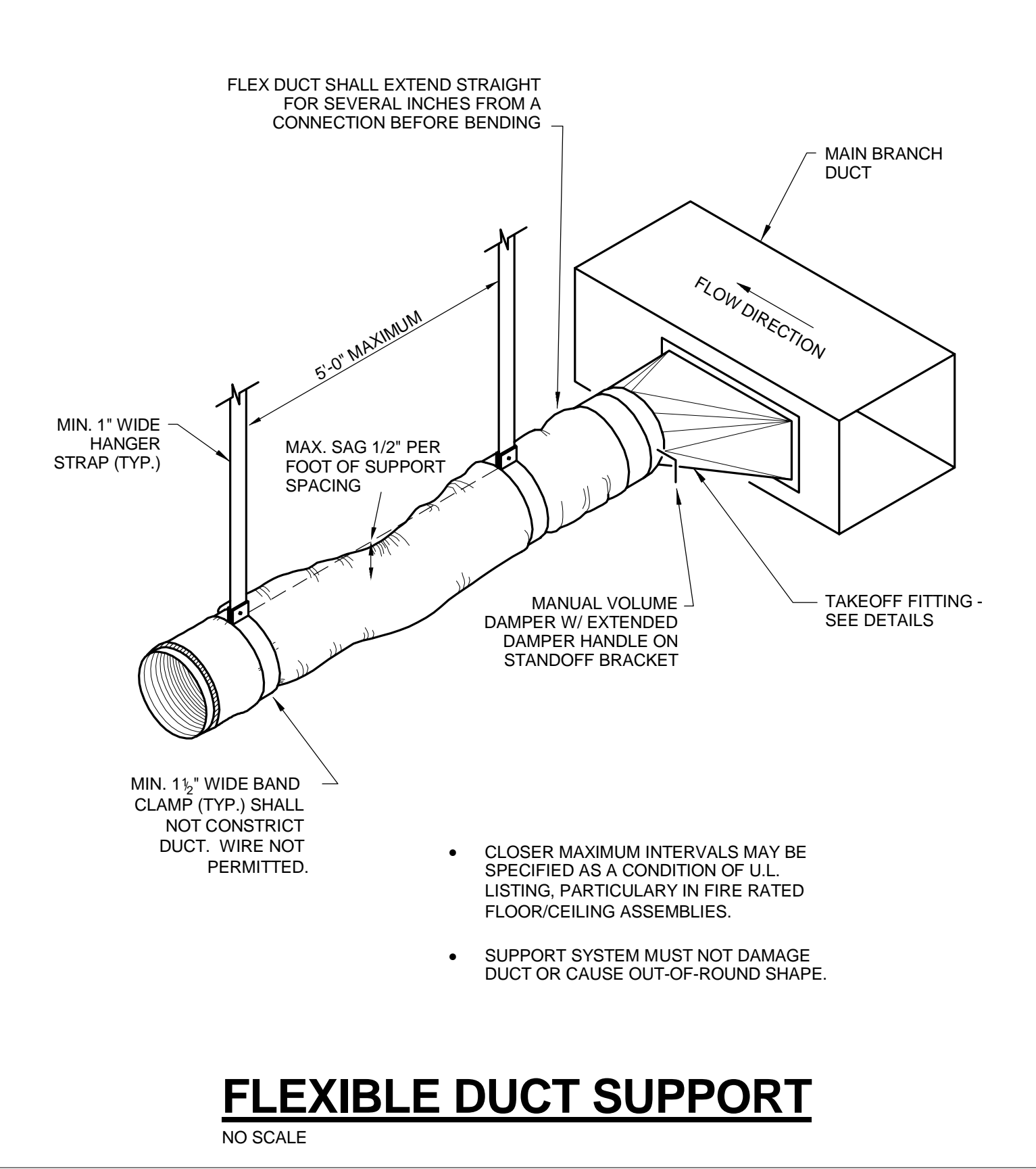
NO SCALE



DUCT MOUNTED SMOKE DETECTOR

NO SCALE

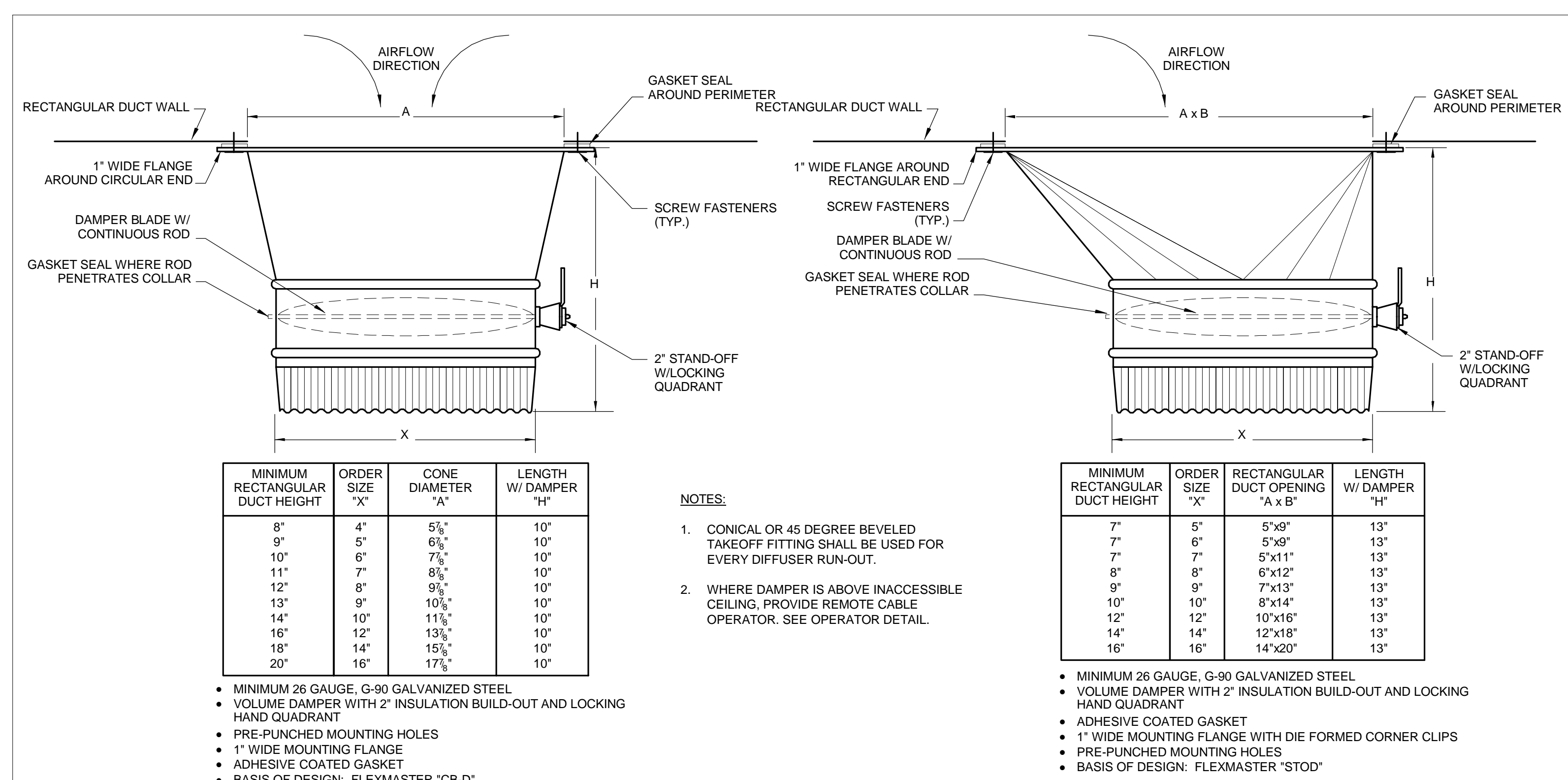
- NOTES:
- INSTALL IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
 - NEW SMOKE DETECTORS TO BE FURNISHED BY ELECTRICAL AND MOUNTED IN DUCTS BY MECHANICAL.
 - INSTALL SAMPLING AND DISCHARGE TUBES IN THE GREATEST DIMENSION.
 - PROVIDE WITH WEATHERPROOF COVER FOR EXTERIOR MOUNTING WHERE REQUIRED.



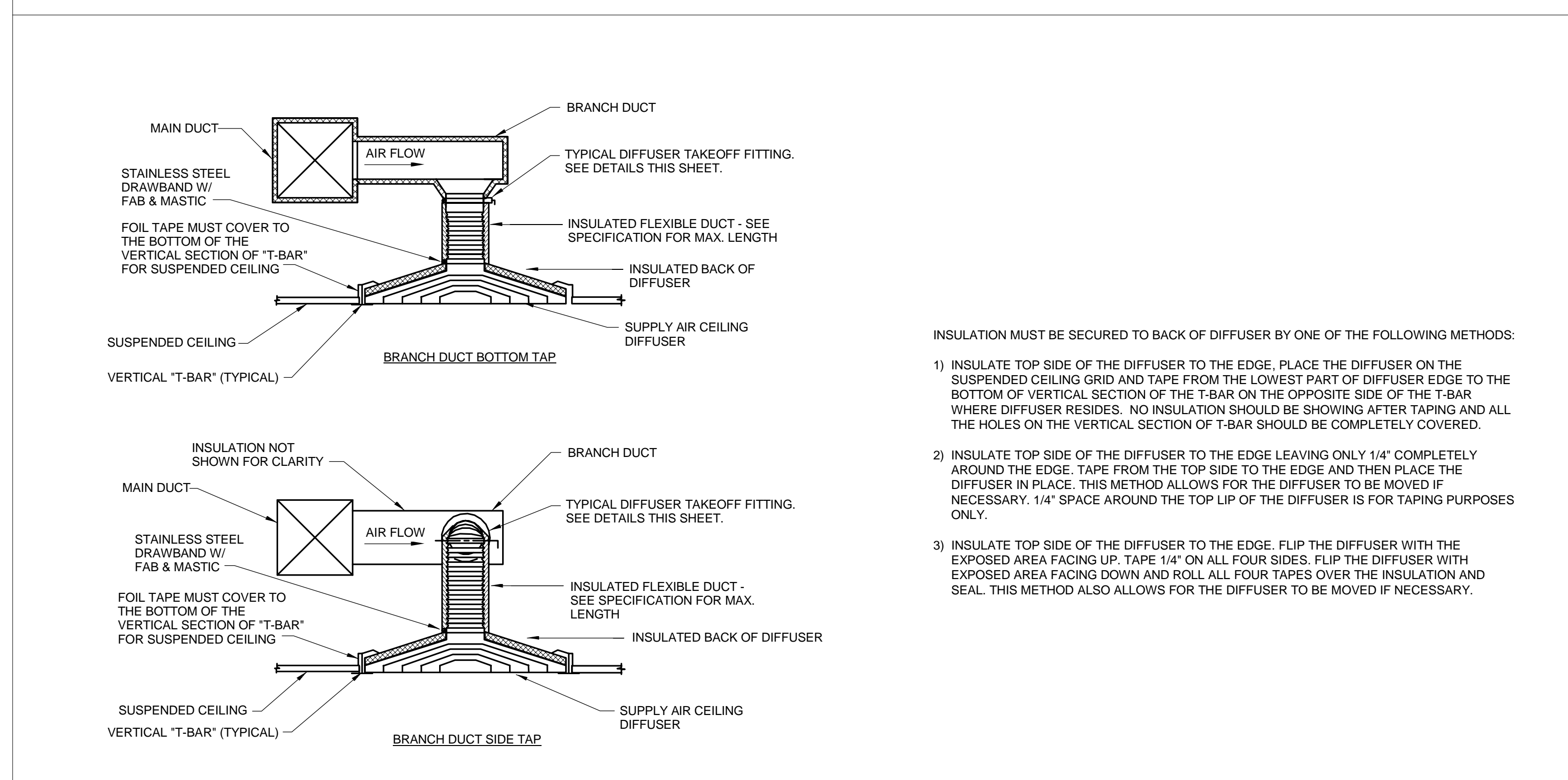
FLEXIBLE DUCT SUPPORT

NO SCALE

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| MARK | DESCRIPTION | DATE |
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TYPICAL DIFFUSER TAKEOFF FITTINGS
NO SCALE



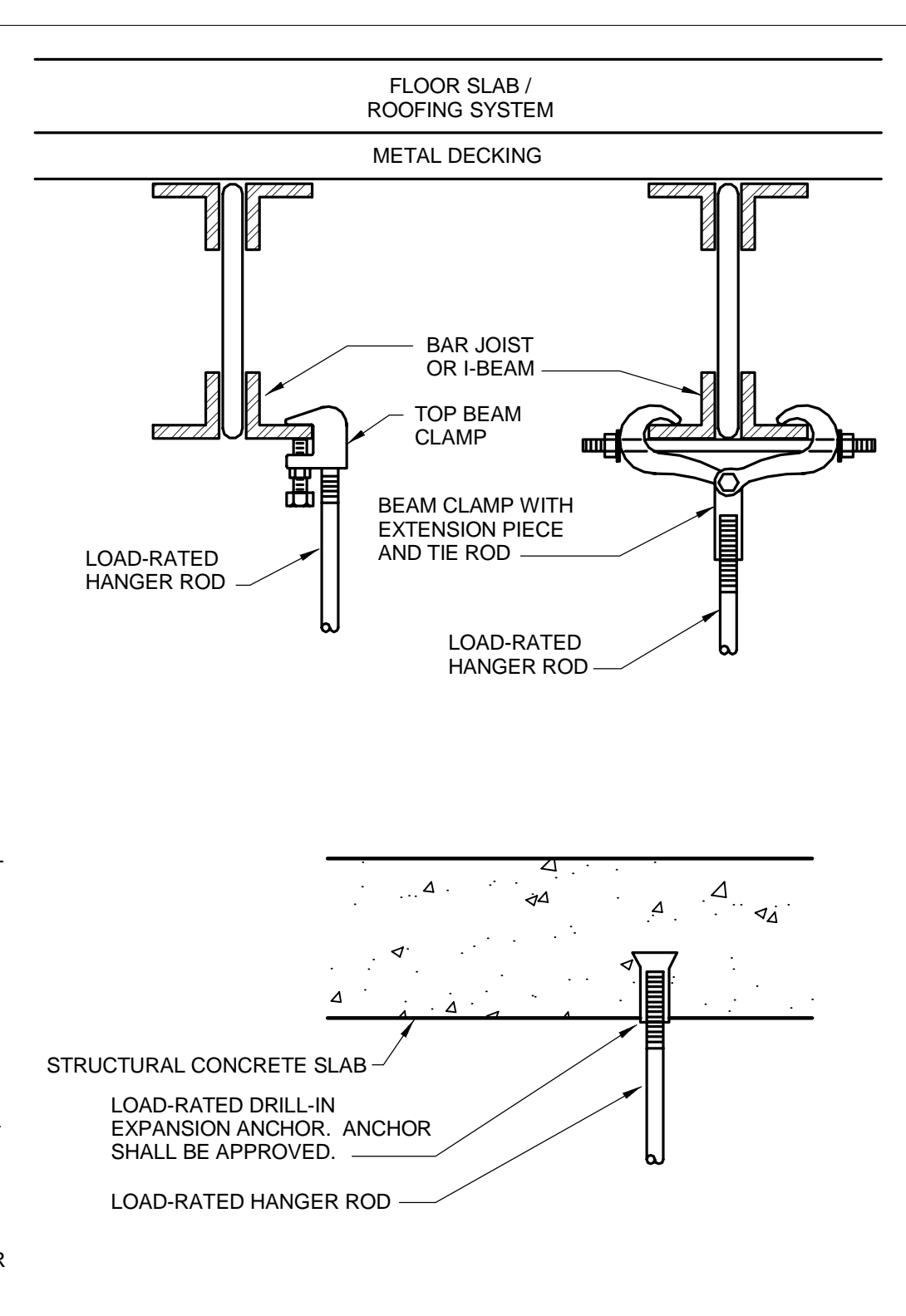
DIFFUSER CONNECTION
NO SCALE

**WORKING LOAD LIMITS STANDARD
THREADED STEEL RODS**

| ROD SIZE | LOAD LBS | ROD SIZE | LOAD LBS | ROD SIZE | LOAD LBS |
|----------|----------|----------|----------|----------|----------|
| 3/8" | 610 | 3/4" | 2710 | 1-1/8" | 6230 |
| 1/2" | 1130 | 7/8" | 3770 | 1-1/4" | 8000 |
| 5/8" | 1810 | 1" | 4960 | 1-1/2" | 11630 |

NOTES:
1. ABOVE LOADS ARE APPROXIMATE AND ARE BASED ON A SAFETY FACTOR OF 5 AND MAXIMUM WORKING TEMPERATURE OF 650°F.
2. CONTRACTOR IS RESPONSIBLE TO CALCULATE THE EXPECTED LOAD ON HANGERS. ADJUST HANGER SIZES, SPACING AND ATTACHMENT METHODS TO BE WITHIN THEIR LOAD LIMITS. DO NOT EXCEED THE MANUFACTURER'S RATED "WORKING LOAD" LIMITS.

- NOTES:
- CONTRACTOR SHALL NOT, UNDER ANY CIRCUMSTANCE, DRILL ANY HOLE IN BUILDING STRUCTURAL STEEL MEMBERS (BAR JOISTS, I-BEAMS, ETC.) UNLESS SPECIFICALLY PERMITTED BY THE STRUCTURAL ENGINEER.
 - THE WEIGHT OF VERTICAL PIPING SHALL BE SUPPORTED INDEPENDENTLY OF HORIZONTAL PIPING.
 - IN ADDITION TO THE WEIGHT OF THE PIPE, CONTRACTOR SHALL CONSIDER THE WEIGHT IMPARTED ON THE PIPING SYSTEM BY INSULATIONS, FITTINGS, VALVES, HYDRONIC SPECIALTIES, IN-LINE PUMPS OR OTHER PIPE-SUPPORTED EQUIPMENT, PIPE FLANGES, ETC. LARGE AND/OR HEAVY ITEMS SHALL BE SUPPORTED INDEPENDENTLY OF THE PIPING.
 - ALL HANGER SUPPORTS LOCATED BETWEEN BAR JOIST FLANGES SHALL NOT BE LOCATED IN EXCESS OF 4" FROM THE PANEL POINT OF THE BAR JOIST.
 - IF CONCENTRATED LOAD CANNOT BE POSITIONED WITHIN 4" OF THE PANEL POINT, CONTRACTOR TO FIELD INSTALL WEB STIFFENER ANGLE, ONE STIFFENER ON EACH SIDE OF THE JOIST, FROM THE CONCENTRATED LOAD TO OPPOSITE CHORD PANEL POINT. PROVIDE (2) L2x2x1/16 FOR JOISTS UP TO 30" DEEP. JOISTS GREATER THAN 30" DEEP SHALL HAVE STIFFENER ANGLES AT LEAST EQUAL TO THE BOTTOM CHORD ANGLE SIZE.



UPPER HANGER ATTACHMENTS DETAILS
NO SCALE

ROUND DUCT HANGER SCHEDULE

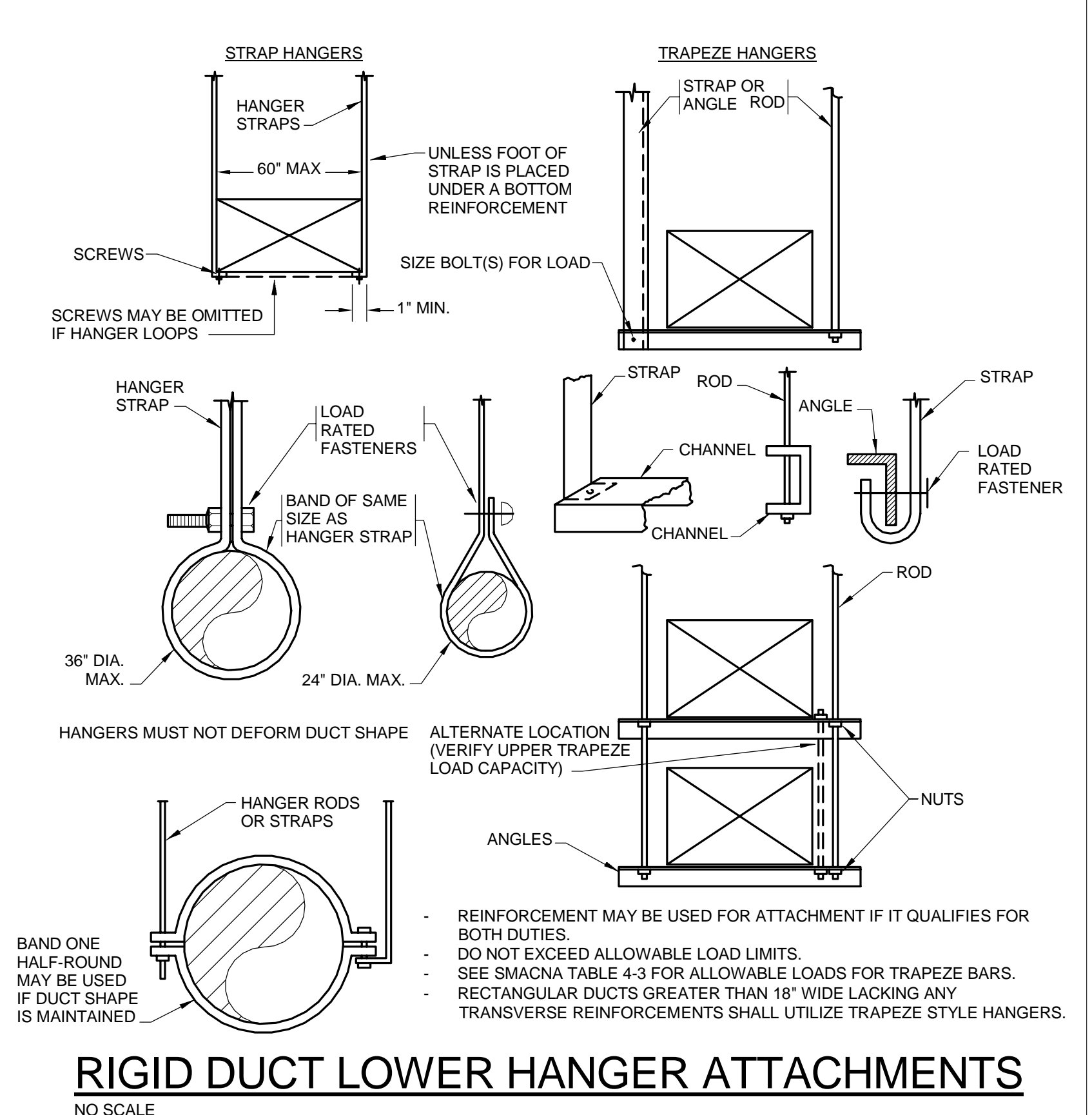
| DIAMETER | MAX. SPACING | ROD | STRAP |
|----------|--------------|----------|------------------|
| 10" & DN | 12" | 1/4" | 1" x 22' GA. |
| 11"-18" | 12" | 1/4" | 1" x 22' GA. |
| 19"-24" | 12" | 3/8" | 1" x 22' GA. |
| 25"-36" | 12" | 3/8" | 1" x 20' GA. |
| 37"-50" | 12" | TWO 3/8" | TWO 1" x 20' GA. |
| 51"-60" | 12" | TWO 3/8" | TWO 1" x 18' GA. |
| 61"-84" | 12" | TWO 3/8" | TWO 1" x 16' GA. |

- NOTES:
- SCHEDULE ADAPTED FROM SMACNA "HVAC DUCT CONSTRUCTION STANDARDS" TABLE 4-2. SMACNA REQUIREMENTS GOVERN, EXCEPT WHERE MORE STRINGENT PARAMETERS ARE REQUIRED BY THESE DRAWINGS.
 - TABLE ALLOWS FOR CONVENTIONAL WALL THICKNESS, AND JOINT SYSTEMS PLUS 1 LB/SF INSULATION WEIGHT. IF HEAVIER DUCTS ARE TO BE INSTALLED, ADJUST HANGER SIZES TO BE WITHIN THEIR LOAD LIMITS.
 - HANGER SPACING MAY BE ADJUSTED BY SPECIAL ANALYSIS.
 - STRAPS ARE TO BE GALVANIZED STEEL. WIRE IS NOT AN APPROVED HANGER ON THIS PROJECT.
 - STRAP AND ROD SIZES ARE MINIMUM ALLOWABLE.
 - FOR UPPER ATTACHMENTS, LOWER ATTACHMENTS, TRAPEZE SIZES, AND ROD/STRAP ALLOWABLE LOADS, SEE SMACNA MANUAL AND DETAILS IN THESE DRAWINGS.

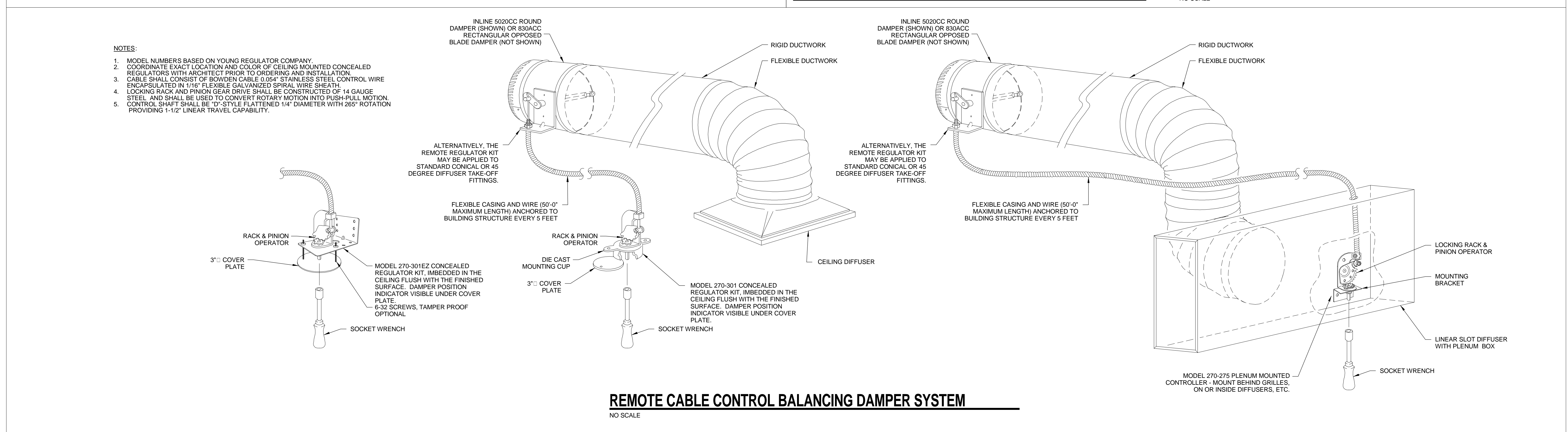
RECTANGULAR DUCT HANGER SCHEDULE

| MAX. HALF OF DUCT PERIMETER | PAIR AT 10FT SPACING | | PAIR AT 8FT SPACING | | PAIR AT 5FT SPACING | | PAIR AT 4FT SPACING | |
|-----------------------------|---------------------------|------|---------------------|------|---------------------|------|---------------------|------|
| | STRAP | ROD | STRAP | ROD | STRAP | ROD | STRAP | ROD |
| P2-30" | 1" x 22 GA | 1/4" | 1" x 22 GA | 1/4" | 1" x 22 GA | 1/4" | 1" x 22 GA | 1/4" |
| P2-72" | 1" x 18 GA | 3/8" | 1" x 20 GA | 1/4" | 1" x 22 GA | 1/4" | 1" x 22 GA | 1/4" |
| P2-96" | 1" x 16 GA | 3/8" | 1" x 18 GA | 3/8" | 1" x 20 GA | 3/8" | 1" x 22 GA | 1/4" |
| P2-120" | 1.5" x 16 GA | 1/2" | 1" x 16 GA | 3/8" | 1" x 18 GA | 3/8" | 1" x 20 GA | 1/4" |
| P2-168" | 1.5" x 16 GA | 1/2" | 1.5" x 16 GA | 1/2" | 1" x 16 GA | 3/8" | 1" x 18 GA | 3/8" |
| P2-192" | N/A | 1/2" | 1.5" x 16 GA | 1/2" | 1" x 16 GA | 3/8" | 1" x 16 GA | 3/8" |
| P2-192" | SPECIAL ANALYSIS REQUIRED | | | | | | | |

- NOTES:
- SCHEDULE ADAPTED FROM SMACNA "HVAC DUCT CONSTRUCTION STANDARDS" TABLE 4-1. SMACNA REQUIREMENTS GOVERN, EXCEPT WHERE MORE STRINGENT PARAMETERS ARE REQUIRED BY THESE DRAWINGS.
 - TABLE ALLOWS FOR TYPICAL DUCT WEIGHT WITH NORMAL REINFORCEMENT AND JOINTS, 1 LB/SF INSULATION WEIGHT, AND TRAPEZE WEIGHT, BUT NO EXTERNAL LOADS. IF HEAVIER DUCTS ARE TO BE INSTALLED (SUCH AS DOUBLE-WALL, DENSE INSULATIONS, OR LAGGING), ADJUST HANGER SIZES TO BE WITHIN THEIR LOAD LIMITS.
 - STRAPS ARE TO BE GALVANIZED STEEL. WIRE IS NOT AN APPROVED HANGER ON THIS PROJECT.
 - ALLOWABLE LOADS FOR P2 ASSUME THAT DUCTS ARE 16 GA MAX., EXCEPT THAT WHEN MAXIMUM DUCT DIMENSION (W) IS OVER 60", THEN P2 MAX. IS 1.25W.
 - STRAP AND ROD SIZES ARE MINIMUM ALLOWABLE.
 - FOR UPPER ATTACHMENTS, LOWER ATTACHMENTS, TRAPEZE SIZES, AND ROD/STRAP ALLOWABLE LOADS, SEE SMACNA MANUAL AND DETAILS IN THESE DRAWINGS.



RIGID DUCT LOWER HANGER ATTACHMENTS
NO SCALE



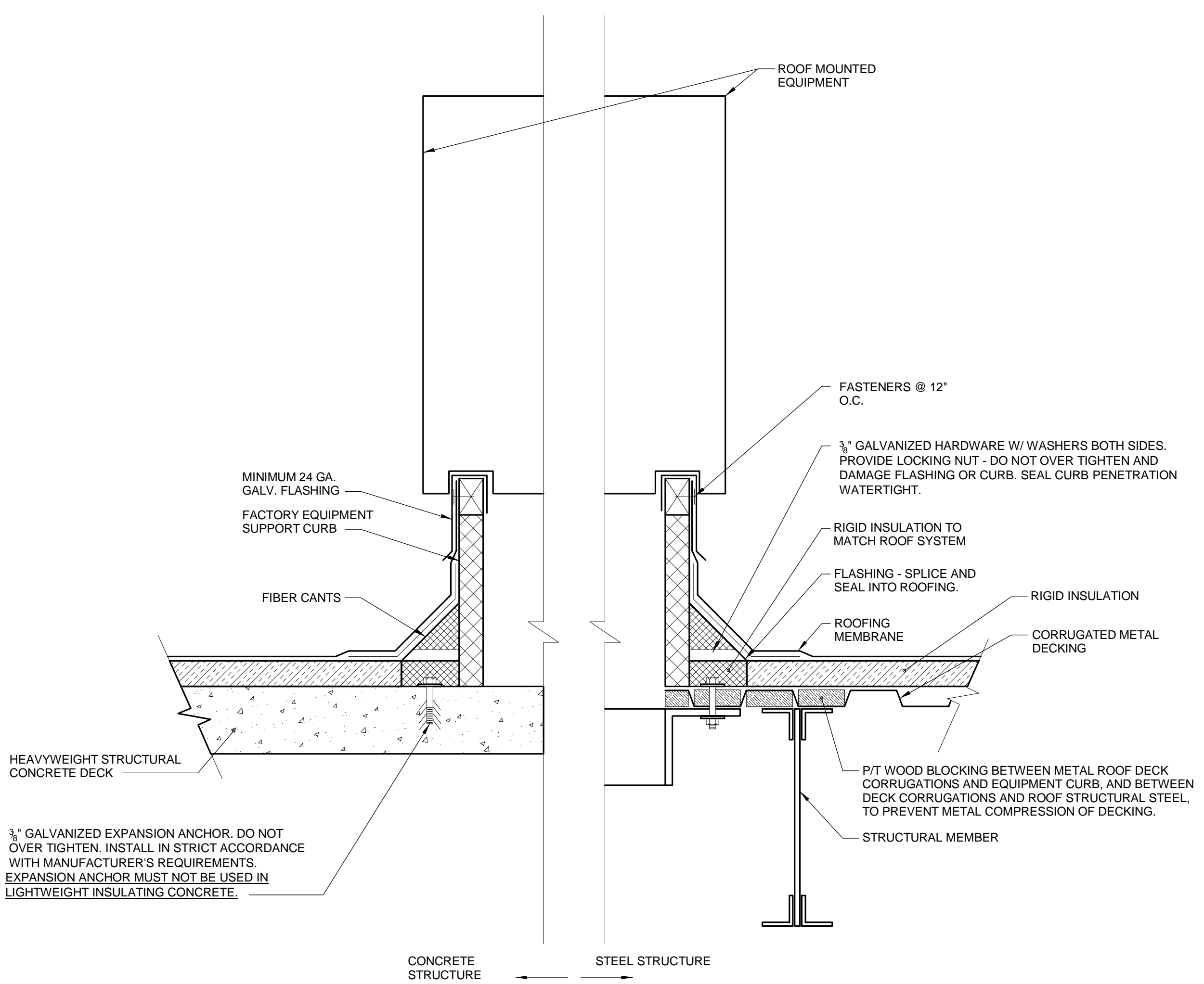
REMOTE CABLE CONTROL BALANCING DAMPER SYSTEM
NO SCALE

| REVISIONS | | |
|-----------|-------------|------|
| MARK | DESCRIPTION | DATE |
| | | |

WIND RESTRAINT REQUIREMENTS

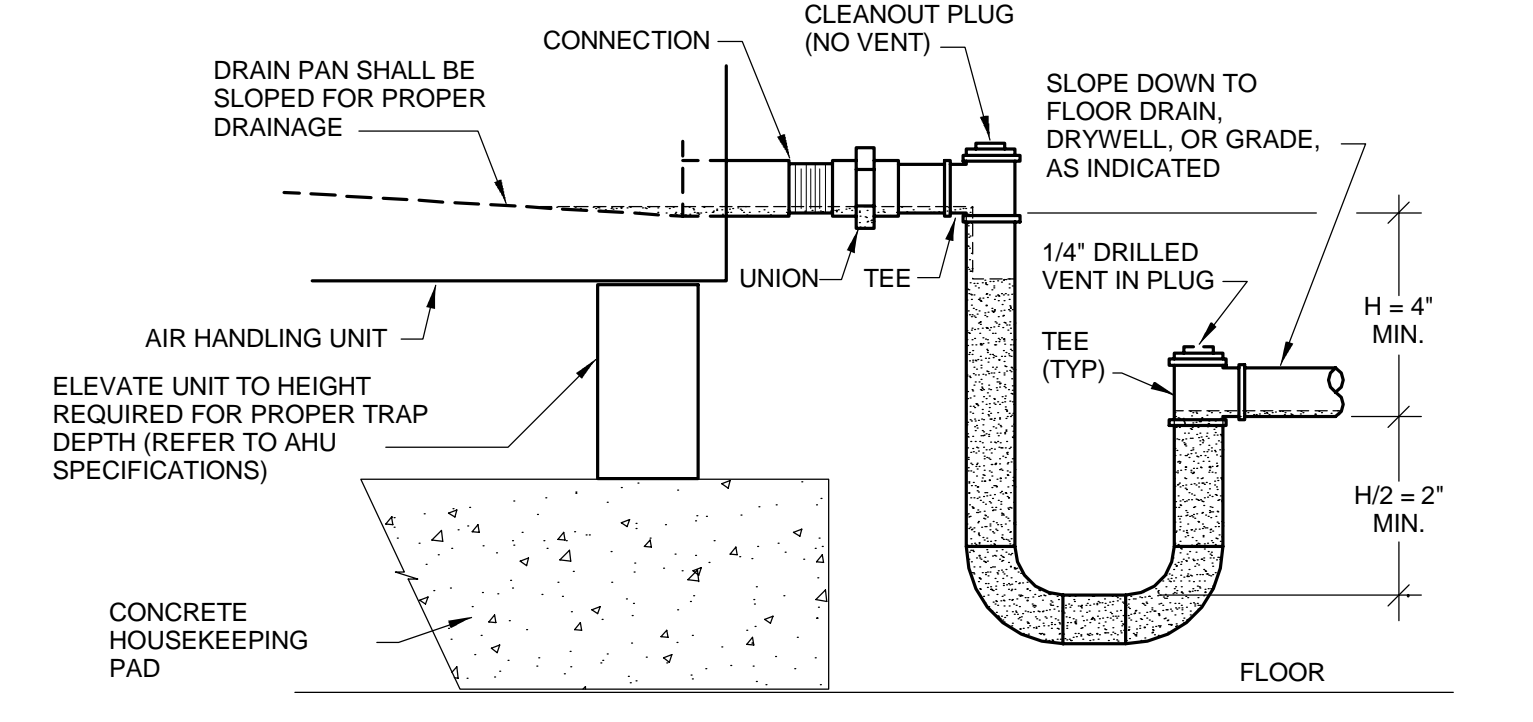
- ALL ROOF MECHANICAL EQUIPMENT (ROOFTOP AHUs, FAN EQUIPMENT, AND ETC.) SHALL BE FABRICATED TO RESIST THE EFFECTS OF WIND. WIND LOADS SHALL BE BASED ON A WIND SPEED OF 150 MPH, ACTING NORMAL TO THE BUILDING FACE. DESIGN ROOF-MOUNTED MECHANICAL EQUIPMENT, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING STRUCTURAL AND WIND PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.
- ALL ROOF-MOUNTED MECHANICAL EQUIPMENT (ROOFTOP AHUs, FAN EQUIPMENT, AND ETC.) SHALL BE ANCHORED TO RESIST THE EFFECTS OF WIND. WIND LOADS SHALL BE BASED ON A WIND SPEED OF 150 MPH, ACTING NORMAL TO THE BUILDING FACE. DESIGN ROOF-MOUNTED MECHANICAL EQUIPMENT ANCHORAGE, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING STRUCTURAL AND WIND PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED. CONTRACTOR SHALL PREPARE WIND RESTRAINT DETAILS INDICATED TO COMPLY WITH PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA, INCLUDING ANALYSIS DATA SIGNED AND SEALED BY THE QUALIFIED PROFESSIONAL ENGINEER RESPONSIBLE FOR THEIR PREPARATION.
- DESIGN ANALYSIS AND CALCULATIONS:** PROVIDE TO SUPPORT SELECTION AND ARRANGEMENT OF WIND RESTRAINTS. INCLUDE CALCULATIONS OF COMBINED TENSILE AND SHEAR LOADS. PROVIDE REACTIONS AT CONNECTION POINTS TO THE BUILDING STRUCTURE.
- FABRICATION AND ARRANGEMENT DETAILS:** DETAIL ATTACHMENTS OF RESTRAINTS TO THE RESTRAINED ITEMS AND TO THE STRUCTURE. SHOW ATTACHMENT LOCATIONS, METHODS, AND SPACING. IDENTIFY COMPONENTS, LIST THEIR STRENGTHS, AND INDICATE DIRECTIONS AND VALUES OF FORCES TRANSMITTED TO THE STRUCTURE DURING WIND EVENTS. INCLUDE FABRICATION REQUIREMENTS OF THE EQUIPMENT CURB AND ITS ABILITY TO SUPPORT THE LATERAL LOAD IMPARTED BY THE EQUIPMENT DURING A WIND EVENT.
- PRE-APPROVAL AND EVALUATION DOCUMENTATION:** PROVIDE, BY AN AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, SHOWING MAXIMUM RATINGS OF RESTRAINT ITEMS AND THE BASIS FOR APPROVAL (TESTS OR CALCULATIONS).
- WIND RESTRAINT QUALIFICATION CERTIFICATES:** PROVIDE, FROM THE MANUFACTURER, FOR ALL ROOF- AND GROUND-MOUNTED MECHANICAL EQUIPMENT. INCLUDE DIMENSIONED OUTLINE DRAWINGS OF EQUIPMENT UNIT, IDENTIFYING CENTER OF GRAVITY AND LOCATION AND DESCRIPTION OF MOUNTING AND ANCHORAGE PROVISIONS. INCLUDE DETAILED DESCRIPTION OF EQUIPMENT ANCHORAGE DEVICES ON WHICH THE CERTIFICATION IS BASED AND THEIR INSTALLATION REQUIREMENTS.

WIND RESTRAINT REQUIREMENTS
NO SCALE



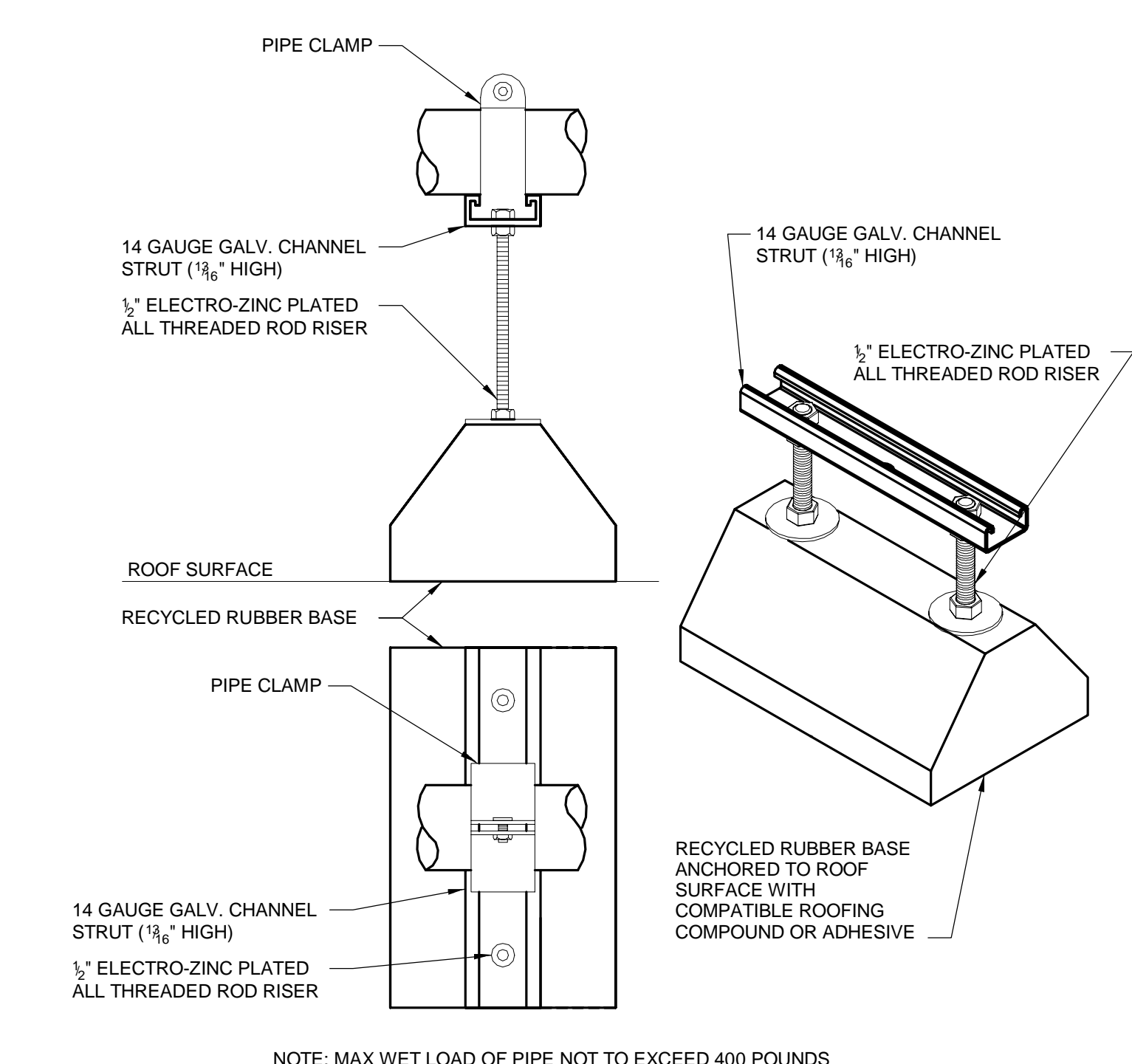
- NOTES:**
- SEE "WIND RESTRAINT REQUIREMENTS" ON THIS SHEET AND COMPLY WITH ALL.
 - CONTRACTOR SHALL PROVIDE PRE-MANUFACTURED ROOF CURBS SIMILAR IN SHAPE TO ABOVE AS MANUFACTURED BY APPROVED MANUFACTURER. ROOF CURBS SHALL BE DESIGNED TO MEET THE SUPPORT REQUIREMENTS OF THE EQUIPMENT WITH REGARD TO DIMENSIONS, ANCHORING POINTS, ROOF TYPE, INSULATION, AND ALL ASSOCIATED APPURTENANCES. ROOF CURBS SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL PRIOR TO ORDERING. ROOF CURBS SHALL BE INCORPORATED INTO ROOFING IN A MANNER SIMILAR TO ABOVE, WATERTIGHT, IN ACCORDANCE WITH THE SMACNA ARCHITECTURAL SHEET METAL MANUAL AND THE NATIONAL ROOFING CONTRACTORS ASSOCIATION ROOFING & WATERPROOFING MANUAL.
 - PROVIDE HIGH WIND CALCULATIONS CERTIFIED BY A PROFESSIONAL STRUCTURAL ENGINEER LICENSED WITH THE STATE OF FLORIDA. CURB ASSEMBLY SHALL BE CERTIFIED FOR PERFORMANCE WITHOUT THE USE OF ADDITIONAL CABLE OR GUY-WIRE RESTRAINTS, WHEN CURB IS ANCHORED TO ROOF AND UNIT ANCHORED TO CURB IN ACCORDANCE WITH MANUFACTURER'S CERTIFIED INSTALLATION INSTRUCTIONS.
 - ANCHOR PER MANUFACTURER'S CERTIFIED INSTALLATION INSTRUCTIONS. AS A MINIMUM, ANCHOR AS FOLLOWS:
 - CURB TO STRUCTURAL CONCRETE ROOF DECK - MINIMUM 3/8" BOLTS WITH EXPANSION ANCHORS, AT 12" O.C. (MIN 3 PER SIDE), WITH FENDER WASHERS ON TOP OF SHEET METAL CURB BASE.
 - CURB TO METAL DECK - MINIMUM 3/8" BOLTS THROUGH ROOF ASSEMBLY AND STRUCTURAL STEEL FRAMING ON UNDERSIDE AROUND OPENING, AT 12" O.C., WITH FENDER WASHERS ON TOP OF SHEET METAL CURB BASE.
 - EQUIPMENT TO CURB - MINIMUM #12 HEX HEAD SHEET METAL SCREWS WITH WASHERS, THROUGH CURB SHEET METAL ASSEMBLY, SPACED MIN. 9" O.C.

ROOF EQUIPMENT CURB MOUNTING
NO SCALE

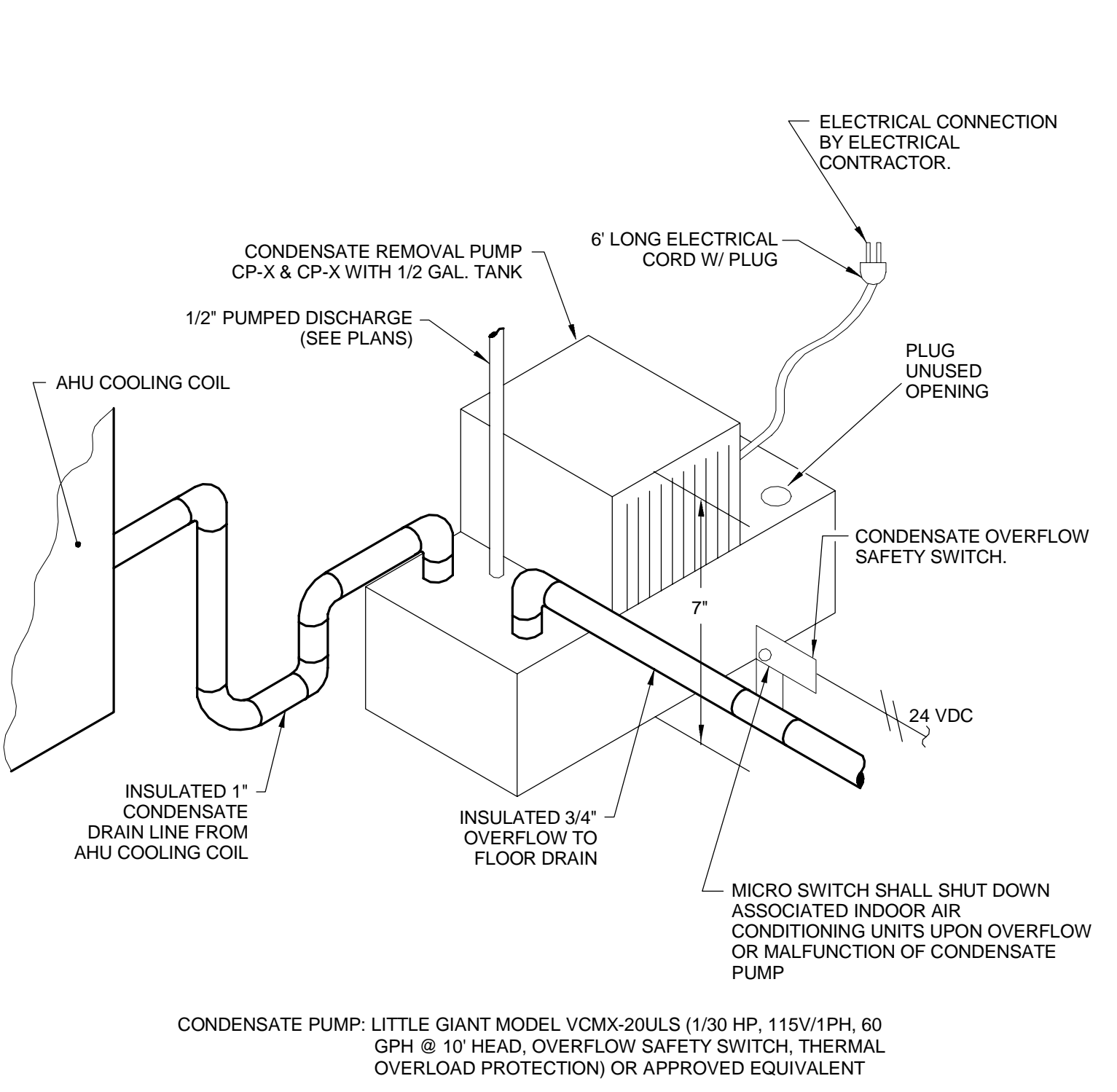


- NOTES:**
- DRAIN LINE SIZE SHALL BE SAME SIZE AS UNIT CONNECTION, BUT NOT LESS THAN 3/4 NPS.
 - MANUALLY FILL TRAP WITH CLEAN WATER PRIOR TO UNIT START UP.
 - THERE SHALL BE NO VENTS DRILLED ON THE ENTERING SIDE OF THE TRAP. ALL CAPS AND PLUGS ON THE ENTERING SIDE OF THE TRAP MUST BE SEALED AIRTIGHT TO PREVENT AIR ENTRY.
 - TRAP HEIGHT "H" SHOWN IN DIAGRAM IS THE KEY DIMENSION. THIS DIMENSION MUST EXCEED THE MAXIMUM EXPECTED NEGATIVE SUCTION PRESSURE AT THE DRAIN PAN CONNECTION BY AT LEAST 1". ALL POTENTIAL UPSTREAM COMPONENT STATIC PRESSURE LOSSES MUST BE INCLUDED. FOR EXAMPLE: RETURN DUCT SYSTEM STATIC PRESSURE; AHU INLET AND DAMPER STATIC PRESSURES; MAXIMUM EXPECTED DIRTY FILTER STATIC PRESSURES FOR EACH FILTER BANK; COOLING COIL STATIC PRESSURE; PLUS ADD 1" SAFETY FACTOR.
 - THE DIMENSION OF THE LEAVING SIDE OF THE TRAP MUST BE A MINIMUM OF 1/2 OF THE "H" DIMENSION DESCRIBED ABOVE.

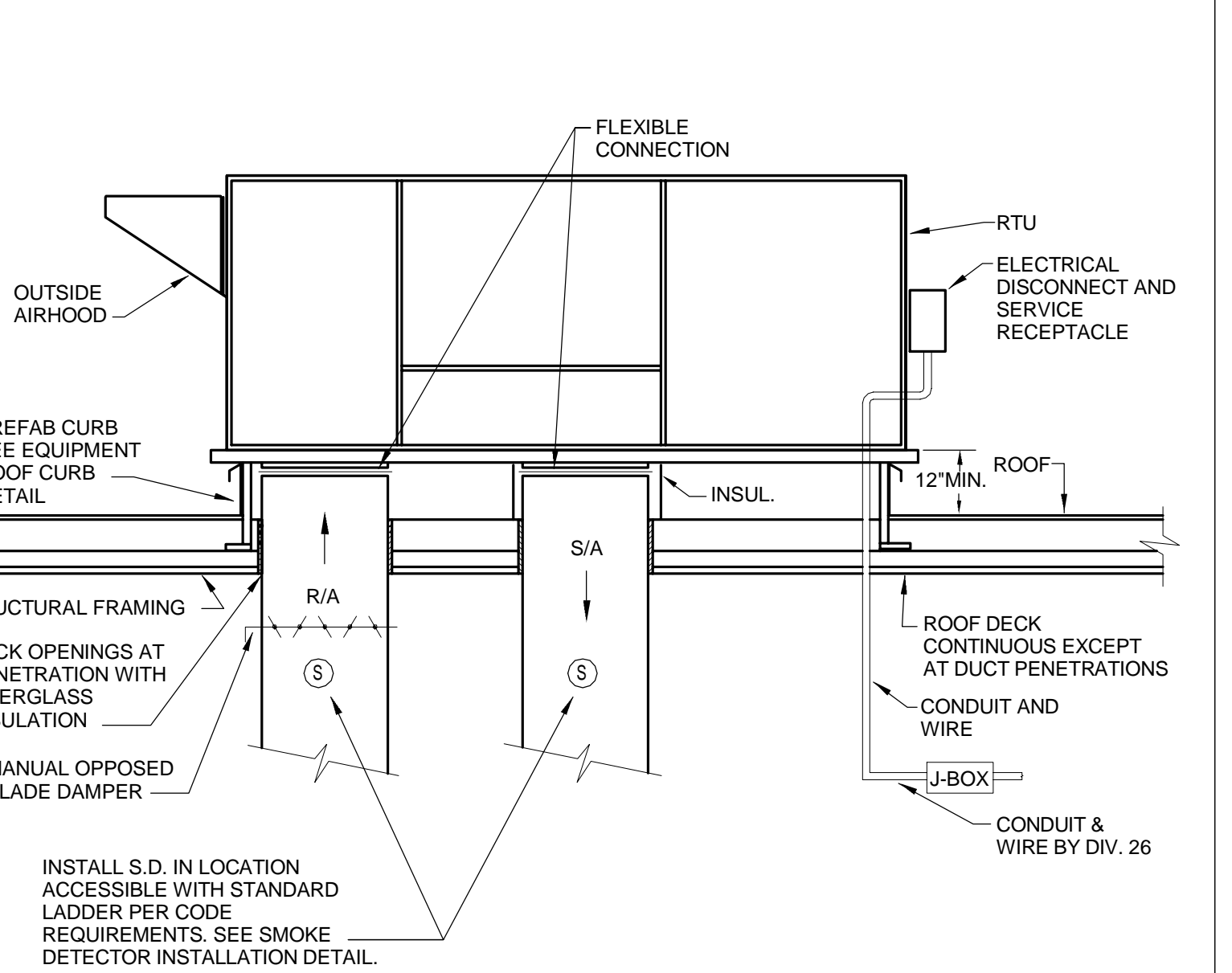
DRAW-THRU AHU CONDENSATE
NO SCALE



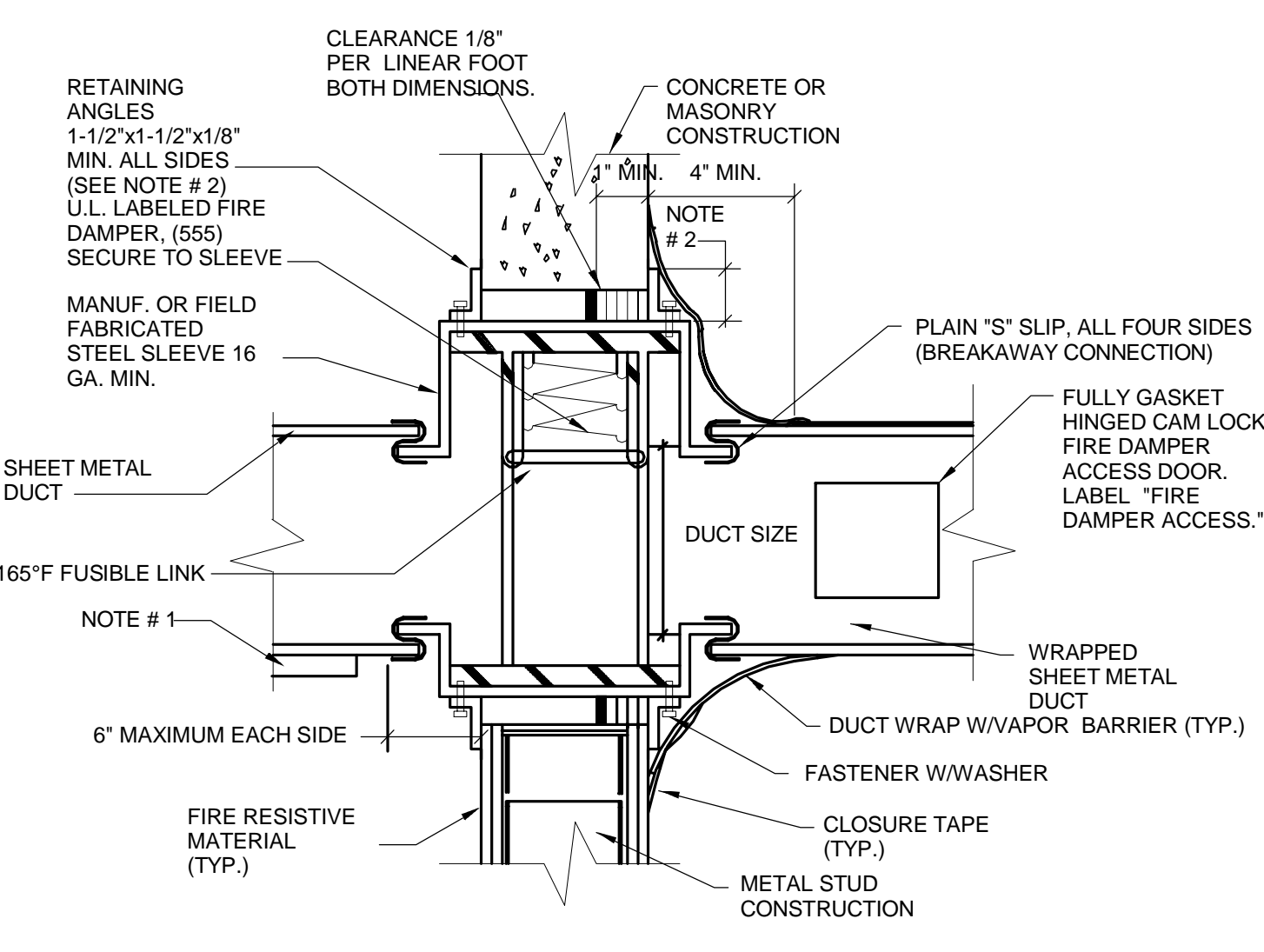
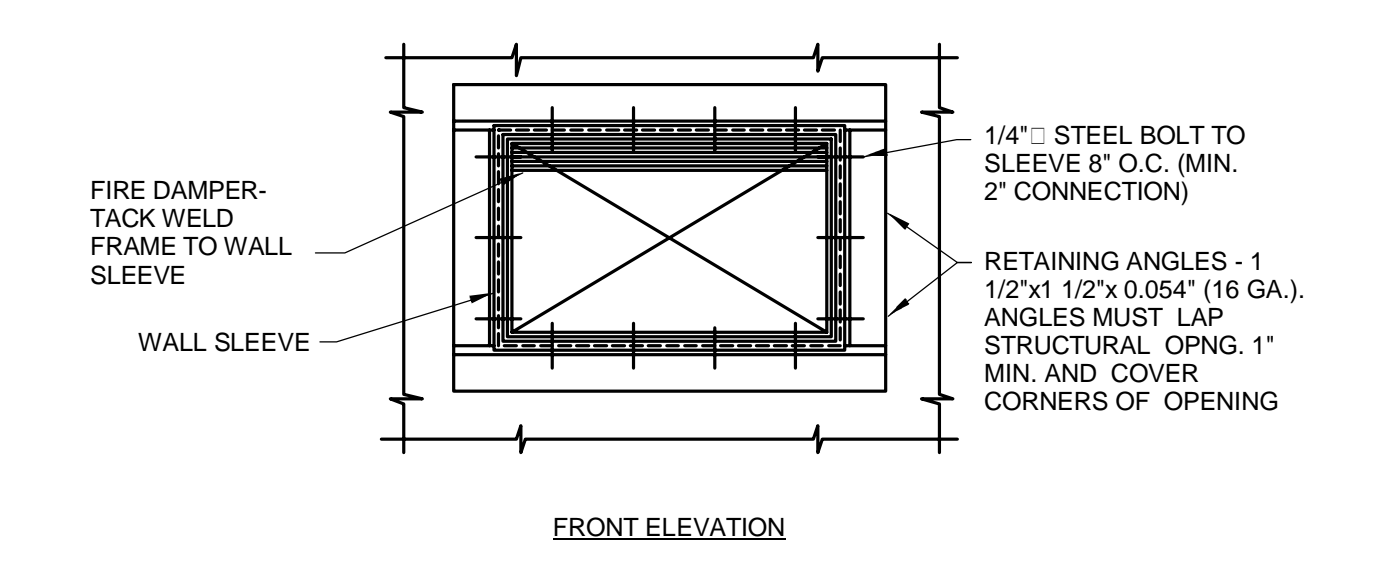
ROOF MOUNTED CONDENSATE PIPING SUPPORT
NO SCALE



CONDENSATE REMOVAL PUMP
NO SCALE



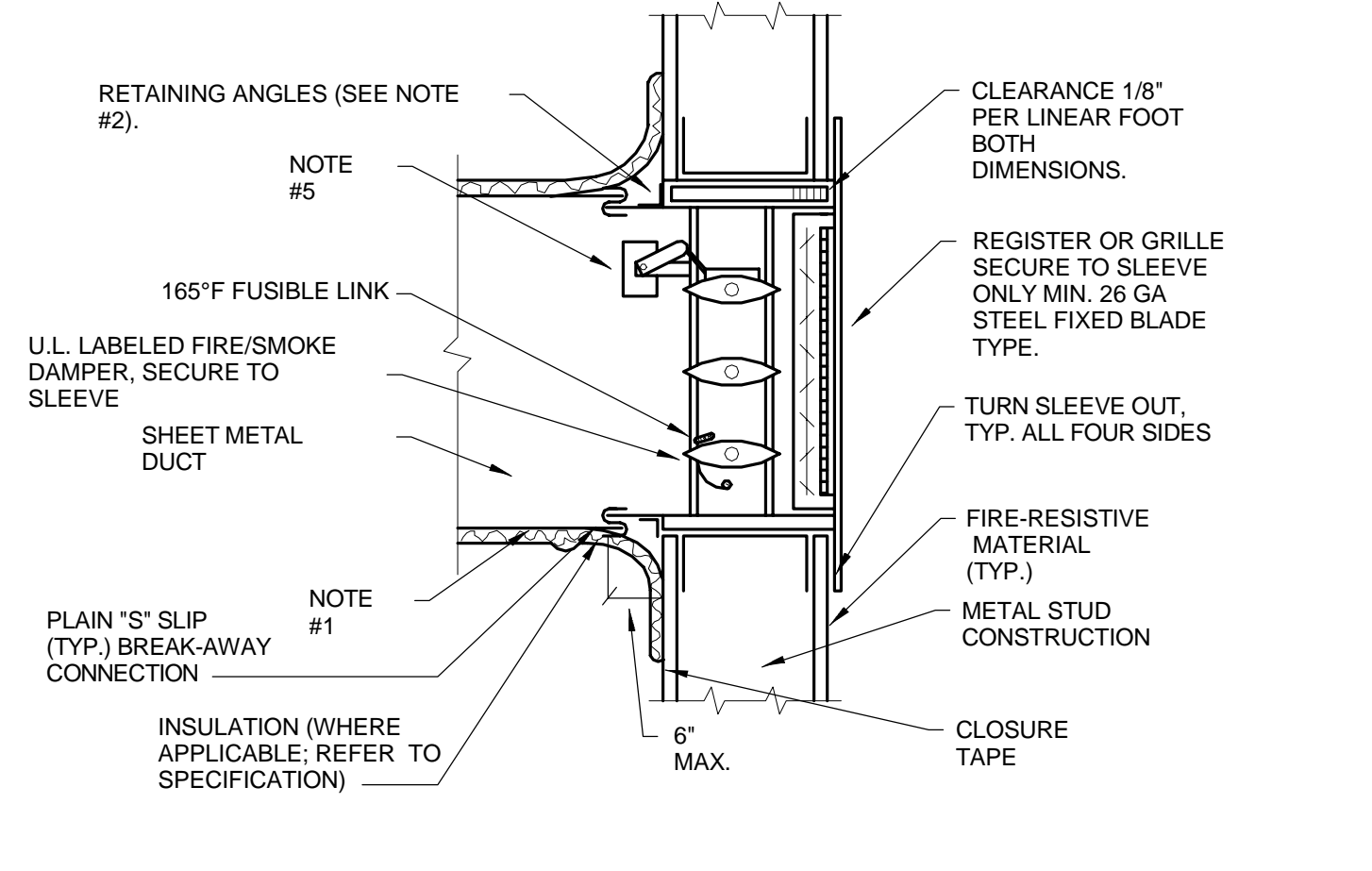
ROOFTOP UNIT INSTALLATION
NO SCALE



- NOTES:**
- PROVIDE ACCESS DOOR & LABEL ON SIDE OR BOTTOM OF DUCT AS FOLLOWS:

| DUCT WIDTH | DOOR SIZE | REQUIRES REMOVABLE DUCT SECTION |
|---------------|-----------|---------------------------------|
| 10" THRU 12" | 8" x 8" | |
| 14" THRU 20" | 12" x 12" | |
| 22" AND ABOVE | 18" x 18" | |
 - RETAINING ANGLES SHALL LAP STRUCTURAL OPENING 1" MIN. & COVER CORNERS OF OPENINGS. ANGLES ATTACH TO SLEEVE ONLY AND MUST NOT BE ATTACHED TO EACH OTHER AT CORNERS OR TO WALL.
 - ALL ATTACHMENTS PER MANUFACTURER'S APPROVED INSTALLATION INSTRUCTION.
 - VERTICAL POSITION SHOWN. HORIZONTAL INSTALLATION SIMILAR. DAMPER TO BE SPRING LOADED WHEN HORIZONTAL.
 - FIRE DAMPER INSTALLATION SHALL BE IN COMPLIANCE WITH NFPA 90A AND SMACNA MANUAL "FIRE, SMOKE & RADIATION DAMPER INSTALLATION GUIDE FOR HVAC SYSTEMS", LATEST EDITION.
 - PROVIDE PERMANENT IDENTIFICATION LABELING ON THE EXTERIOR OF THE ASSOCIATED DUCTWORK. LABEL LETTERING SHALL NOT BE LESS THAN 1/2" IN HEIGHT AND SHALL READ "FIRE DAMPER".

FIRE DAMPER INSTALLATION
NO SCALE

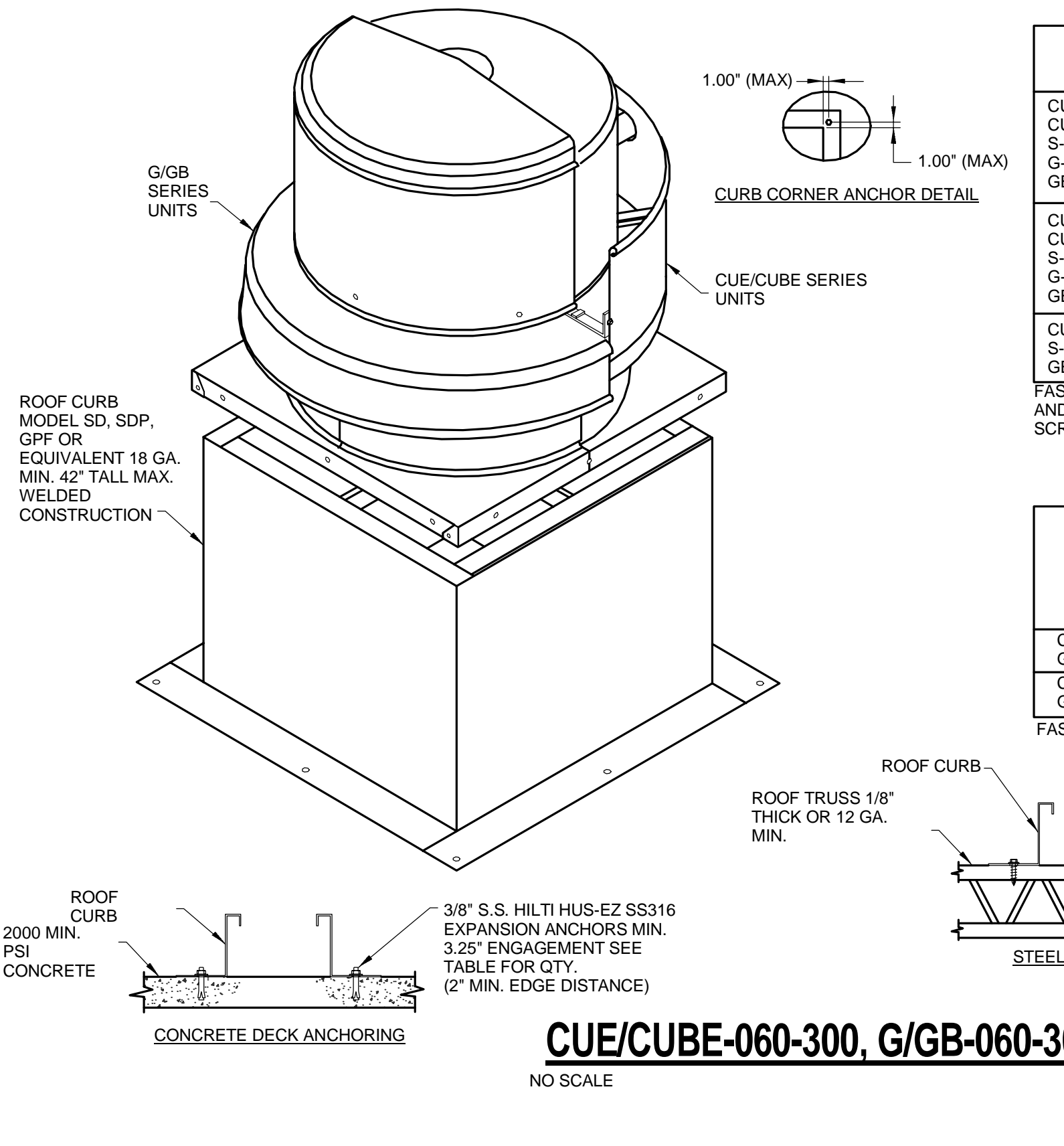
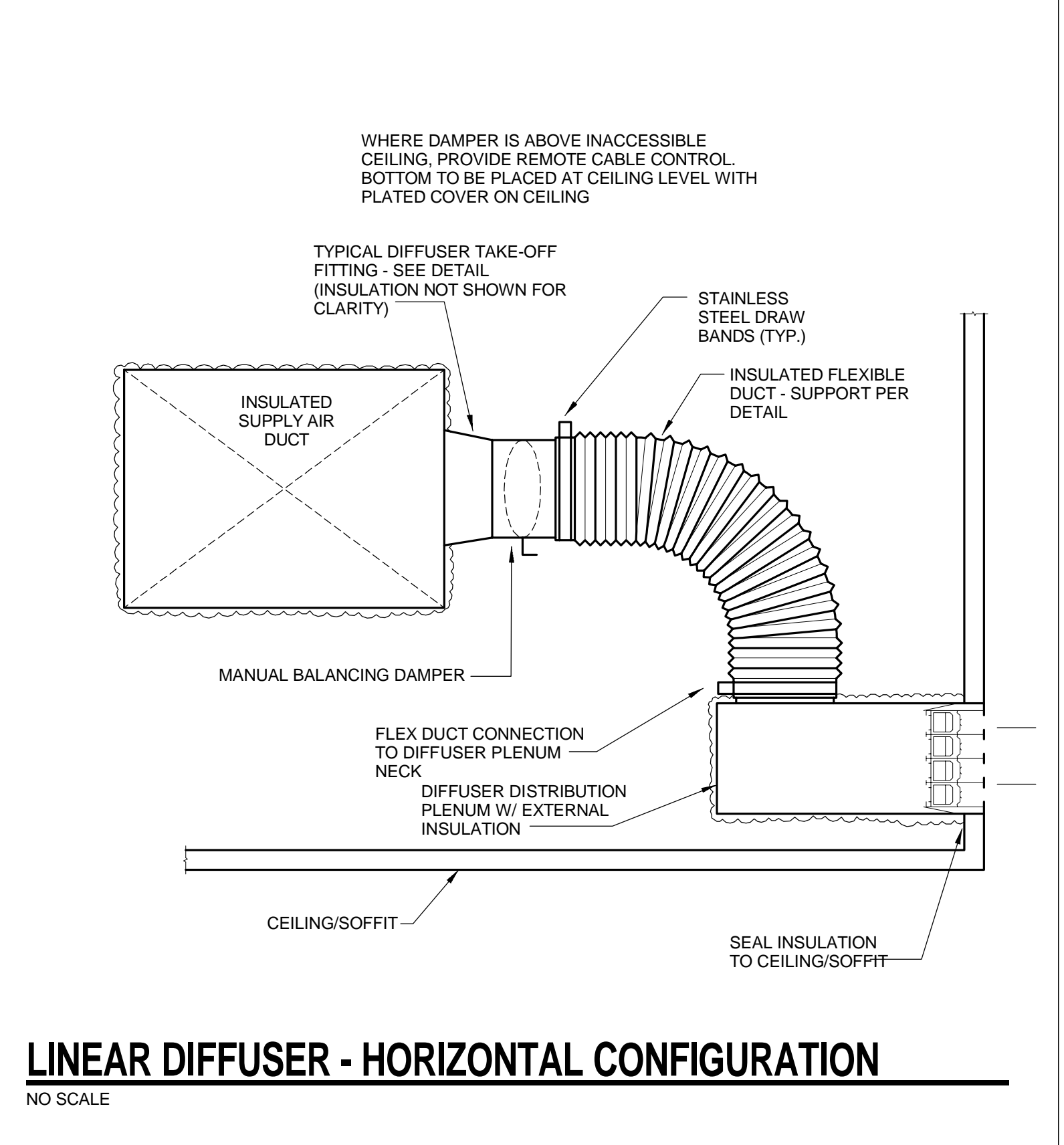
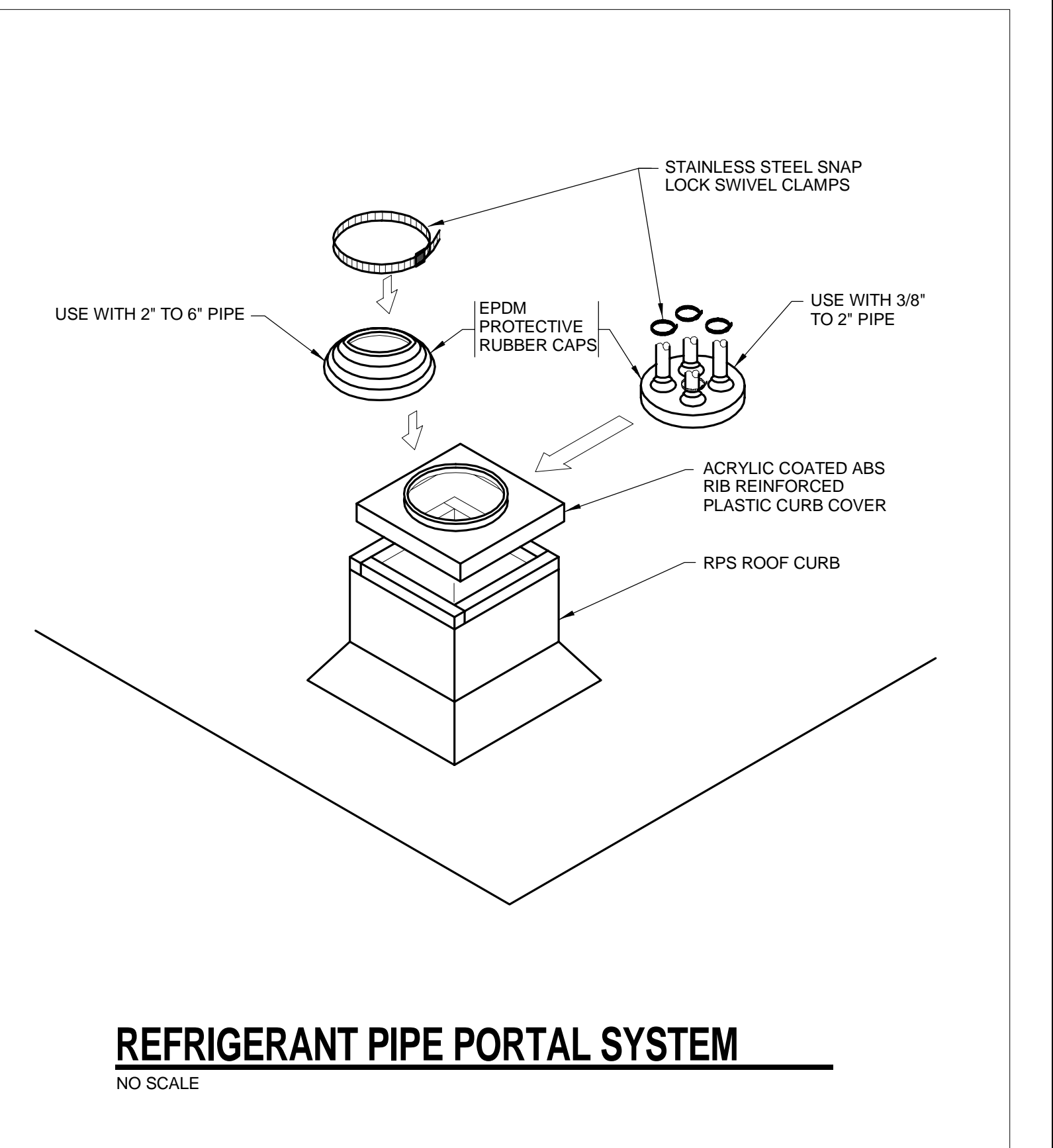
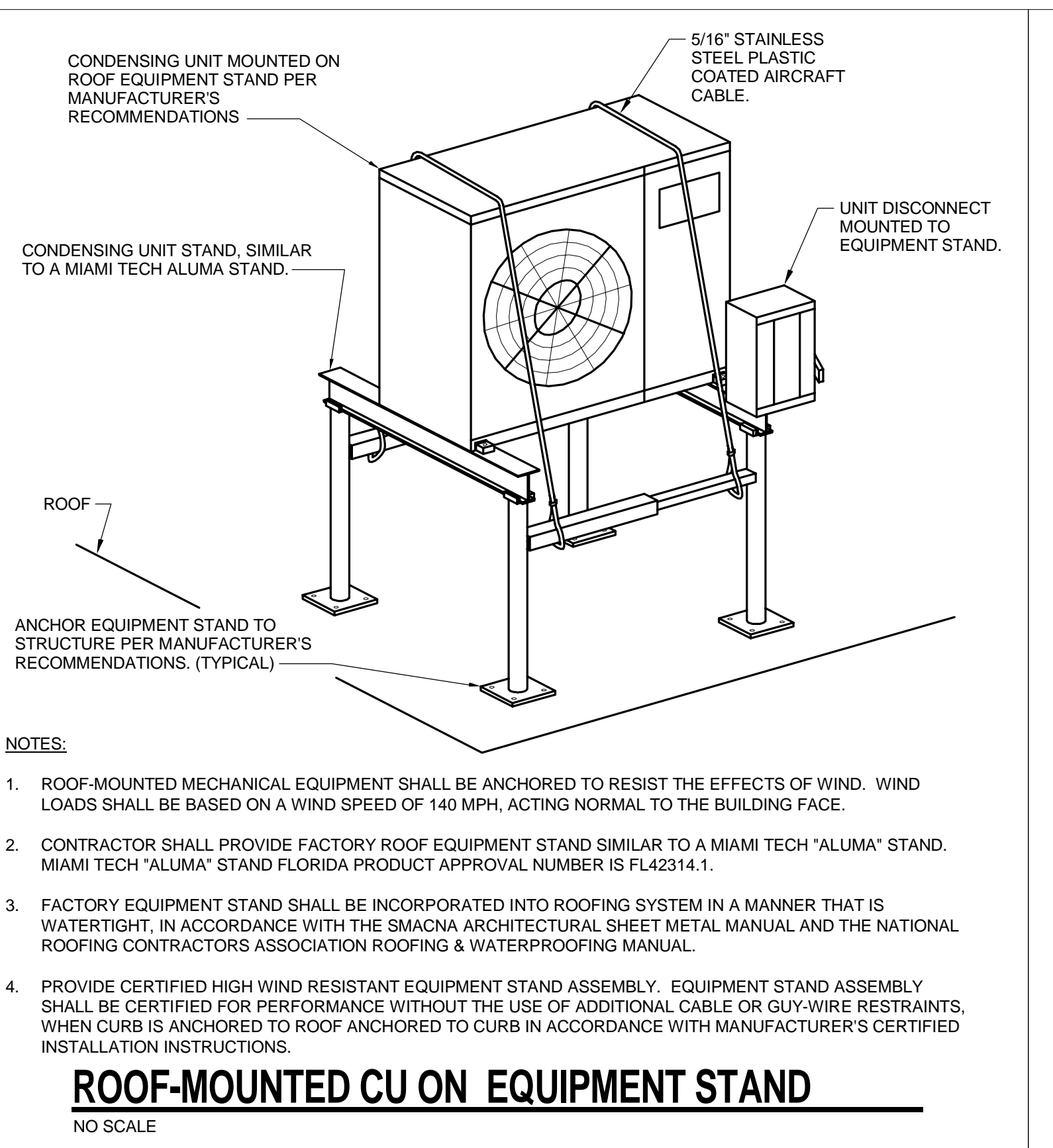
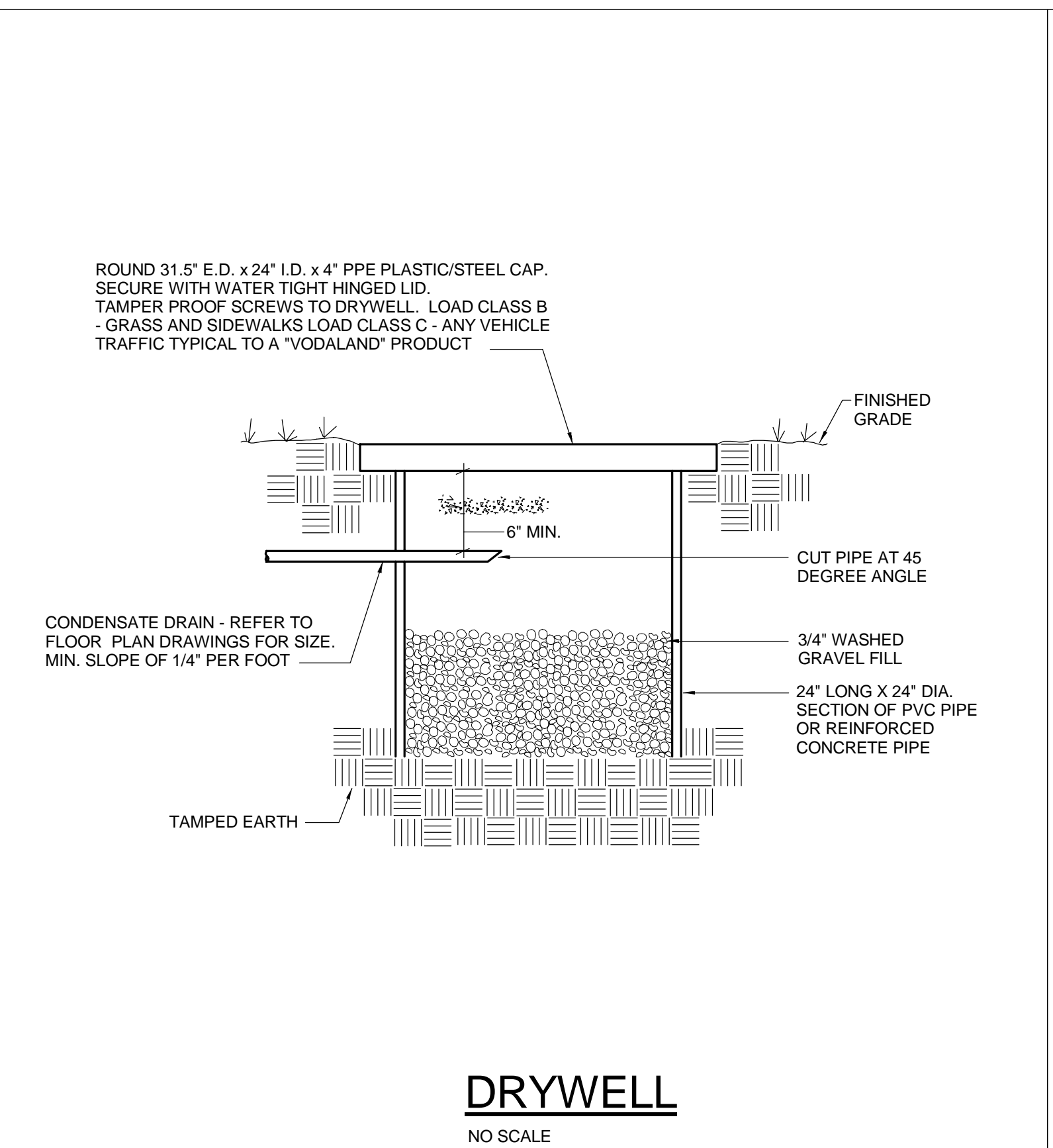
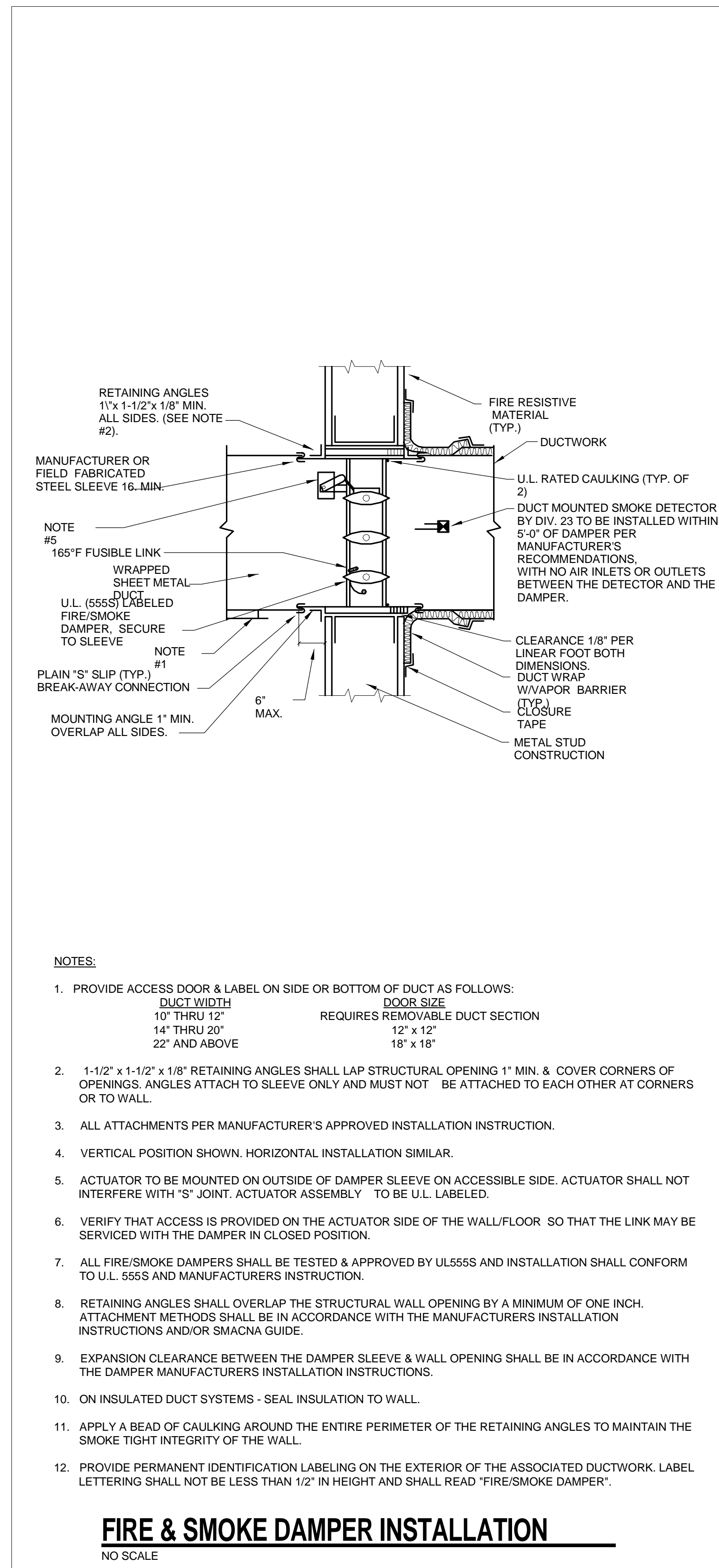


- NOTES:**
- PROVIDE ACCESS DOOR & LABEL ON SIDE OR BOTTOM OF DUCT AS FOLLOWS:

| DUCT WIDTH | DOOR SIZE | REQUIRES REMOVABLE DUCT SECTION |
|---------------|-----------|---------------------------------|
| 10" THRU 12" | 8" x 8" | |
| 14" THRU 20" | 12" x 12" | |
| 22" AND ABOVE | 18" x 18" | |
 - 1-1/2" x 1-1/2" x 1/8" RETAINING ANGLES SHALL LAP STRUCTURAL OPENING 1" MIN. & COVER CORNERS OF OPENINGS. ANGLES ATTACH TO SLEEVE ONLY AND MUST NOT BE ATTACHED TO EACH OTHER AT CORNERS OR TO WALL.
 - ALL ATTACHMENTS PER MANUFACTURER'S APPROVED INSTALLATION INSTRUCTION.
 - VERTICAL POSITION SHOWN. HORIZONTAL INSTALLATION SIMILAR.
 - ACTUATOR TO BE MOUNTED ON OUTSIDE OF DAMPER SLEEVE ON ACCESSIBLE SIDE. ACTUATOR SHALL NOT INTERFERE WITH "S" JOINT. ACTUATOR ASSEMBLY TO BE U.L. LABELED.
 - VERIFY THAT ACCESS IS PROVIDED ON THE ACTUATOR SIDE OF THE WALL/FLOOR. SO THAT THE LINK MAY BE SERVICED WITH THE DAMPER IN CLOSED POSITION.

FIRE & SMOKE DAMPER INSTALLATION AT GRILLE
NO SCALE

| REVISIONS | | |
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| MARK | DESCRIPTION | DATE |
| | | |



FAN TO CURB MOUNTING

| UNIT SIZE | FASTENERS | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------|
| | PER SIDE | TOTAL |
| CUE-060-065-070-075-080-085-090-095-098-099-101-121-131-141-HP-161-HP CUBE-098-099-101-HP-121-131-141-HP-161-HP S-CUBE-141-HP-161-HP G-060-065-070-075-080-085-090-095-097-098-099-101-103-121-123-131-133-141-143-163 GB-071-091-091-101-HP-121-131-141-HP-161-HP | 3 | 12 |
| CUE-180-HP-200 CUBE-180-HP-200-HP-220-HP-240-HP-XP S-CUBE-200-240 G-190-160-170-180-183-203 GB-180-HP-200-HP-220-HP-240-HP | 5 | 20 |
| CUBE-300-HP-XP S-CUBE-300 GB-260-300-HP | 9 | 36 |

FASTENERS ON EACH SIDE OF THE FAN ARE TO BE INSTALLED WITH ONE FASTENER 4 INCHES FROM EACH EDGE AND ONE FASTENER CENTERED. THE FASTENERS ARE TO BE EQUALLY SPACED. 5/16 INCH SELF-DRILLING SCREWS.

CURB TO DECK MOUNTING

| UNIT SIZE | CONCRETE ANCHORING NO. OF FASTENERS | | STEEL DECK ANCHORING NO. OF FASTENERS | | TIMBER ANCHORING NO. OF FASTENERS | |
|---------------|-------------------------------------|-------|---------------------------------------|-------|-----------------------------------|-------|
| | PER SIDE | TOTAL | PER SIDE | TOTAL | PER SIDE | TOTAL |
| CUE/CUBE s161 | 3 | 12 | 5 | 20 | 3 | 12 |
| G/GB > 141 | 4 | 16 | 8 | 32 | 4 | 16 |

FASTENERS NEED TO BE LOCATED ON ALL 4 SIDES OF FAN CURB.

