

### SECTION 23 00 00 - MECHANICAL GENERAL REQUIREMENTS

#### PART 1 - GENERAL

1. THE TERM "TENANT," "TENANT'S CONSTRUCTION MANAGER," "OWNER," OR "OWNER'S CONSTRUCTION MANAGER" SHALL REFER TO SWEETGREEN.
2. THE GENERAL CONTRACTOR SHALL PROVIDE ALL MATERIALS AND LABOR AS REQUIRED TO PROVIDE A COMPLETE WORKING SYSTEM AND AS DESCRIBED IN THESE DRAWINGS.
3. THE GENERAL CONTRACTOR SHALL REVIEW A COMPLETE SET OF THE CONSTRUCTION DOCUMENTS. EACH SUB-CONTRACTOR SHALL MAINTAIN A COMPLETE SET OF DRAWINGS ON SITE DURING THE CONSTRUCTION PROCESS.
4. COORDINATE WORK AS REQUIRED WITH THE LANDLORD. THE GENERAL CONTRACTOR SHALL UTILIZE LANDLORD-REQUIRED CONTRACTORS AT THE GENERAL CONTRACTOR'S EXPENSE.

#### PART 2 - PRODUCTS

1. PRODUCTS SHALL BE AS DESCRIBED IN THE DRAWINGS AND AS REQUIRED FOR A COMPLETE AND FUNCTIONING SYSTEM.

#### PART 3 - EXECUTION

1. UNLESS DIMENSIONS HAVE BEEN PROVIDED, THE DRAWINGS ARE DIAGRAMMATIC IN NATURE, SHOWING THE GENERAL LOCATION, TYPE, LAYOUT AND REQUIRED EQUIPMENT. THEY SHALL NOT BE SCALED. COORDINATE WITH THE ARCHITECTURAL DRAWINGS, TENANT VENDORS AND MANUFACTURER'S INSTALLATION INSTRUCTIONS AND CUTSHEETS AS REQUIRED.
2. COMPLETE ALL WORK IN COMPLIANCE WITH THE CODES LISTED ON SHEET G-001 INCLUDING ALL LOCAL AMENDMENTS, ALL RELEVANT NFPA CODES AND STANDARDS AND SMACNA STANDARDS.
3. COORDINATE WITH THE LOCAL AUTHORITY HAVING JURISDICTION AND ARRANGE ALL INSPECTIONS AS REQUIRED.
4. MAINTAIN A CLEAN CONSTRUCTION SITE DURING CONSTRUCTION. CLEAN SCRAP MATERIAL AND REMOVE FROM SITE DAILY AND MAINTAIN WORKING AREA IN AN ORDERLY FASHION.
5. PROVIDE SUBMITTALS AS NOTED IN THESE SPECIFICATIONS AND AS REQUESTED BY THE TENANT'S CONSTRUCTION MANAGER.
  - A. ALL SHOP DRAWINGS SHALL BE REVIEWED AND STAMPED BY THE GENERAL CONTRACTOR PRIOR TO SUBMITTING TO THE TENANT'S CONSTRUCTION MANAGER.
  - B. SHOP DRAWINGS SHALL BE SUBMITTED TO ALLOW FOR FIVE BUSINESS DAYS OF REVIEW TIME.
  - C. PROVIDE REQUESTS FOR INFORMATION TO THE TENANT'S CONSTRUCTION MANAGER.
  - D. REQUESTS FOR INFORMATION SHALL PROVIDE A DETAILED DESCRIPTION OF THE SITE CONDITION OR DISCREPANCY AND THE CONTRACTORS PROPOSED REMEDY.
  - E. REQUESTS FOR INFORMATION SHALL BE SUBMITTED TO ALLOW FOR FIVE BUSINESS DAYS OF REVIEW TIME.
  - F. UPON COMPLETION OF WORK, THE GENERAL CONTRACTOR SHALL PROVIDE THE TENANT'S CONSTRUCTION MANAGER WITH A SOUND RECORD OF ALL MECHANICAL EQUIPMENT UTILIZED IN THE JOB. THE GENERAL CONTRACTOR SHALL PROVIDE THE SAME INFORMATION ON A COMPACT DISC. THE DISKET SHALL CONTAIN:
    1. COVER SHEET INDICATING THE PROJECT NAME, ADDRESS AND TURNOVER DATE.
    2. COMPANY NAME AND CONTACT INFORMATION OF THE CONTRACTORS UTILIZED FOR THE MECHANICAL SCOPE OF WORK.
    3. CUTSHEETS, INSTALLATION MANUALS AND MAINTENANCE REQUIREMENTS.
  - G. UPON COMPLETION OF WORK, THE GENERAL CONTRACTOR SHALL PROVIDE THE TENANT'S CONSTRUCTION MANAGER A FULL SET OF DRAWINGS WITH ANY DEVIATIONS FROM THE DRAWINGS INDICATED IN RED INK.

(END OF SECTION 23 00 00)

### SECTION 23 05 93 - TESTING, ADJUSTING AND BALANCING FOR HVAC

#### PART 1 - GENERAL

1. QUALITY ASSURANCE: ALL TESTING AND BALANCING WORK SHALL BE COMPLETED BY AN INDEPENDENT CONTRACTOR, CERTIFIED BY NEBB OR TABB AS A T&B TECHNICIAN. BALANCE THE SYSTEM IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING STANDARDS.

#### PART 2 - PRODUCTS: N/A

#### PART 3 - EXECUTION

1. AIR SYSTEMS
  - A. PROVIDE ALL LABOR AND MATERIALS REQUIRED TO BALANCE THE SYSTEM AS NOTED ON THE PLANS.
  - B. FAN SYSTEMS SHALL BE ADJUSTED SUCH THAT THE LOWEST FAN SPEED IS UTILIZED TO DELIVER THE REQUIRED CFM TO THE AIR TERMINALS.
  - C. ADJUST DAMPERS AS REQUIRED TO BALANCE THE SUPPLY, RETURN AND EXHAUST DEVICES TO 10% OF THE DESIGN RATES. ADJUST THE OUTSIDE AIR DAMPER AS REQUIRED TO OBTAIN THE MINIMUM OUTSIDE AIR REQUIREMENTS AS NOTED IN THE SCHEDULES.
  - D. RECORD THE OPERATING VOLTAGE, AMPACITY, SUPPLY/RETURN SYSTEM STATIC PRESSURES, SUPPLY/RETURN AIR TEMPERATURES (BOTH HEATING AND COOLING) AND FINAL FAN RPM.
  - E. VERIFY SYSTEM CONTROLS ARE FUNCTIONING AS INTENDED.
2. REPORTING
  - A. THE TEST AND BALANCE AGENT SHALL PREPARE A REPORT INCLUDING THE FINAL VALUES OF THE AIR SYSTEM BALANCING, SYSTEM DIAGRAMS, AND SYSTEM NOTES.
  - B. THE GENERAL CONTRACTOR SHALL REVIEW THE FINAL BALANCE REPORT PRIOR TO SENDING TO THE TENANT'S CONSTRUCTION MANAGER.
  - C. PROVIDE TAB REPORT TO THE LANDLORD AND THE AUTHORITY HAVING JURISDICTION AS REQUIRED.

(END OF SECTION 23 05 93)

### SECTION 23 07 13 - DUCT INSULATION

#### PART 1 - GENERAL

1. INSULATION SHALL BE PROVIDED ON THE FOLLOWING DUCT SERVICES:
  - A. INDOOR, CONCEALED SUPPLY AND OUTDOOR AIR.
  - B. INDOOR, CONCEALED RETURN.
  - C. INDOOR, CONCEALED OVERHEAD WAREWASH EXHAUST FROM AIR TERMINAL TO PENETRATION OF BUILDING EXTERIOR.
  - D. INDOOR, CONCEALED GENERAL EXHAUST FROM AIR TERMINAL TO PENETRATION OF BUILDING EXTERIOR.
  - E. OUTDOOR, SUPPLY AND RETURN.
2. QUALITY ASSURANCE
  - A. INSULATION INSTALLED INDOORS SHALL HAVE A FLAME-SPREAD INDEX OF 25 OR LESS, AND SMOKE-DEVELOPED INDEX OF 50 OR LESS.
  - B. INSULATION INSTALLED OUTDOORS SHALL HAVE A FLAME-SPREAD INDEX OF 75 OR LESS, AND SMOKE-DEVELOPED INDEX OF 150 OR LESS.

#### PART 2 - PRODUCTS

1. INTERIOR DUCTWORK SHALL HAVE FLEXIBLE FIBERGLASS DUCT WRAP LAMINATED TO FOIL REINFORCED KRAFT VAPOR BARRIER FACING WITH 2" STARLING FLANGE AND AN INSTALLED THICKNESS OF 1/2" WITH AN R-VALUE OF 8.0
2. EXTERIOR DUCTWORK SHALL BE INSULATED WITH 2" THICK RIGID INSULATION WITH A MINIMUM R-VALUE OF 12.0, PROTECTED WITH ROOFING MEMBRANE.

#### PART 3 - EXECUTION

1. PREPARATION: CLEAN AND DRY SURFACES. REMOVE MATERIALS THAT WILL ADVERSELY AFFECT INSULATION APPLICATION.
2. GENERAL INSTALLATION REQUIREMENTS:
  - A. INSTALL INSULATION ACCORDING TO MANUFACTURER'S INSTALLATION INSTRUCTIONS.
  - B. INSTALL INSULATION AND ACCESSORIES AND FINISHES WITH SMOOTH, STRAIGHT AND EVEN SURFACES, FREE OF VOIDS THROUGHOUT THE LENGTH OF DUCT AND FITTINGS.
  - C. INSTALL ACCESSORIES COMPATIBLE WITH INSULATION MATERIALS AND SUITABLE FOR THE SERVICE. ACCESSORIES SHALL NOT CORRODE, SOFTEN OR OTHERWISE ATTACK INSULATION OR JOINT IN EITHER WET OR DRY STATE.
  - D. INSTALL INSULATION WITH LONGITUDINAL SEAMS AT TOP OF HORIZONTAL RUNS, LONGITUDINAL SEAMS AND END JOINTS SHALL BE TIGHT, BOND SEAMS AND JOINTS WITH ADHESIVE RECOMMENDED BY INSULATION MANUFACTURER TO MAINTAIN VAPOR BARRIER INTEGRITY.
  - E. APPLY ADHESIVES, MASTICS AND SEALANTS AT MANUFACTURER'S RECOMMENDED COVERAGE RATE.
  - F. CUT INSULATION IN A MANNER TO AVOID COMPRESSING INSULATION MORE THAN 75 PERCENT ITS NOMINAL THICKNESS.
3. PENETRATIONS
  - A. ROOF PENETRATIONS: INSTALL INSULATION CONTINUOUSLY THROUGH ROOF PENETRATIONS. FOR APPLICATIONS REQUIRING ONLY INDOOR INSULATION, TERMINATE INSULATION ABOVE ROOF SURFACE AND SEAL WITH JOINT SEALANT. FOR APPLICATIONS REQUIRING INDOOR AND OUTDOOR INSULATION, INSTALL INSULATION FOR OUTDOOR APPLICATIONS TIGHTLY JOINED TO INDOOR INSULATION ENDS. SEAL JOINT WITH JOINT SEALANT.
  - B. WALL PENETRATIONS: INSTALL INSULATION CONTINUOUSLY THROUGH WALL PENETRATIONS. FOR APPLICATIONS REQUIRING ONLY INDOOR INSULATION, TERMINATE INSULATION ABOVE ROOF SURFACE AND SEAL WITH JOINT SEALANT. FOR APPLICATIONS REQUIRING INDOOR AND OUTDOOR INSULATION, INSTALL INSULATION FOR OUTDOOR APPLICATIONS TIGHTLY JOINED TO INDOOR INSULATION ENDS. SEAL JOINT WITH JOINT SEALANT.
  - C. INTERIOR WALLS: INSTALL INSULATION CONTINUOUSLY THROUGH WALLS AND PARTITIONS THAT ARE NOT FIRE RATED. TERMINATE INSULATION AT FIRE DAMPER SLEEVES FOR FIRE-RATED WALL AND PARTITION PENETRATIONS. EXTERNALLY INSULATE THE DAMPER SLEEVES TO MATCH ADJACENT INSULATION AND OVERLAP DUCT INSULATION AT LEAST 2 INCHES.

(END OF SECTION 23 07 13)

### SECTION 23 31 13 - METAL DUCTS

#### PART 1 - GENERAL

1. SECTION INCLUDES
  - A. RECTANGULAR DUCTS AND FITTINGS
  - B. ROUND DUCTS AND FITTINGS
  - C. DOUBLE-WALL DUCTWORK AND FITTINGS
  - D. FLAT-OVAL DUCTS AND FITTINGS
  - E. SHEET METAL MATERIALS
  - F. SEALANTS AND GASKETS
  - G. HANGERS AND SUPPORTS
2. PERFORMANCE REQUIREMENTS
  - A. DUCT CONSTRUCTION, INCLUDING SHEET METAL THICKNESS, SEAM AND JOINT CONSTRUCTION, REINFORCEMENTS AND HANGERS/SUPPORTS SHALL COMPLY WITH THE LATEST VERSION OF SMACNA'S HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE.
  - B. DUCT HANGERS AND SUPPORTS SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS UNDER CONDITIONS DESCRIBED IN SMACNA'S HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE.
  - C. SURFACES IN CONTACT WITH THE AIRSTREAM SHALL COMPLY WITH REQUIREMENTS IN ANSII/ASHRAE 62.1.
3. SECTION REQUIREMENTS
  - A. SUBMITTALS: NONE REQUIRED.

#### PART 2 - PRODUCTS

1. RECTANGULAR DUCTS AND FITTINGS:
  - A. COMPLY WITH SMACNA'S HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE BASED ON INDICATED STATIC-PRESSURE CLASS UNLESS NOTED OTHERWISE.
  - B. TRAVERSE JOINTS: SELECT JOINT TYPES AND FABRICATE ACCORDING TO SMACNA'S HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE; FIGURE 2-1 FOR STATIC PRESSURE CLASS, APPLICABLE SEALING REQUIREMENTS, MATERIALS INVOLVED, DUCT SUPPORT INTERVALS AND OTHER PROVISIONS AS REQUIRED.
  - C. LONGITUDINAL SEAMS: SELECT SEAM TYPES AND FABRICATE ACCORDING TO SMACNA'S HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE; FIGURE 2-2 FOR STATIC PRESSURE CLASS, APPLICABLE SEALING REQUIREMENTS, MATERIALS INVOLVED, DUCT SUPPORT INTERVALS AND OTHER PROVISIONS AS REQUIRED.
  - D. ELBOWS, TRANSITIONS OFFSETS, BRANCH CONNECTIONS AND OTHER DUCT CONSTRUCTION: SELECT TYPES AND FABRICATE ACCORDING TO SMACNA'S HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE; CHAPTER 4 FOR STATIC PRESSURE CLASS, APPLICABLE SEALING REQUIREMENTS, MATERIALS INVOLVED, DUCT SUPPORT INTERVALS AND OTHER PROVISIONS AS REQUIRED.
2. ROUND DUCTS AND FITTINGS:
  - A. SPIRAL LOCK SEAM WITHOUT INSULATION
  - B. BASIS OF DESIGN: LINDAB SAFE SINGLE WALL DUCTS AND FITTINGS. ALTERNATES BY MCGILL AIRFLOW. ALL DUCTWORK SHALL BE PREPPED AND READY TO RECEIVE PAINT.
3. FLAT-OVAL DUCTS AND FITTINGS
  - A. SPIRAL LOCK SEAM WITHOUT INSULATION
  - B. BASIS OF DESIGN: LINDAB FOSR FLAT-OVAL SPIRAL DUCTS AND FITTINGS. ALTERNATES BY MCGILL AIRFLOW. ALL DUCTWORK SHALL BE PREPPED AND READY TO RECEIVE PAINT.
4. DOUBLE-WALL DUCTWORK AND FITTINGS
  - A. SPIRAL LOCK SEAM WITH 1" INSULATION THICKNESS
  - B. BASIS OF DESIGN: LINDAB SAFE DOUBLE WALL DUCTS AND FITTINGS. ALTERNATES BY MCGILL AIRFLOW.
  - C. MATERIALS: GALVANIZED SHEET STEEL, COMPLY WITH ASTM A 653/A 653M, G90 COATING DESIGNATION.
5. SEALANTS AND GASKETS
  - A. MAXIMUM FLAME-SPREAD INDEX: 25 (WHEN TESTED ACCORDING TO UL 723).
  - B. MAXIMUM SMOKE-DEVELOPED INDEX: 50 (WHEN TESTED ACCORDING TO UL 723).
  - C. TWO-PART TAPE SEALING SYSTEM: PROVIDE 2" TAPE CONSTRUCTED OF WOVEN COTTON FIBER IMPREGNATED WITH MINERAL GYPSUM AND MODIFIED ACRYLIC/SILICONE TO FORM A HARD, DURABLE AIR-TIGHT SEAL. SEALANT SHALL BE A MODIFIED STYRENE ACRYLIC, COMPATIBLE WITH GALVANIZED SHEET STEEL, WATER, MOLD AND MILDEW RESISTANT, VOC CONTENT OF 250g/L OR LESS.
  - D. WATER BASED JOINT AND SEAM SEALANT: BRUSH ON WITH MINIMUM OF 65% SOLIDS CONTENT, MINIMUM SHORE A HARDNESS OF 20, COMPATIBLE WITH GALVANIZED SHEET STEEL, WATER, MOLD AND MILDEW RESISTANT, VOC CONTENT OF 75g/L (LESS WATER).
6. HANGERS AND SUPPORTS
  - A. RECTANGULAR DUCTWORK: HANGER RODS SHALL BE CADMIUM-PLATED STEEL RODS AND NUTS. STRAP AND ROD SIZE SHALL COMPLY WITH SMACNA'S HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE; TABLE 5-1. SECURE TO DUCT WITH SHEET METAL SCREWS COMPATIBLE WITH DUCT MATERIALS.
  - B. ROUND DUCTWORK: SUPPORT WITH AIRDRAFT CABLE COMPLYING WITH ASTM A 603. CONNECT ENDS WITH CADMIUM-PLATED STEEL ASSEMBLIES WITH BRACKETS, SWIVEL AND BOLTS DESIGNED FOR DUCT HANGER SERVICE.
  - C. EXTERIOR DUCTWORK SHALL BE PROVIDED WITH DUCT SUPPORTS, SPACED PER THE MANUFACTURER'S RECOMMENDATIONS.

#### PART 3 - EXECUTION

1. INSTALLATION
  - A. DRAWING PLANS, SCHEMATICS AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF DUCTWORK ROUTING. COORDINATE INSTALLATION WITH WORK OF ALL OTHER TRADES AND EXISTING CONDITIONS. ACCOMMODATE DUCT HANGER RODS, INSULATION AND OTHER REQUIREMENTS AS REQUIRED.
  - B. INSTALL DUCTS ACCORDING TO SMACNA'S HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE IN MAXIMUM PRACTICAL LENGTHS WITH FEWEST POSSIBLE JOINTS.
  - C. UNLESS NOTED OTHERWISE, INSTALL DUCTS PARALLEL AND PERPENDICULAR TO BUILDING LINES.
  - D. INSTALL DUCTS WITH CLEARANCES AS REQUIRED TO ACCOMMODATE THE INSTALLATION OF INSULATION.
  - E. INSTALLATION OF EXPOSED DUCTWORK: PROTECT DUCTWORK FROM DAMAGE. REPAIR/REPLACE ALL DAMAGED SECTIONS AND FINISHED WORK. TRIM SEALANTS FLUSH WITH METAL. CREATE A SMOOTH AND UNIFORM EXPOSED BEAD. DO NOT USE TWO-PART TAPING SYSTEM. MAINTAIN CONSISTENCY, SYMMETRY AND UNIFORMITY IN THE INSTALLATION.
2. DUCT SEALING: CONSTRUCT DUCTS WITH 2" INCH POSITIVE AND NEGATIVE DUCT PRESSURE CLASSIFICATIONS.
3. HANGER AND SUPPORT INSTALLATION: COMPLY WITH SMACNA'S HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE; CHAPTER 5. HANGERS EXPOSED TO VIEW SHALL BE AIRDRAFT IN ACCORDANCE WITH THE MECHANICAL DETAILS.
4. CONNECTIONS: MAKE CONNECTIONS TO EQUIPMENT WITH FLEXIBLE CONNECTORS COMPLYING WITH SECTION 23 33 00 AIR DUCT ACCESSORIES; COMPLY WITH SMACNA'S HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE; FOR BRANCH, OUTLET AND INLET, AND TERMINAL UNIT CONNECTIONS.
5. CLEANING: CLEAN ALL EXISTING DUCTWORK TO REMAIN PRIOR TO TESTING, ADJUSTING AND BALANCING. REMOVE ALL SURFACE CONTAMINANTS AND DEPOSITS ON AIR OUTLETS AND INLETS PRIOR TO PUNCH.
6. PROVIDE AIR BALANCE IN ACCORDANCE WITH SECTION 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC.
7. DUCT ELBOWS
  - A. RECTANGULAR: PROVIDE HOLLOW-FORMED, DOUBLE-THICKNESS TURNING VANES OR RADUSED ELBOWS WITH INSIDE RADIUS NO SMALLER THAN 1/2 OF THE DUCT WIDTH.
  - B. ROUND DUCT ELBOWS: PROVIDE RADUSED ELBOWS WITH AN INSIDE RADIUS NO SMALLER THAN 1/2 OF THE DUCT WIDTH.
8. BRANCH CONFIGURATION
  - A. RECTANGULAR: COMPLY WITH SMACNA'S HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE; FIGURE 4-6. RECTANGULAR MAIN TO RECTANGULAR BRANCH SHALL BE A 45-DEGREE ENTRY. RECTANGULAR MAIN TO ROUND BRANCH SHALL BE A SPIN-IN FITTING.
  - B. ROUND: COMPLY WITH SMACNA'S HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE; FIGURE 3-5 AND FIGURE 3-6. PROVIDE 90 DEGREE TAP.

(END OF SECTION 23 31 13)

### SECTION 23 33 00 - AIR DUCT ACCESSORIES

#### PART 1 - GENERAL

1. SECTION INCLUDES
  - A. BACKDRAFT AND PRESSURE RELIEF DAMPERS
  - B. MANUAL VOLUME DAMPERS
  - C. CONTROL DAMPERS
  - D. TURNING VANES
  - E. FLEXIBLE CONNECTORS
  - F. DUCT ACCESSORY HARDWARE
2. SECTION REQUIREMENTS
  - A. SUBMITTALS: NONE REQUIRED.

#### PART 2 - PRODUCTS

1. COMPLY WITH NFPA 90A AND WITH NFPA 90B.
2. COMPLY WITH SMACNA'S HVAC DUCT CONSTRUCTION STANDARDS-METAL AND FLEXIBLE FOR ACCEPTABLE MATERIALS, MATERIAL THICKNESS AND DUCT CONSTRUCTION METHODS UNLESS NOTED OTHERWISE. SHEET METAL MATERIALS SHALL BE FREE FROM FITTING, SEAM MARKS, ROLLER MARKS, STAINS, DISCOLORATIONS AND OTHER IMPERFECTIONS.
3. GALVANIZED SHEET STEEL, COMPLY WITH ASTM A 653/A 653M, G90 COATING DESIGNATION.
4. BACKDRAFT AND PRESSURE RELIEF DAMPERS: GRAVITY-OPERATED, AS SPECIFIED ON THE PLANS.
5. MANUAL VOLUME DAMPERS: STANDARD LEAKAGE RATING WITH LINKAGE OUTSIDE OF AIRFRAME. SUITABLE FOR HORIZONTAL OR VERTICAL APPLICATIONS
  - A. FRAME: HAT SHAPED WITH MITERED AND WELDED CORNERS. FLANGELESS FRAMES FOR INSTALLING IN DUCTS.
  - B. BLADES: RECTANGULAR DAMPERS SHALL BE MULTIPLE BLADES WITH OPPOSED-BLADE DESIGN. ROUND DAMPERS SHALL BE SINGLE BLADE.
  - C. BLADE AXLES: GALVANIZED STEEL.
  - D. BEARINGS: MOLDED SYNTHETIC.
  - E. THE BARS AND BRACKETS: GALVANIZED STEEL.
  - F. JACKSHAFT: 1/2" DIAMETER CONSTRUCTED OF GALVANIZED STEEL WITH PIPE-BEARING ASSEMBLY WITH SUPPORTS. LENGTH AND NUMBER OF MOUNTINGS AS REQUIRED.
  - G. HARDWARE: ZINC-PLATED, DIE CAST CORE WITH DIAL HANDLE AND A LOCKING NUT.
6. CONTROL DAMPERS
  - A. FRAME: HAT SHAPED WITH MITERED AND WELDED CORNERS. FLANGELESS FRAMES FOR INSTALLING IN DUCTS.
  - B. BLADES: RECTANGULAR DAMPERS SHALL BE MULTIPLE BLADES WITH OPPOSED-BLADE DESIGN. ROUND DAMPERS SHALL BE SINGLE BLADE. BLADE EDGING SHALL BE REPLACEABLE.
  - C. RUBBER SEALS.
  - D. BLADE AXLES: 1/2" DIAMETER. BLADE LINKAGE HARDWARE OF ZINC-PLATED STEEL AND BRASS; ENDS SEALED AGAINST BLADE BEARING.
  - E. BEARINGS: MOLDED SYNTHETIC.
7. TURNING VANES: CURVED BLADES OF GALVANIZED SHEET STEEL PROVIDED WITH SUPPORT BARS PERPENDICULAR TO BLADE SET SUITABLE FOR DUCT MOUNTING. COMPLY WITH SMACNA'S HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE; SINGLE WALL CONSTRUCTION.
8. FLEXIBLE CONNECTORS: CONSTRUCTED OF FLAME-RETARDANT OR NONCOMBUSTIBLE FABRIC. FABRIC SHALL BE A GLASS FABRIC, DOUBLE COATED WITH NEOPRENE. COMPLY WITH UL 181 CLASS 1, FACTORY-FABRICATED WITH A FABRIC STRIP 3-1/2 INCHES WIDE ATTACHED TO TWO STRIPS OF 2-3/4 INCH THICK GALVANIZED SHEET STEEL.

(END OF SECTION 23 33 00)

### SECTION 23 33 46 - FLEXIBLE DUCTS

#### PART 1 - GENERAL

1. SECTION REQUIREMENTS
  - A. SUBMITTALS: NONE REQUIRED.

#### PART 2 - PRODUCTS

1. COMPLY WITH NFPA 90A AND NFPA 90B.
2. COMPLY WITH SMACNA'S HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE FOR ACCEPTABLE MATERIALS, MATERIAL THICKNESS AND DUCT CONSTRUCTION METHODS UNLESS NOTED OTHERWISE.
3. COMPLY WITH ASTM E 96E 96M.
4. INSULATED, FLEXIBLE DUCTS: UL 181, CLASS 1, FACTORY FABRICATED AND INSULATED. PROVIDED WITH INTERIOR LINER, FIBROUS-GLASS INSULATION AND VAPOR-BARRIER FILM.
  - A. PRESSURE RATING: 10" W.G. POSITIVE.
  - B. MAXIMUM VELOCITY: 4,000 FPM
  - C. INSULATION R-VALUE: R8
5. FLEXIBLE DUCT CONNECTORS SHALL BE NYLON STRAPS IN SIZES 3 THROUGH 18 INCHES TO SUIT DUCT SIZE.

#### PART 3 - EXECUTION

1. INSTALLATION
  - A. INSTALL FLEXIBLE DUCTS ACCORDING TO APPLICABLE DETAILS IN SMACNA'S HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE.
  - B. INSTALL IN INDOOR APPLICATIONS ONLY. FLEXIBLE DUCTWORK IS ONLY PERMITTED TO CONNECT TO SUPPLY AIR GRILLES, REGISTERS AND DIFFUSERS. MAXIMUM LENGTH SHALL BE 60 INCHES.
  - C. CONNECT FLEXIBLE DUCTS TO METAL DUCTS WITH DRAW BANDS AND TAPE.
  - D. INSTALL DUCTS FULLY EXTENDED.
  - E. DO NOT BEND DUCTS ACROSS SHARP CORNERS.
  - F. BENDS OF FLEXIBLE DUCTING SHALL NOT EXCEED A MINIMUM OF ONE DUCT DIAMETER.
  - G. AVOID CONTACT WITH METAL FIXTURES, WATER LINES, PIPES, ADJACENT DUCTWORK OR CONDUIT.
  - H. INSTALL FLEXIBLE DUCTS IN A DIRECT LINE, WITHOUT SAGS, TWISTS OR TURNS.
  - I. SUSPEND FLEXIBLE DUCTS WITH BANDS 1-1/2 INCHES WIDE AND SPACED A MAXIMUM OF 48 INCHES APART. PROVIDE ADDITIONAL SUPPORT AT BENDS. DUCTS MAY REST ON CEILING JOISTS OR TRUSS SUPPORTS. SPACINGS BETWEEN THESE ELEMENTS SHALL NOT EXCEED 48 INCHES.

(END OF SECTION 23 33 46)

### SECTION 23 34 00 - SQUARE INLINE FANS

#### PART 1 - GENERAL

1. SECTION REQUIREMENTS
  - A. SUBMITTALS: PROVIDE SHOP DRAWINGS INDICATING THE DIMENSIONS, WEIGHTS, REQUIRED CLEARANCES, COMPONENTS, ELECTRICAL CHARACTERISTICS, CFM, STATIC PRESSURE AND FAN CURVE.
  - B. WARRANTY: SUBMIT A WRITTEN WARRANTY, SIGNED BY THE MANUFACTURER AGREEING TO REPAIR OR REPLACE COMPONENTS OF RTUS THAT FAIL IN MATERIALS OR WORKMANSHIP WITHIN THE MANUFACTURER'S STANDARD WARRANTY PERIOD.

#### PART 2 - PRODUCTS

1. DESCRIPTION
  - A. INLINE TYPE FAN WITH SQUARE INLET AND OUTLET DESIGNED FOR FLOOR-MOUNTING OR HUNG INSTALLATIONS IN-LINE WITH DUCTWORK WITH CENTRIFUGAL OR MIXED-FLOW WHEEL.
  - B. MANUFACTURERS: AS NOTED IN THE MECHANICAL SCHEDULES. NO SUBSTITUTIONS SHALL BE PERMITTED.
2. CHARACTERISTICS: PROVIDED WITH:
  - A. FAN: CONSTRUCTED OF CORROSION RESISTANT STEEL, DIRECT DRIVEN, SQUARE INLINE BLOWER.
  - B. HOUSING: CONSTRUCTED OF HEAVY-GAUGE GALVANIZED STEEL OR STAINLESS STEEL FOR UL762 LISTED FANS. SIDE PANELS SHALL BE REMOVABLE FOR SERVICE ACCESS.
  - C. WHEEL: BACKWARD INCLINED, NON-OVERLOADING, ALL-ALUMINUM WHEEL, BALANCED IN ACCORDANCE WITH AMCA STANDARD 20A-36.
  - D. MOTOR: VOLTAGE AS NOTED IN THE MECHANICAL SCHEDULES. MOTOR SHALL HAVE PERMANENTLY LUBRICATED BALL BEARINGS, SUPPLIED WITH A MOTOR COVER.
  - E. ACCESSORIES: AS NOTED ON THE MECHANICAL SCHEDULES.

#### PART 3 - EXECUTION

1. INSTALLATION
  - A. SUSPEND THE INLINE FAN FROM STRUCTURE WITH NEOPRENE-TYPE VIBRATION ISOLATORS AS NOTED IN THE STRUCTURAL DRAWINGS.
2. CONNECTIONS
  - A. COMPLY WITH DUCT INSTALLATION REQUIREMENTS SPECIFIED IN OTHER HVAC SECTIONS. DRAWINGS INDICATE GENERAL ARRANGEMENTS OF DUCTS.
  - B. WHERE INSTALLING ADJACENT TO OTHER BUILDING SYSTEMS, ALLOW SPACE FOR SERVICE AND MAINTENANCE.
  - C. CONNECT DUCTWORK TO FAN WITH FLEXIBLE DUCT CONNECTORS.
  - D. CONNECT ELECTRICAL WIRING IN ACCORDANCE WITH THE ELECTRICAL SPECIFICATIONS.
  - E. GROUND EQUIPMENT IN ACCORDANCE WITH THE ELECTRICAL SPECIFICATIONS.
3. FIELD QUALITY CONTROL
  - A. AFTER INSTALLING FANS, TEST UNITS FOR COMPLIANCE WITH REQUIREMENTS.
  - B. CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATIONS.
  - C. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATION.

(END OF SECTION 23 34 00)

### HVAC GENERAL NOTES

- A. GENERAL NOTES APPLY TO ALL HVAC SHEETS.
- B. WORK SHALL COMPLY WITH STATE AND LOCAL CODE REQUIREMENTS AS APPROVED AND AMENDED BY THE AUTHORITY HAVING JURISDICTION, INCLUDING APPLICABLE SECTIONS OF NFPA, THE MECHANICAL CODE, AND ANY INTERIM AMENDMENTS AT THE TIME OF THE PROPOSAL. PURCHASE PERMITS ASSOCIATED WITH THE WORK. OBTAIN INSPECTIONS REQUIRED BY CODE. SEE SHEET G-001 FOR THE PREVAILING CODES.
- C. CONTRACTOR AND SUBCONTRACTORS SHALL REVIEW A COMPLETE SET OF THE CONSTRUCTION DOCUMENTS.
- D. COORDINATE WORK WITH THE WORK OF OTHER TRADES, EQUIPMENT FURNISHED BY OTHERS, REQUIREMENTS OF THE OWNER, AND OF THE EXISTING CONDITIONS AT THE PROJECT SITE.
- E. DRAWINGS FOR THE MECHANICAL WORK ARE DIAGRAMMATIC, SHOWING THE GENERAL LOCATION, TYPE, LAYOUT, AND EQUIPMENT REQUIRED. THE DRAWINGS SHALL NOT BE SCALED FOR EXACT MEASUREMENTS, REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS. REFER TO MANUFACTURER'S STANDARD INSTALLATION DRAWINGS FOR EQUIPMENT CONNECTIONS AND INSTALLATION REQUIREMENTS. PROVIDE DUCTWORK, CONNECTIONS, OFFSETS, ACCESSORIES, AND MATERIALS NECESSARY FOR A COMPLETE SYSTEM.
- F. DUCT DIMENSIONS ON PLANS INDICATE DIMENSIONS OF INTERNAL FREE AREA.
- G. PERFORATED CEILING DIFFUSERS SHALL BE 4-WAY UNLESS NOTED OTHERWISE.
- H. COORDINATE ROOF WORK WITH THE LANDLORD AND THE OWNER'S CONSTRUCTION MANAGER PRIOR TO CONSTRUCTION. UTILIZE THE LANDLORD'S ROOFING CONTRACTOR AT THE GENERAL CONTRACTOR'S EXPENSE WHEN REQUIRED.
- I. UNLESS NOTED OTHERWISE RECTANGULAR DUCT ELBOWS SHALL BE MITERED ELBOWS WITH DOUBLE-THICKNESS TURNING VANES.
- J. REPLACE AIR FILTERS WITH NEW, CLEAN MERV8 FILTERS AT TURNOVER.
- K. THE TERM "FURNISH" OR "SUPPLY" MEANS SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLY, INSTALLATION, AND SIMILAR OPERATIONS. THE TERM "INSTALL" DESCRIBES THE OPERATIONS AT THE PROJECT SITE INCLUDING THE ACTUAL UNLOADING, UNPACKING, ASSEMBLY, ERECTING, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, AND SIMILAR OPERATIONS. THE TERM "PROVIDE" MEANS TO FURNISH AND INSTALL, COMPLETE AND READY FOR THE INTENDED USE.
- L. A FINAL REPORT FOR THE TESTING AND ADJUSTMENTS OF ALL NEW SYSTEMS FROM ALL DISCIPLINES SHALL BE COMPLETED WITH FINAL APPROVAL BY THE FIELD INSPECTOR. THIS REPORT SHALL BE SIGNED BY THE INDIVIDUAL RESPONSIBLE FOR PERFORMING THESE SERVICES.
- M. TESTING AND BALANCING OF THE MECHANICAL SYSTEMS TO BE COMPLETED BY NATIONALTAB AT THE GENERAL CONTRACTOR'S EXPENSE. THE CONTRACTOR SHALL CONTRACT WITH, SCHEDULE AND SUPERVISE/ASSIST NATIONALTAB AS REQUIRED. REFER TO THE COVER SHEET, OR CONTACT SWEETGREEN'S CONSTRUCTION MANAGER FOR CONTACT INFORMATION.
- N. ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH TAPE, PLASTIC, OR SHEET METAL UNTIL THE FINAL START UP OF THE HEATING, COOLING, AND VENTILATION EQUIPMENT.
- O. REFER TO THE TRANE AND CAPTIVE-AIRE NATIONAL ACCOUNT INFORMATION BLOCKS ON SHEET M-300 FOR REPRESENTATIVE CONTACT INFORMATION.
- P. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY UNIT CONFIGURATIONS, COORDINATE DELIVERY WITH TRANE, RECEIVE AND UNLOAD EQUIPMENT, INSPECT EQUIPMENT, PROPERLY INSTALL EQUIPMENT INCLUDING FIELD-INSTALLED ITEMS, EQUIPMENT STARTUP AND 1ST YEAR LABOR WARRANTY AND ADMINISTRATION.
- Q. PROVIDE ALL REQUIRED FIRESTOPPING AND SLEEVES AS REQUIRED FOR ALL LINESET PIPING, CONTROL AND POWER WIRING AND ALL OTHER SYSTEMS PENETRATING FIRE-RATED PARTITIONS.

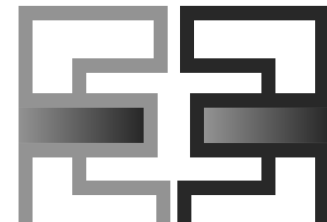


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ENGINEER OF RECORD:



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*Joshua A. Everett*

JOSHUA A. EVERETT, P.E.  
LICENSE NUMBER: 59703

11/10/2022

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PROJECT MANAGER: JAE  
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SG CONSTR. MANAGER: JB  
PROJECT NO: 210020  
TEMPLATE VERSION: 12/21/2021

REVISIONS  
REV. DATE DESCRIPTION

MECHANICAL  
SPECIFICATIONS

M-010

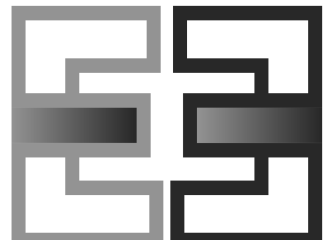


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M-011

SECTION 23 34 01 - CEILING AND INLINE FANS

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. SUBMITTALS: PROVIDE SHOP DRAWINGS INDICATING THE DIMENSIONS, WEIGHTS, REQUIRED CLEARANCES, COMPONENTS, ELECTRICAL CHARACTERISTICS, CFM, STATIC PRESSURE AND FAN CURVE
- B. WARRANTY: SUBMIT A WRITTEN WARRANTY, SIGNED BY THE MANUFACTURER AGREEING TO REPAIR OR REPLACE COMPONENTS OF RTUS THAT FAIL IN MATERIALS OR WORKMANSHIP WITHIN THE MANUFACTURER'S STANDARD WARRANTY PERIOD.

PART 2 - PRODUCTS

1. DESCRIPTION

- A. HIGH-CAPACITY FAN CAPABLE OF BEING MOUNTED IN THE CEILING OR INLINE ORIENTATION.
- 2. MANUFACTURERS: AS NOTED IN THE MECHANICAL SCHEDULES. NO SUBSTITUTIONS SHALL BE PERMITTED.
- 3. CHARACTERISTICS: PROVIDED WITH:
  - A. FAN: CONSTRUCTED OF GALVANIZED STEEL, FORWARD CURVED AND DIRECT DRIVE.
  - B. HOUSING: CONSTRUCTED OF 20 GAUGE GALVANIZED STEEL WITH 1/2" THICK ACOUSTIC INSULATION. PROVIDED WITH AN AUTOMATIC BACKDRAFT DAMPER ON THE DISCHARGE SIDE OF THE FAN LOCATED WITHIN THE DUCT CONNECTOR. PROVIDED WITH TWO 8-POSITION MOUNTING BRACKETS.
  - C. WHEEL: FORWARD CURVED, DYNAMICALLY BALANCED, POLYMERIC CENTRIFUGAL WHEEL ATTACHED TO THE MOTOR SHAFT WITH SET SCREWS.
  - D. MOTOR: 120 VOLT, OPEN DRIP MOTOR, PERMANENTLY LUBRICATED, RATED FOR CONTINUOUS DUTY, THERMALLY PROTECTED AND MOUNTED ON VIBRATION ISOLATORS. DISCONNECT SHALL BE INTERNAL AND OF THE PLUG TYPE.
  - E. ACCESSORIES: AS NOTED ON THE MECHANICAL SCHEDULES.

PART 3 - EXECUTION

1. INSTALLATION

- A. INSTALL CEILING-MOUNTED UNITS LEVEL, PLUMB AND SQUARE WITH CEILINGS AND WALLS.
- B. SUPPORT CEILING-MOUNTED UNITS SO THEY WILL NOT FALL OR SAG. SUPPORT SUCH THAT THAT THE CEILING WILL NOT BE DEFORMED AFTER MAINTENANCE.
- C. INSTALL INLINE UNITS PER THE MANUFACTURER'S INSTRUCTIONS.

2. CONNECTIONS

- A. COMPLY WITH DUCT INSTALLATION REQUIREMENTS SPECIFIED IN OTHER HVAC SECTIONS. DRAWINGS INDICATE GENERAL ARRANGEMENTS OF DUCTS.
- B. WHERE INSTALLING ADJACENT TO OTHER BUILDING SYSTEMS, ALLOW SPACE FOR SERVICE AND MAINTENANCE.
- C. CONNECT DUCTWORK TO FAN WITH FLEXIBLE DUCT CONNECTORS.
- D. CONNECT ELECTRICAL WIRING IN ACCORDANCE WITH THE ELECTRICAL SPECIFICATIONS.
- E. GROUND EQUIPMENT IN ACCORDANCE WITH THE ELECTRICAL SPECIFICATIONS.

3. FIELD QUALITY CONTROL

- A. AFTER INSTALLING FANS, TEST UNITS FOR COMPLIANCE WITH REQUIREMENTS.
- B. CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATIONS.
- C. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATION.

(END OF SECTION 23 34 01)

SECTION 23 37 13 - GRILLES, REGISTERS & DIFFUSERS

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. SUBMITTALS: NONE REQUIRED.

PART 2 - PRODUCTS

- 1. GRILLES: MANUFACTURER, MODEL, MATERIAL, FINISH, MOUNTING AND ACCESSORIES SHALL BE AS NOTED IN THE MECHANICAL SCHEDULES. NO SUBSTITUTIONS SHALL BE PERMITTED.
- 2. REGISTERS: MANUFACTURER, MODEL, MATERIAL, FINISH, MOUNTING AND ACCESSORIES SHALL BE AS NOTED IN THE MECHANICAL SCHEDULES. NO SUBSTITUTIONS SHALL BE PERMITTED.
- 3. DIFFUSERS: MANUFACTURER, MODEL, MATERIAL, FINISH, MOUNTING AND ACCESSORIES SHALL BE AS NOTED IN THE MECHANICAL SCHEDULES. NO SUBSTITUTIONS SHALL BE PERMITTED.

PART 3 - EXECUTION

1. INSTALLATION

- A. INSTALL GRILLES, REGISTERS & DIFFUSERS LEVEL AND PLUMB.
- B. INSTALL GRILLES, REGISTERS & DIFFUSERS AS INDICATED. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION.
- C. INSTALL GRILLES, REGISTERS & DIFFUSERS WITH AIRTIGHT CONNECTIONS TO DUCTS AND TO ALLOW SERVICE AND MAINTENANCE OF DAMPERS, EXTRACTORS AND OTHER ACCESSORIES.
- D. AFTER INSTALLATION, ADJUST REGISTERS & DIFFUSERS TO AIR PATTERNS (IF NOTED) OR AS DIRECTED BY THE TENANT'S CONSTRUCTION MANAGER PRIOR TO STARTING AIR BALANCING.

(END OF SECTION 23 37 13)

SECTION 23 55 01 - COMMERCIAL CEILING HEATERS

PART 1 - GENERAL

1. SECTION REQUIREMENTS

- A. SUBMITTALS: PROVIDE SHOP DRAWINGS INDICATING THE HEATING WATTAGE, ELECTRICAL CHARACTERISTICS, AIRFLOW CHARACTERISTICS, DIMENSIONS, WEIGHTS, REQUIRED CLEARANCES AND ACCESSORIES
- B. WARRANTY: SUBMIT A MANUFACTURER'S WARRANTY EFFECTIVE FOR 18 MONTHS ON THE HEATER. THE GENERAL CONTRACTOR SHALL PROVIDE A 12 MONTH WARRANTY ON ALL WORKMANSHIP.

PART 2 - PRODUCTS

1. DESCRIPTION

- A. ELECTRICAL COMPONENTS, DEVICES AND ACCESSORIES SHALL BE LABELED AND LISTED AS DEFINED IN NFPA 70 BY A QUALIFIED TESTING AGENCY.
- 2. MANUFACTURERS: AS NOTED IN THE MECHANICAL SCHEDULES. ALTERNATES BY QMARK OR BENO. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL STRUCTURAL, ELECTRICAL AND OTHER REQUIREMENTS RESULTING FROM THE SUBSTITUTION. ALL CHANGE ORDERS RESULTING IN THE USE OF AN ALTERNATE SHALL BE PAID FOR BY THIS CONTRACTOR.
- 3. CHARACTERISTICS: PROVIDED WITH:
  - A. HEATING ELEMENT CONSTRUCTED OF FINNED TUBULAR STEEL ELEMENTS.
  - B. LOUVERED FRONT GRILLE CONSTRUCTED OF 18-GAUGE STEEL.
  - C. AUTOMATIC RESET THERMAL CUTOFF AND FAN OVERRIDE.
  - D. FAN MOTOR SHALL BE PERMANENTLY LUBRICATED, OPEN AND VENTILATED.
  - E. WATTAGE, TEMPERATURE RISE, AIRFLOW AND VOLTAGE SHALL BE NOTED ON THE SCHEDULES.
  - F. PROVIDE ALL ACCESSORIES AS NOTED IN THE SCHEDULES.

PART 3 - EXECUTION

1. INSTALLATION

- A. COORDINATE INSTALLATION WITH WORK OF ALL OTHER TRADES. ACCOMMODATE HANGERS AND OTHER REQUIREMENTS AS NECESSARY.
- B. INSTALL UNIT LEVEL AND PLUMB.
- C. INSTALL THE UNIT IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS SO THAT THE UNIT WILL NOT FALL OR SAG. CEILING SHALL NOT DEFORM AFTER INSTALLATION OR MAINTENANCE.

2. CONNECTIONS

- A. CONNECT ELECTRICAL WIRING IN ACCORDANCE WITH THE ELECTRICAL SPECIFICATIONS.
- B. GROUND EQUIPMENT IN ACCORDANCE WITH THE ELECTRICAL SPECIFICATIONS.

3. FIELD QUALITY CONTROL

- A. CONFIRM THERMOSTAT FUNCTION.
- B. CONFIRM HEATER AND FAN FUNCTION.
- C. CONFIRM ALL INTERLOCKINGS WITH OTHER MECHANICAL COMPONENTS ARE FUNCTIONAL.
- D. CLEAN FRONT GRILLE PRIOR TO TURNOVER.

(END OF SECTION 23 55 01)

SECTION 23 90 00 - LOUVERS

PART 1 - GENERAL

1. SECTION INCLUDES

- A. EXTRUDED ALUMINUM LOUVERS
- 2. PERFORMANCE REQUIREMENTS
  - A. UL CLASSIFIED FOR WIND RESISTANT BUILDING COMPONENTS IN ACCORDANCE WITH ASTM E330-02 FOR + F5 WINDLOAD.
  - B. LOUVERS SHALL BEAR THE AMCA CERTIFIED RATINGS SEAL, LISTED FOR BASE PROTECTION.

3. SECTION REQUIREMENTS

- A. SUBMITTALS: PROVIDE SHOP DRAWINGS INDICATING SIZE, FACE AREA, FREE AREA, AIRFLOW, PRESSURE DROP, MATERIAL, FINISH AND FURNISHED ACCESSORIES.
- 4. WARRANTY: SUBMIT A WRITTEN WARRANTY, SIGNED BY THE MANUFACTURER INDICATING THAT THE PRODUCT WILL BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF 5-YEARS AS OF THE DATE OF DELIVERY TO THE DELIVERY LOCATION.

PART 2 - PRODUCTS

1. DESCRIPTION

- A. LOUVERS SHALL BE STATIONARY DRAINABLE TYPE WITH DRAIN GLITTERS IN EACH BLADE AND DOWNSPOUTS IN JAMBS AND MULLIONS.
- B. STATIONARY DRAINABLE BLADES SHALL BE CONTAINED WITHIN A FRAME.
- C. LOUVER COMPONENTS (HEADS, JAMBS, SKLS, BLADES & MULLIONS) SHALL BE FACTORY ASSEMBLED BY THE MANUFACTURER.
- D. LOUVER SIZES TOO LARGE FOR SHIPPING SHALL BE BUILT UP BY THE CONTRACTOR FROM FACTORY-ASSEMBLED SECTIONS.
- E. LOUVERS SHALL BE FURNISHED WITH A FLATTENED ALUMINUM BIRD SCREEN IN REMOVEABLE FRAME.
- F. FINISH SHALL BE AS NOTED IN THE MATERIAL SCHEDULES.

- 2. MANUFACTURERS: AS NOTED IN THE MECHANICAL SCHEDULES. ALTERNATES BY GREENHECK AND NAILOR.

PART 3 - EXECUTION

1. INSTALLATION

- A. INSPECT AREAS TO RECEIVE LOUVERS. NOTIFY THE ARCHITECT OF CONDITIONS THAT WOULD ADVERSELY AFFECT THE INSTALLATION OR UTILIZATION OF THE LOUVERS.
- B. CLEAN OPENING THOROUGHLY PRIOR TO INSTALLATION AND PREPARE SURFACES USING THE METHODS RECOMMENDED BY THE MANUFACTURER.
- C. INSTALL LOUVERS AT LOCATIONS INDICATED AND IN ACCORDANCE WITH THE STRUCTURAL DETAILS AND MANUFACTURER'S INSTRUCTIONS.
- D. INSTALL LOUVERS LEVEL, PLUMB, IN PLANE OF WALL AND IN ALIGNMENT WITH ANY ADJACENT WORK.
- E. INSTALL JOINT SEALANTS AS REQUIRED.

2. FIELD QUALITY CONTROL

- A. CLEAN LOUVER SURFACES IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
- B. TOUCH-UP, REPAIR OR REPLACE DAMAGED PRODUCTS.

(END OF SECTION 23 90 00)

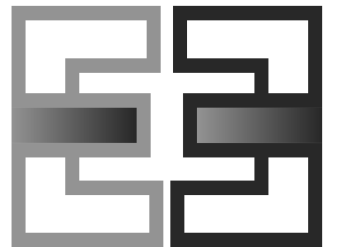


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REVISIONS  
REV. DATE DESCRIPTION  
3 08/25/2022 HVAC REVISIONS  
4 11/08/2022 ENTRY VESTIBULE REVISION

HVAC PLAN

M-100

### CODED NOTES

- 1 INSTALL EQUIPMENT PER MANUFACTURER'S INSTALLATION INSTRUCTION AND PER THE STRUCTURAL DETAILS.
- 2 COORDINATE MOUNTING LOCATION FOR WALK-IN COOLER CONDENSING UNIT, CU-1 ON TOP OF THE WALK-IN COOLER WITH THE KITCHEN EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN. ENSURE ALL CLEARANCE REQUIREMENTS FOR THE UNIT ARE MAINTAINED THROUGHOUT CONSTRUCTION. KITCHEN EQUIPMENT SUPPLIER SHALL PROVIDE LINESET, SPECIALTIES AND MAKE ALL FINAL CONNECTIONS BETWEEN THE CONDENSING UNIT AND EVAPORATOR COIL.
- 3 PROVIDE SUPPLY DIFFUSER CONNECTION PER DETAIL 1/SHEET M-400.
- 4 REFER TO THE ARCHITECTURAL RCP FOR CEILING MOUNTED EQUIPMENT LOCATION. TYPICAL.
- 5 EXISTING MECHANICAL EQUIPMENT TO BE PROVIDED BY THE LANDLORD. CONNECT SUPPLY AND RETURN DUCTWORK AS NOTED.
- 6 RELOCATE THE LANDLORD-PROVIDED MAIN CONTROLLER FOR THE VRF SYSTEM TO THIS LOCATION AT 48" AFF. COORDINATE WITH ELECTRICAL SWITCHING IN THE AREA AND EXTEND CONTROLS WIRING AS NOTED IN THE TRADE SHOP DRAWINGS. COORDINATE CONTROLLER LOCATION WITH WALL-MOUNTED EQUIPMENT SO THAT THE THERMOSTATS ARE NOT BLOCKED BY SHELVING, COAT RACKS OR DOORS.
- 7 INSTALL THE TEMPERATURE SENSOR FOR THE KITCHEN SYSTEM NOTED AT THIS LOCATION AT 5'-0" AFF. COORDINATION LOCATION WITH EQUIPMENT AND WALL-MOUNTED FIXTURES AS REQUIRED SUCH THAT THE SENSOR IS NOT BLOCKED.
- 8 INSTALL THE TEMPERATURE SENSOR IN AN INSULATED JUNCTION BOX FOR THE HVAC EQUIPMENT NOTED AT THIS LOCATION AT 5'-0" AFF. COORDINATION LOCATION WITH EQUIPMENT AND WALL-MOUNTED FIXTURES AS REQUIRED SUCH THAT THE SENSOR IS NOT BLOCKED.
- 9 PROVIDE EXPOSED DUCTWORK AS SHOWN, PER THE SPECIFICATIONS AND PER DETAIL 2/SHEET M-400.
- 10 THE GENERAL CONTRACTOR SHALL FURNISH A REME HALO AIR PURIFICATION SYSTEM AND REQUIRED TRANSFORMER, PURCHASED THROUGH SWEETGREEN'S VENDOR (NATIONAL TAB) AND INSTALL SYSTEM IN THE SUPPLY AIR DUCTWORK AND PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. ADJUST AS REQUIRED FOR THE SUPPLY AIRFLOW.
- 11 MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCE ZONES. NO DUCTWORK, PIPING, CONDUIT OR OTHER SYSTEMS SHALL BE PERMITTED IN THIS AREA. COORDINATE WITH SITE CONDITIONS AND WORK OF OTHER TRADES AS REQUIRED. TYPICAL.
- 12 REFRIGERANT PIPING FOR THE VRF SYSTEMS SHALL BE FURNISHED AND INSTALLED BY THE LANDLORD.
- 13 FILTER BOX FOR THE AIR HANDLING UNIT SHALL BE FURNISHED AND INSTALLED BY THE LANDLORD.
- 14 PROVIDE A DUCT HEATER IN THE OUTSIDE-AIR STREAM IN LOCATION SHOWN. ENSURE THAT THERE IS A MINIMUM OF 4'-0" OF STRAIGHT DUCT AT THE INLET AND OUTLET OF THE HEATER. INSTALL PER THE DUCT HEATER INSTALLATION DETAIL AND PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- 15 PROVIDE A DUCT-MOUNTED TEMPERATURE SENSOR IN THE LOCATION SHOWN. REFER TO THE SEQUENCE OF OPERATIONS FOR MORE INFORMATION.
- 16 INSTALL DUCT HEATER WITH DISCONNECT AND CONTROL PANEL FACING DOWN.
- 17 PROVIDE DUCT-MOUNTED THERMOSTAT FOR DUCT HEATER. REFER TO THE SEQUENCE OF OPERATIONS FOR MORE INFORMATION.
- 18 MAIN TRUNK DUCTWORK SERVING THE DIFFUSER SHALL BE ROUTED ABOVE THE CLEARANCE ZONE OF AHU-5. PROVIDE FLEXIBLE DUCT CONNECTION SO THAT THE DIFFUSER CAN BE COMPLETELY REMOVED FROM THE CLEARANCE ZONE OF AHU-5.
- 19 PROVIDE HEATER RECESSED IN THE CEILING, INTERLOCKED WITH AHU-5 SO THAT THE HEATING SHALL NOT BE ENERGIZED UNLESS VAV-2 IS PROVIDING HEATING.
- 20 EXTEND DUCTWORK THROUGH THE SOFFIT OVER TOP OF THE SERVE LINE AND CAP TO MAINTAIN A SYMMETRICAL LOOK IN THE DINING AREA.
- 21 PROVIDE DIFFUSER WITH DUCTWORK AND CAP AS SHOWN.
- 22 PAINT INTERIOR OF DUCTWORK VISIBLE FROM THE DINING ROOM BLACK. TYPICAL.
- 23 PROVIDE A TWO-POSITION DAMPER IN LOCATION SHOWN. WHEN THE SPACE IS SCHEDULED TO BE IN OCCUPIED MODE, THE DAMPER SHALL POWER CLOSED TO IT'S SETPOINT POSITION. DURING UNOCCUPIED MODE, THE DAMPER SHALL SPRING OPEN. REFER TO THE SEQUENCE OF OPERATIONS FOR MORE INFORMATION.
- 24 PROVIDE A BELIMO ZIP ECONOMIZER FOR MECHANICAL EQUIPMENT. PROVIDE 24V FULLY-MODULATING DAMPERS, SENSORS AND WIRING AS REQUIRED FOR A FULLY FUNCTIONING ENTHALPY ECONOMIZER SYSTEM. INSTALL PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- 25 THE GENERAL CONTRACTOR SHALL FURNISH A REME HALO AIR PURIFICATION SYSTEM AND REQUIRED TRANSFORMER, PURCHASED THROUGH SWEETGREEN'S VENDOR (NATIONAL TAB) AND INSTALL SYSTEM IN THE SUPPLY AIR DUCTWORK AND PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. ADJUST AS REQUIRED FOR THE SUPPLY AIRFLOW.
- 26 PROVIDE MITERED 90° OVAL ELBOW WITH TURNING VANES.
- 27 PROVIDE A 30"x24" RUSKIN CBD2 COUNTERBALANCED BACKDRAFT DAMPER IN THE PRESSURE-RELIEF AIR DUCTWORK. DAMPER SHALL BE BALANCED TO PERMIT THE REQUIRED AIRFLOW TO EXIT DURING ECONOMIZER OPERATION AND SHALL REMAIN CLOSED DURING DESIGN CONDITIONS. INSTALL PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- 28 PANELBOARDS LOCATED IN WALL BETWEEN THE OFFICE AND THE RESTROOM. NO FOREIGN SYSTEMS (DUCTWORK, LINESET PIPING, DRAIN PIPING, ETC.) SHALL BE ROUTED THROUGH THE DEDICATED ELECTRICAL SPACE IN ACCORDANCE WITH SECTION 110.26 OF THE NEC. REFER TO THE POWER PLAN FOR EXACT PANEL LOCATION.
- 29 PROVIDE EXHAUST DUCTWORK UP TO ROOF IN APPROXIMATE LOCATION SHOWN. COORDINATE ROUTING THROUGH THE EXISTING STORAGE AREA WITH THE LANDLORD AS REQUIRED. TERMINATE WITH A GOOSENECK, NO LESS THAN 6" ABOVE THE HIGHEST ANTICIPATED SNOWFALL (APPROX. 60" MINIMUM).
- 30 PROVIDE A TEMPERATURE SENSOR ON THE EXTERIOR OF THE BUILDING TO SERVE THE VESTIBULE UNIT HEATER. INTERLOCK THE SENSOR WITH THE EQUIPMENT SUCH THAT THE EQUIPMENT SHALL BE DE-ENERGIZED WHEN THE OUTDOOR AIR TEMPERATURE IS GREATER THAN 68°F. ADJUST THE THERMOSTAT FURNISHED WITH THE UNIT HEATER TO LIMIT HEATING TO A TEMPERATURE NOT GREATER THAN 68°F.
- 31 PROVIDE A TEMPERATURE SENSOR ON THE EXTERIOR OF THE BUILDING TO SERVE THE AIR CURTAIN. INTERLOCK THE SENSOR WITH THE EQUIPMENT SUCH THAT THE EQUIPMENT SHALL BE DE-ENERGIZED WHEN THE OUTDOOR AIR TEMPERATURE IS GREATER THAN 60°F. ADJUST THE THERMOSTAT FURNISHED WITH THE UNIT HEATER TO LIMIT HEATING TO A TEMPERATURE NOT GREATER THAN 60°F.
- 32 ADJUST THE DOOR SWITCH SO THAT THE AIR CURTAIN'S FAN REMAINS ENERGIZED FOR TWO SECONDS AFTER THE DOOR IS SHUT.

### SYMBOLS & ABBREVIATIONS

#### HVAC SYMBOLS

- MITERED CORNER WITH TURNING VANES
- DUCTWORK INTERNAL FREE DIMENSIONS (WIDTH/HEIGHT)
- RECTANGULAR TO ROUND DUCT TRANSITION
- MOTOR-OPERATED DAMPER
- MANUAL VOLUME DAMPER
- MITERED CORNER WITHOUT TURNING VANES
- CEILING DIFFUSER
- CEILING-MOUNTED RETURN OR EXHAUST REGISTER
- SUPPLY REGISTER
- RETURN REGISTER
- FLEXIBLE DUCT
- THERMOSTAT
- REMOTE TEMPERATURE SENSOR
- PLAN NOTE: SEE PLAN NOTES LISTED ON THE SAME SHEET FOR NOTE MEANING
- CONNECT TO EXISTING
- EQUIPMENT TAG: SEE EQUIPMENT SCHEDULE ON SHEET M-300 FOR EQUIPMENT INFORMATION
- TAG
- NECK SIZE
- AIRFLOW (CFM)

#### HVAC ABBREVIATIONS

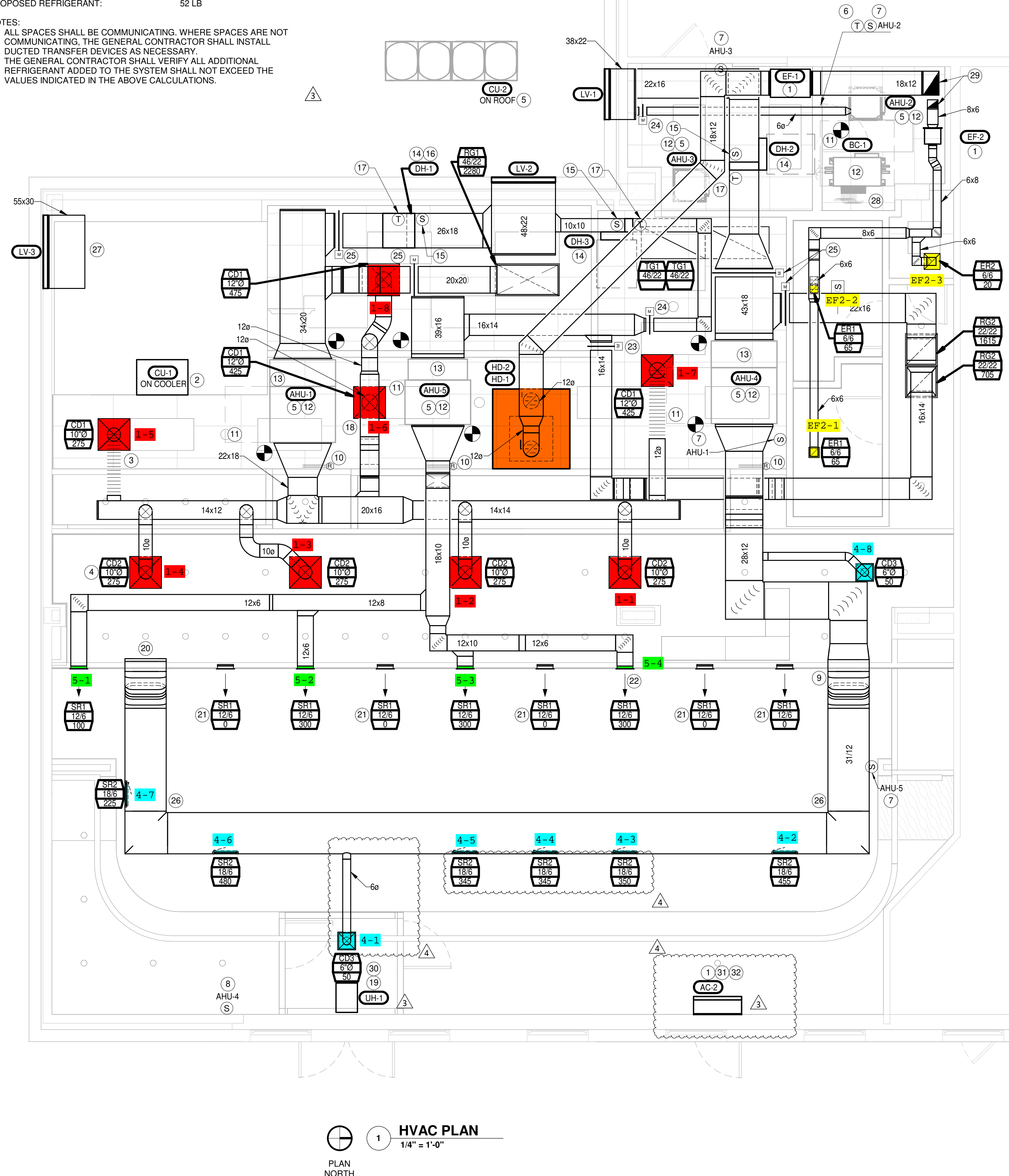
- (E) EXISTING
- (R) RELOCATED
- AFF ABOVE FINISHED FLOOR
- AFG ABOVE FINISHED GRADE
- AHU AIR HANDLING UNIT
- BC BLOWER COIL
- CD CEILING DIFFUSER
- CU CONDENSING UNIT
- EF EXHAUST FAN
- ER EXHAUST REGISTER
- EXTG EXISTING
- GC GENERAL CONTRACTOR
- HES TENANT'S HVAC EQUIPMENT SUPPLIER
- KES TENANT'S KITCHEN EQUIPMENT SUPPLIER
- OBD BLADE DAMPER
- PL PLENUM
- RG RETURN GRILLE
- RTU ROOFTOP UNIT
- SD SLOT DIFFUSER
- SR SUPPLY REGISTER
- VSC VARIABLE SPEED CONTROL
- WSHP WATER SOURCE HEAT PUMP

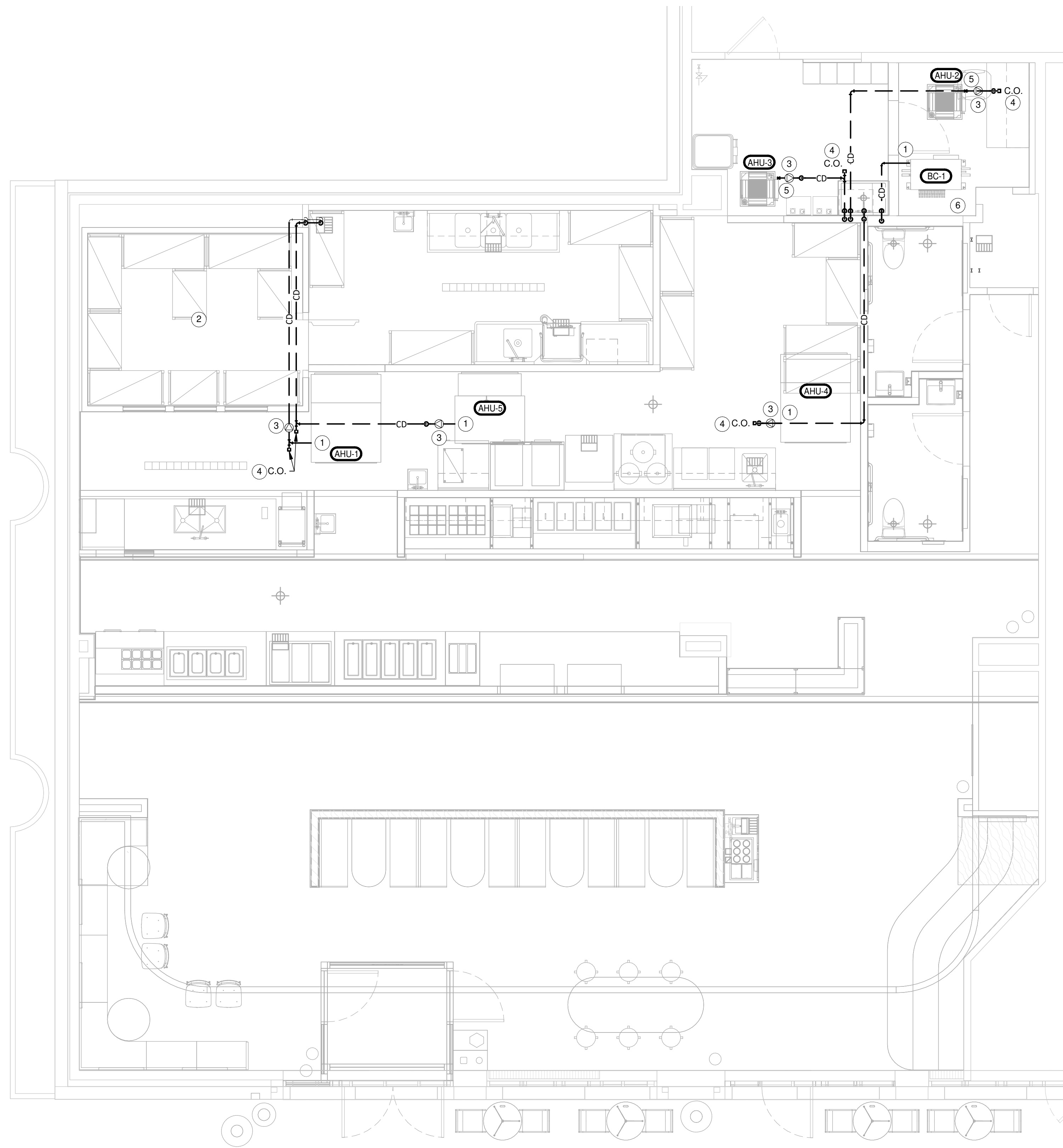
### REFRIGERATION SAFETY CALCULATIONS



SYSTEM CLASSIFICATION:	HIGH PROBABILITY
REFRIGERANT CLASSIFICATION:	R-410A TYPE A1
REFRIGERANT PER OCCUPIED SPACE:	26 LB / 1,000 CUBIC FEET
COMMUNICATIVE VOLUME:	26,857 CUBIC FEET
MAXIMUM REFRIGERANT PERMITTED:	698.2 LB
PROPOSED REFRIGERANT:	52 LB

#### NOTES:

1. ALL SPACES SHALL BE COMMUNICATING. WHERE SPACES ARE NOT COMMUNICATING, THE GENERAL CONTRACTOR SHALL INSTALL DUCTED TRANSFER DEVICES AS NECESSARY.
2. THE GENERAL CONTRACTOR SHALL VERIFY ALL ADDITIONAL REFRIGERANT ADDED TO THE SYSTEM SHALL NOT EXCEED THE VALUES INDICATED IN THE ABOVE CALCULATIONS.





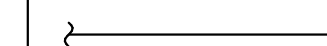
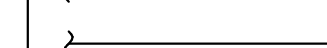



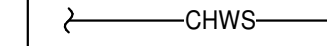
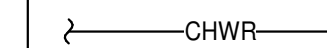

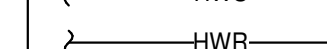



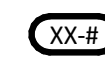

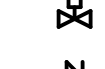
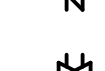




**HVAC PIPING PLAN**  
 1/4" = 1'-0"  
 PLAN NORTH

**CODED NOTES**

- 1 PROVIDE CONDENSATE DRAIN FROM THE AIR HANDLING UNIT AS SHOWN, PER DETAIL 3/SHEET M-400 AND PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE INDIRECT DRAIN PER DETAIL 5/SHEET P-400. ALL DRAIN PIPING SHALL BE CONCEALED ABOVE CEILINGS AND WITHIN FRAMED WALLS UNLESS OTHERWISE NOTED.
- 2 REFER TO SANITARY WASTE AND VENT PLAN FOR WALK-IN COOLER CONDENSATE DRAIN ROUTING.
- 3 THE GENERAL CONTRACTOR SHALL PROVIDE A CONDENSATE PUMP (BLUE DIAMOND MAXBLUE), PURCHASED THROUGH SWEETGREEN'S TRANE NATIONAL ACCOUNTS REPRESENTATIVE. CONTRACTOR SHALL PROVIDE PIPING UP TO A HEIGHT SUFFICIENT ENOUGH TO DRAIN THE CONDENSATE VIA GRAVITY AND PROVIDE PIPING TO THE INDIRECT WASTE RECEPTOR SHOWN PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. TERMINATE PER THE INDIRECT WASTE PIPING DETAIL. ALL DRAIN PIPING SHALL BE CONCEALED WITHIN FRAMED WALLS AND ABOVE FINISHED CEILINGS UNLESS NOTED OTHERWISE. COORDINATE WITH FIELD-CONDITIONS AS REQUIRED.
- 4 PROVIDE CLEANOUTS IN CONDENSATE PIPING AS SHOWN AND AS REQUIRED TO CLEAN BLOCKAGES IN THE CONDENSATE DRAIN SYSTEM. TYPICAL.
- 5 PROVIDE CONDENSATE DRAIN FROM THE AIR HANDLING UNIT AS SHOWN AND PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE INDIRECT DRAIN PER DETAIL 5/SHEET P-400. ALL DRAIN PIPING SHALL BE CONCEALED ABOVE CEILINGS AND WITHIN FRAMED WALLS UNLESS OTHERWISE NOTED.
- 6 PANELBOARDS LOCATED IN WALL BETWEEN THE OFFICE AND THE RESTROOM. NO FOREIGN SYSTEMS (DUCTWORK, LINESET PIPING, DRAIN PIPING, ETC.) SHALL BE ROUTED THROUGH THE DEDICATED ELECTRICAL SPACE IN ACCORDANCE WITH SECTION 110.26 OF THE NEC. REFER TO THE POWER PLAN FOR EXACT PANEL LOCATION.

**SYMBOLS & ABBREVIATIONS**

**HVAC PIPING SYMBOLS**

-  ELBOW UP
-  ELBOW DOWN
-  CONDENSER WATER SUPPLY
-  CONDENSER WATER RETURN
-  CHILLED WATER SUPPLY
-  CHILLED WATER RETURN
-  HOT WATER SUPPLY
-  HOT WATER RETURN
-  CONDENSATE DRAIN
-  PLAN NOTE: SEE KEYNOTES LISTED ON THE SAME SHEET FOR NOTE MEANING
-  CONNECT TO EXISTING
-  REDUCED PRESSURE ZONE BACKFLOW PREVENTER
-  EQUIPMENT TAG: SEE EQUIPMENT SCHEDULE ON SHEET M-300 FOR EQUIPMENT INFORMATION
-  VALVE
-  SOLENOID-OPERATED VALVE
-  CHECK VALVE
-  CIRCUIT-SETTER BALANCE VALVE RATED FOR POTABLE WATER
-  BTU METER

**HVAC PIPING ABBREVIATIONS**

- AFF ABOVE FINISHED FLOOR
- AFG ABOVE FINISHED GRADE
- AHU AIR HANDLING UNIT
- BC BLOWER COIL
- CD CONDENSATE DRAIN
- CHWR CHILLED WATER RETURN
- CHWS CHILLED WATER SUPPLY
- CWR CONDENSER WATER RETURN
- CWS CONDENSER WATER SUPPLY
- EXT'G EXISTING
- GC GENERAL CONTRACTOR
- HES TENANT'S HVAC EQUIPMENT SUPPLIER
- HWR HOT WATER RETURN
- HWS HOT WATER SUPPLY
- KES TENANT'S KITCHEN EQUIPMENT SUPPLIER
- RTU ROOFTOP UNIT
- WSHP WATER SOURCE HEAT PUMP

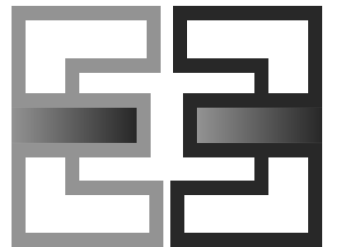


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JOSHUA A. EVERETT, P.E.  
LICENSE NUMBER: 59703 11/10/2022

PROJECT INFORMATION:  
**UNIVERSITY OF MINNESOTA**

PROJECT INFORMATION:  
**615 WASHINGTON AVE SE  
MINNEAPOLIS, MN 55414**

DRAWN BY: JAE  
CHECKED BY: MK  
PROJECT MANAGER: JAE  
SG DESIGN MANAGER: LG  
SG CONSTR. MANAGER: JB  
PROJECT NO: 210020  
TEMPLATE VERSION: 12/21/2021

REVISIONS  
REV. DATE DESCRIPTION

**HVAC PIPING PLAN**

**M-200**

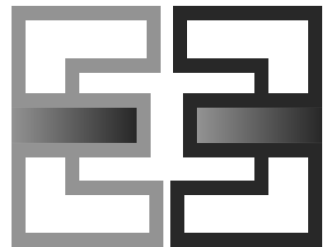


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REVISIONS REV. 4 DATE 11/08/2022 DESCRIPTION ENTRY VESTIBULE REVISION

HVAC SCHEDULES

M-300

HEATED AIR CURTAIN SCHEDULE

Table with columns: TAG, DESCRIPTION, OPENING WIDTH, MAX VELOCITY (FPM), AVERAGE VELOCITY (FPM), AIRFLOW (CFM), HEATING KW, MOCP (A), MCA (A), V/P/H, SUPPLIER, INSTALLER, MANUFACTURER, MODEL, REMARKS.

MATERIAL SCHEDULE

Table with columns: CATEGORY, APPLICATION, ALLOWABLE MATERIAL. Categories include EXPOSED, SUPPLY; EXPOSED, RETURN; EXPOSED, GEN. EXHAUST; EXPOSED, VENTILATION AIR; CONCEALED, SUPPLY; CONCEALED, RETURN; CONCEALED, GEN. EXHAUST; CONCEALED, VENTILATION AIR; CONDENSATE DRAINS.

VENTILATION SCHEDULE

Table with columns: CATEGORY, OCCUPANT DENSITY (# / 1000 SF), AREA (SF), OCCUPANCY BY AREA (PEOPLE), AIR RATE (CFM), VENTILATION REQUIRED (CFM), EFFECTIVENESS, VENTILATION REQUIRED (CFM), VENTILATION PROVIDED (CFM).

EXHAUST SCHEDULE

Table with columns: CATEGORY, AREA (SF), NUMBER OF FIXTURES, AIR RATE, EXHAUST REQUIRED (CFM), VENTILATION REQUIRED (CFM), VENTILATION PROVIDED (CFM).

AIR BALANCE SCHEDULE

Table with columns: TAG, SUPPLY AIRFLOW (CFM), RETURN AIRFLOW (CFM), OUTSIDE AIRFLOW (CFM), EXHAUST AIRFLOW (CFM), SUBTOTAL (CFM).

CAPTIVEAIRE - HVAC SYSTEM INFORMATION

CONTACT THE CAPTIVEAIRE NATIONAL ACCOUNT TEAM FOR HVAC SYSTEM INFORMATION AT: MARK PROFET (301)825-5476 MARK.PROFET@CAPTIVEAIRE.COM

TRANE NATIONAL ACCOUNT - HVAC SYSTEM INFORMATION

CONTACT THE TRANE NATIONAL ACCOUNT TEAM FOR HVAC SYSTEM INFORMATION AT: EMAIL: SOCALNA@TRANE.COM PHONE: (714)983-0505 OPTION 4 (NATIONAL ACCOUNTS TEAM) OR ANY OF THE BELOW SOUTHERN CALIFORNIA NATIONAL ACCOUNTS TEAM MEMBERS:

FAN SCHEDULE

Table with columns: TAG, EXHAUST (CFM), E.S.P. (IN. W.C.), DRIVE TYPE, MOTOR POWER (HP), WEIGHT (LBF), V/P/H, SUPPLIER, INSTALLER, MANUFACTURER, MODEL, SPECIAL REMARKS.

DUCT HEATER SCHEDULE

Table with columns: TAG, DESCRIPTION, AIRFLOW (CFM), OUTPUT (BTU/H), HEATING (EAT (DEG. F), LAT (DEG. F)), ELECTRICAL (KW, V/P/H), SUPPLIER, INSTALLER, BASIS OF DESIGN (MANUFACTURER, MODEL), REMARKS.

TYPE II HOOD SCHEDULE

Table with columns: TAG, DESCRIPTION, HOOD CONSTRUCTION (WIDTH, DEPTH, MATERIAL), MAXIMUM COOKING TEMPERATURE (DEG. F), EXHAUST COLLARS (AIRFLOW (CFM), DIAMETER (IN), PRESSURE DROP (IN. W.G.)), WEIGHT (LBF.), SUPPLIER, INSTALLER, MANUFACTURER, MODEL, REMARKS.

LOUVER SCHEDULE

Table with columns: TAG, DESCRIPTION, SIZE (W"xH"), FACE AREA (SF), FREE AREA (SF), AIRFLOW (TOTAL AIRFLOW (CFM), PRESSURE DROP (IN. W.C.)), MATERIAL, FINISH, SUPPLIER, INSTALLER, MANUFACTURER, MODEL, SPECIAL REMARKS.

CONDENSING UNIT SCHEDULE

Table with columns: TAG, DESCRIPTION, PAIRED WITH, NOMINAL CAPACITY (TONS), NUMBER OF COMPRESSORS, REFRIGERANT TYPE, WEIGHT (LBS), MOCP, CKT 1 (A), MCA, CKT 1 (A), ELECTRICAL (MOCP, CKT 2 (A), MCA, CKT 2 (A)), V/P/H, SUPPLIER, INSTALLER, MANUFACTURER, MODEL, REMARKS.

AIR HANDLING UNIT SCHEDULE

Table with columns: TAG, DESCRIPTION, COOLING CAPACITY (TONS), EER, AIRFLOW (TOTAL (CFM), RETURN (CFM), OA (CFM), E.S.P. (IN W.C.)), COOLING (NET TOTAL (MBH), NET SENSIBLE (MBH), EAT (DEG. F) DB, WB), HEATING (EAT (DEG. F), TOTAL (MBH), LAT (DEG. F), WEIGHT (LBF)), ELECTRICAL (MOCP (A), FLA (A), V/P/H), SUPPLIER, INSTALLER, MANUFACTURER, MODEL, REMARKS.



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*Joshua A. Everett*

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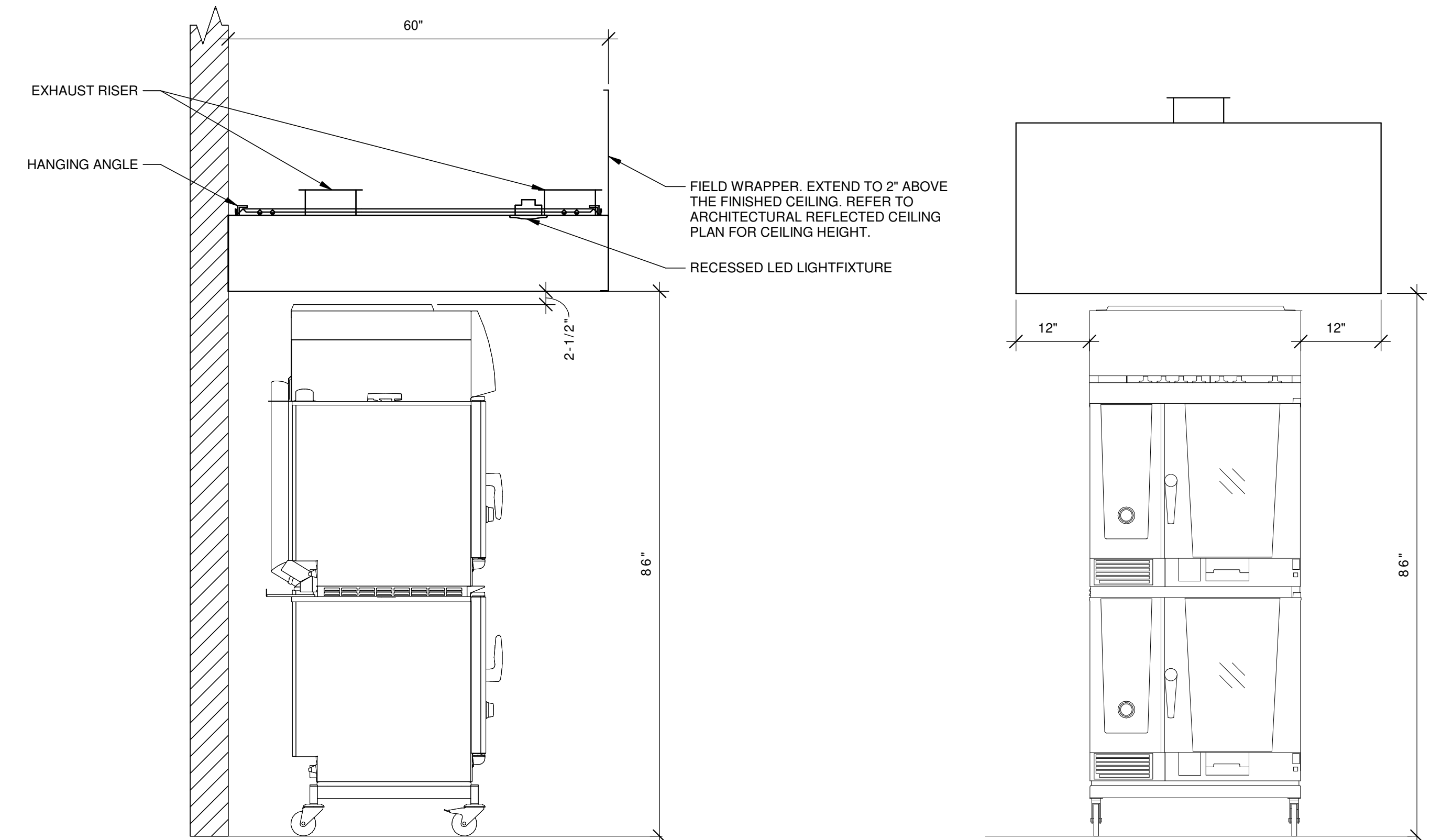
PROJECT INFORMATION:  
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DRAWN BY: JAE  
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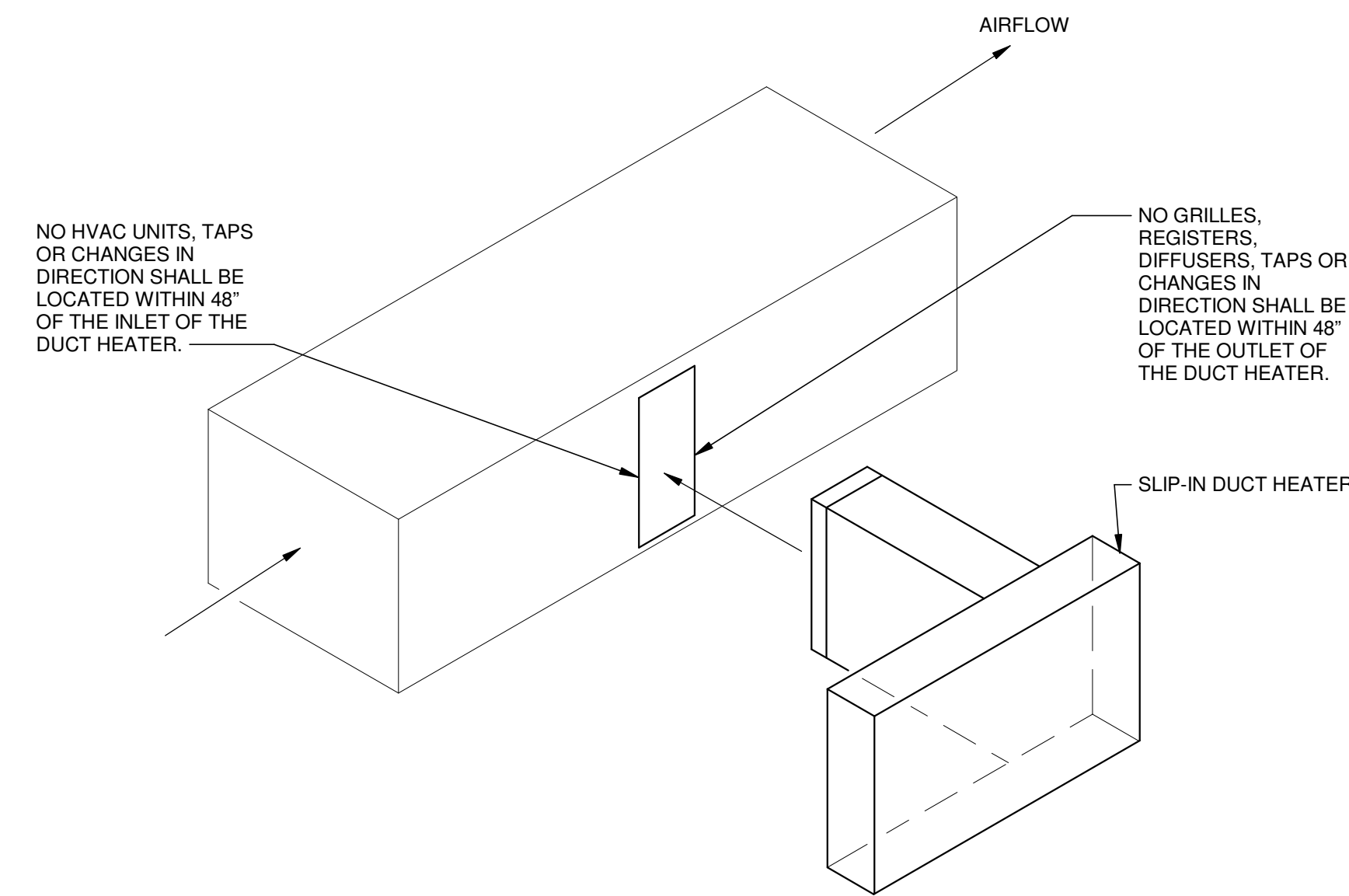
REVISIONS  
REV. DATE DESCRIPTION

HVAC DETAILS

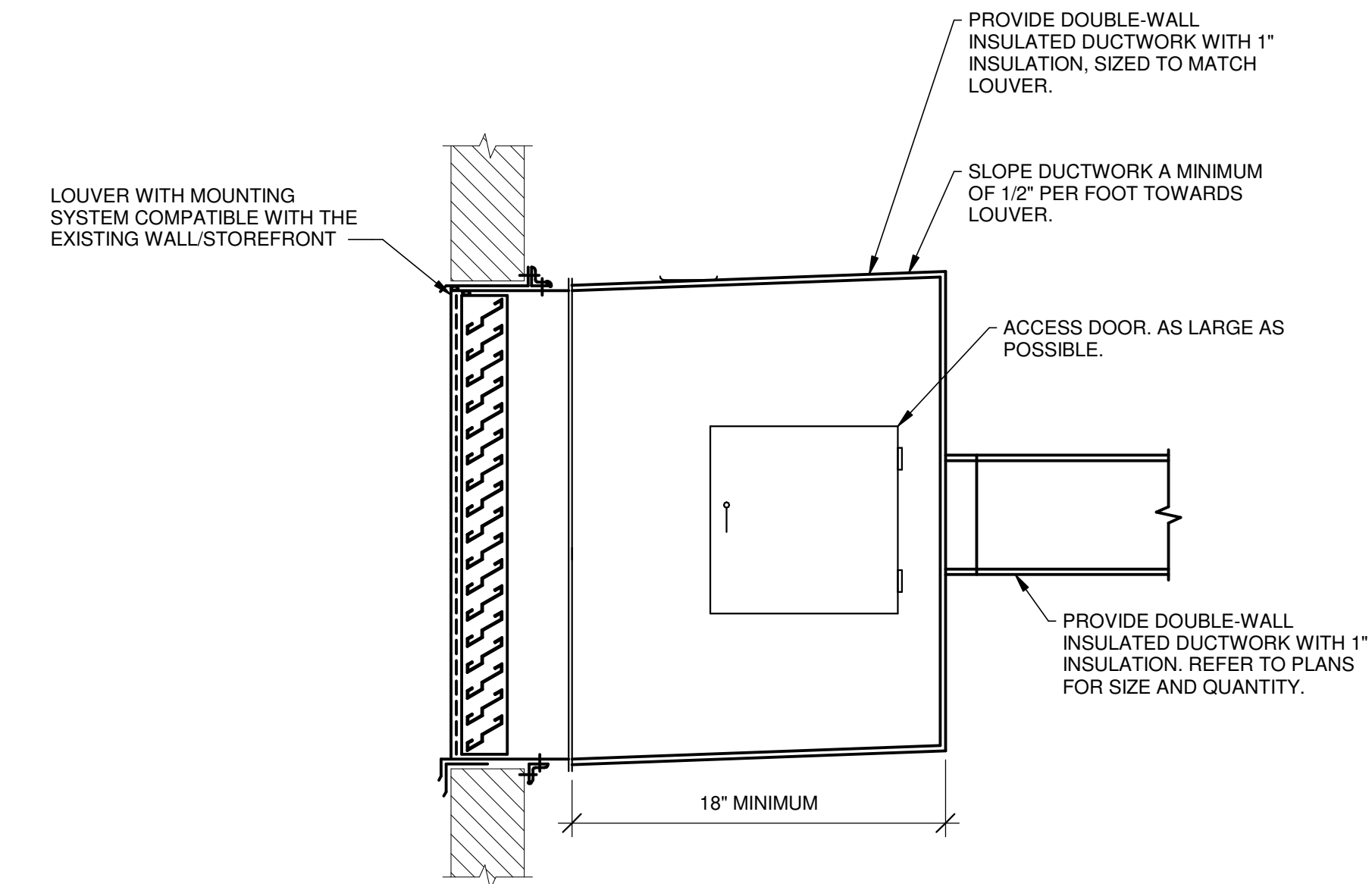
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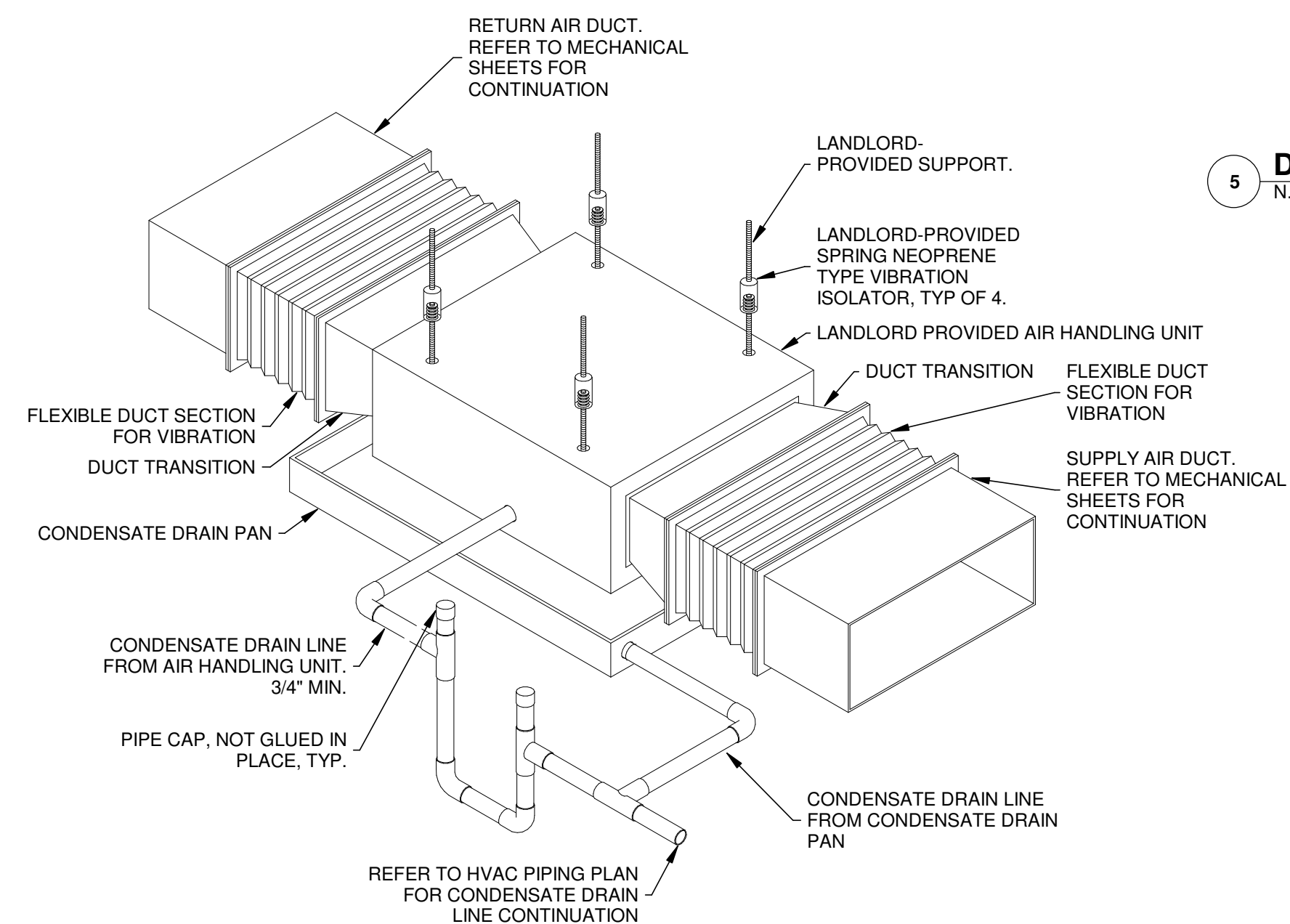
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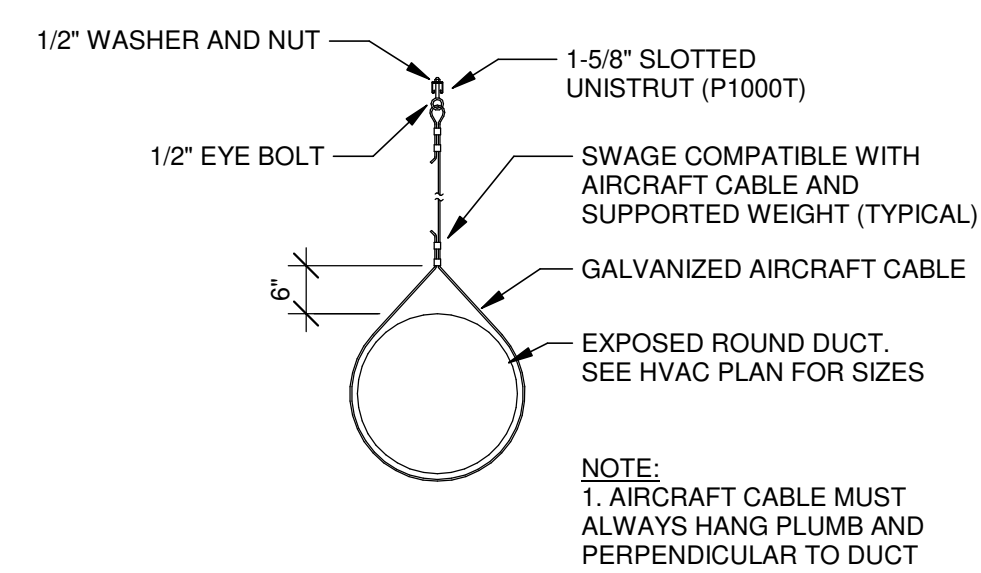
5 DUCT HEATER INSTALLATION DETAIL  
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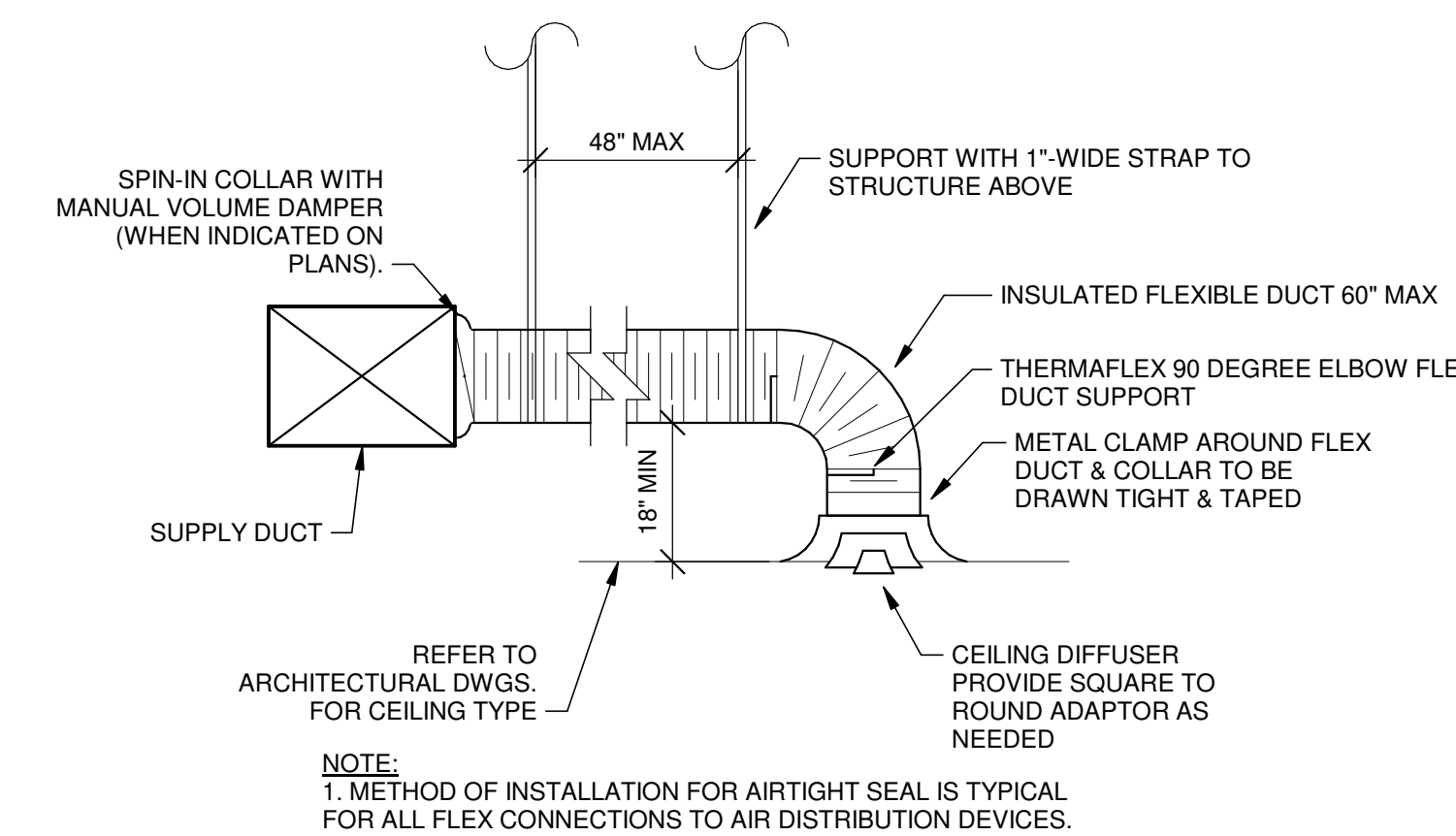
4 LOUVER INSTALLATION DETAIL  
N.T.S.



3 AIR HANDLING UNIT INSTALLATION DETAIL  
N.T.S.



2 EXPOSED DUCTWORK SUPPORT  
N.T.S.



1 DIFFUSER CONNECTION  
N.T.S.

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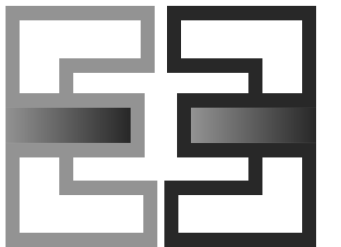


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SG CONSTR. MANAGER: JB  
PROJECT NO: 210020  
TEMPLATE VERSION: 12/21/2021

REVISIONS  
REV. DATE DESCRIPTION

HVAC SEQUENCE OF OPERATIONS

M-401

### SEQUENCE OF OPERATIONS VRF GENERAL

**GENERAL:**  
THE VRF SYSTEM SHALL BE A HEAT PUMP, HEAT RECOVERY SYSTEM CAPABLE OF SIMULTANEOUS HEATING AND COOLING. THE CONDENSING UNIT SHALL MODULATE CAPACITY AS REQUIRED TO SATISFY THE AIR HANDLING UNIT DEMAND. THE BRANCH CIRCUIT CONTROLLER SHALL PROVIDE CONTROL TO THE SYSTEM AS REQUIRED.

### SEQUENCE OF OPERATIONS AHU-1 & AHU-4

**OCCUPIED MODE:**  
**FAN OPERATION/OUTSIDE AIR DAMPER:** WHEN SCHEDULED BY THE TIME CLOCK TO BE IN OCCUPIED MODE, THE AIR HANDLER FANS ARE TO START AND RUN CONTINUOUSLY AND THE OUTSIDE AIR DAMPER SHALL MODULATE TO THE MINIMUM POSITION.  
**HEATING:** ON A FALL IN SPACE TEMPERATURE BELOW THE SETPOINT OF 70 DEGREES (ADJUSTABLE) THE AIR HANDLING UNIT SHALL BE SWITCHED TO HEATING MODE AND THE HEATING CAPACITY SHALL MODULATE UP TO MAXIMUM TO MAINTAIN THE TEMPERATURE SETPOINT.  
**COOLING:** ON A RISE IN SPACE TEMPERATURE ABOVE THE SETPOINT OF 72 DEGREES (ADJUSTABLE), WHEN THE ENTHALPY OF THE OUTSIDE AIR IS FAVORABLE, THE OUTSIDE AIR DAMPER SHALL MODULATE OPEN UP TO 100% AND THE RETURN AIR DAMPER SHALL MODULATE CLOSED AS REQUIRED TO MAINTAIN THE SUPPLY AIRFLOW. IF THE ENTHALPY OF THE OUTSIDE AIR IS NOT FAVORABLE, OR UPON A SUDDEN RISE IN SPACE TEMPERATURE THE DAMPERS SHALL RETURN TO THEIR OCCUPIED SET POSITIONS. THE AIR HANDLING UNIT SHALL BE SWITCHED TO COOLING MODE AND THE COOLING CAPACITY SHALL MODULATE UP TO MAXIMUM TO MAINTAIN THE TEMPERATURE SETPOINT.

**UNOCCUPIED MODE:**  
**FAN OPERATION/OUTSIDE AIR DAMPER:** WHEN SCHEDULED BY THE TIME CLOCK TO BE IN UNOCCUPIED MODE, THE AIR HANDLER FANS ARE TO BE OFF AND THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED.  
**HEATING:** ON A FALL IN SPACE TEMPERATURE BELOW THE SETPOINT OF 65 DEGREES (ADJUSTABLE) THE AIR HANDLING UNIT FAN SHALL START. THE UNIT SHALL BE SWITCHED TO HEATING MODE AND THE HEATING CAPACITY SHALL MODULATE UP TO MAXIMUM TO MAINTAIN THE TEMPERATURE SETPOINT.  
**COOLING:** ON A RISE IN SPACE TEMPERATURE ABOVE THE SETPOINT OF 85 DEGREES (ADJUSTABLE) THE AIR HANDLING UNIT FAN SHALL START. WHEN THE ENTHALPY OF THE OUTSIDE AIR IS FAVORABLE, THE OUTSIDE AIR DAMPER SHALL MODULATE OPEN UP TO 100 AND THE RETURN AIR DAMPER SHALL MODULATE CLOSED AS REQUIRED TO MAINTAIN THE SUPPLY AIRFLOW. IF THE ENTHALPY OF THE OUTSIDE AIR IS NOT FAVORABLE, OR UPON A SUDDEN RISE IN SPACE TEMPERATURE THE DAMPERS SHALL RETURN TO THEIR UNOCCUPIED SET POSITIONS. THE AIR HANDLING UNIT SHALL BE SWITCHED TO COOLING MODE AND THE COOLING CAPACITY SHALL MODULATE UP TO MAXIMUM TO MAINTAIN THE TEMPERATURE SETPOINT.

**EMERGENCY MODE:**  
**FAN OPERATION/OUTSIDE AIR DAMPER:** UPON A SIGNAL FROM THE FIRE ALARM SYSTEM, THE FAN SHALL STOP AND THE OUTSIDE AIR DAMPER SHALL CLOSE.

### SEQUENCE OF OPERATIONS AHU-2 & AHU-5

**OCCUPIED MODE:**  
**FAN OPERATION/OUTSIDE AIR DAMPER:** WHEN SCHEDULED BY THE TIME CLOCK TO BE IN OCCUPIED MODE, THE AIR HANDLER FANS ARE TO START AND RUN CONTINUOUSLY AND THE OUTSIDE AIR DAMPER SHALL MODULATE TO THE MINIMUM POSITION.  
**HEATING:** ON A FALL IN SPACE TEMPERATURE BELOW THE SETPOINT OF 70 DEGREES (ADJUSTABLE) THE AIR HANDLING UNIT SHALL BE SWITCHED TO HEATING MODE AND THE HEATING CAPACITY SHALL MODULATE UP TO MAXIMUM TO MAINTAIN THE TEMPERATURE SETPOINT.  
**COOLING:** ON A RISE IN SPACE TEMPERATURE ABOVE THE SETPOINT OF 72 DEGREES (ADJUSTABLE) THE AIR HANDLING UNIT SHALL BE SWITCHED TO COOLING MODE AND THE COOLING CAPACITY SHALL MODULATE UP TO MAXIMUM TO MAINTAIN THE TEMPERATURE SETPOINT.

**UNOCCUPIED MODE:**  
**FAN OPERATION/OUTSIDE AIR DAMPER:** WHEN SCHEDULED BY THE TIME CLOCK TO BE IN UNOCCUPIED MODE, THE AIR HANDLER FANS ARE TO BE OFF AND THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED.  
**HEATING:** ON A FALL IN SPACE TEMPERATURE BELOW THE SETPOINT OF 65 DEGREES (ADJUSTABLE) THE AIR HANDLING UNIT FAN SHALL START AND THE UNIT SHALL BE SWITCHED TO HEATING MODE AND THE HEATING CAPACITY SHALL MODULATE UP TO MAXIMUM TO MAINTAIN THE TEMPERATURE SETPOINT.  
**COOLING:** ON A RISE IN SPACE TEMPERATURE ABOVE THE SETPOINT OF 85 DEGREES (ADJUSTABLE) THE AIR HANDLING UNIT FAN SHALL START AND THE UNIT SHALL BE SWITCHED TO COOLING MODE AND THE COOLING CAPACITY SHALL MODULATE UP TO MAXIMUM TO MAINTAIN THE TEMPERATURE SETPOINT.

**EMERGENCY MODE:**  
**FAN OPERATION/OUTSIDE AIR DAMPER:** UPON A SIGNAL FROM THE FIRE ALARM SYSTEM, THE FAN SHALL STOP AND THE OUTSIDE AIR DAMPER SHALL CLOSE.

### SEQUENCE OF OPERATIONS AHU-3

**OCCUPIED MODE:**  
**FAN OPERATION/OUTSIDE AIR DAMPER:** WHEN SCHEDULED BY THE TIME CLOCK TO BE IN OCCUPIED MODE, THE AIR HANDLER FANS ARE TO START AND RUN CONTINUOUSLY.  
**HEATING:** ON A FALL IN SPACE TEMPERATURE BELOW THE SETPOINT OF 70 DEGREES (ADJUSTABLE) THE AIR HANDLING UNIT SHALL BE SWITCHED TO HEATING MODE AND THE HEATING CAPACITY SHALL MODULATE UP TO MAXIMUM TO MAINTAIN THE TEMPERATURE SETPOINT.  
**COOLING:** ON A RISE IN SPACE TEMPERATURE ABOVE THE SETPOINT OF 72 DEGREES (ADJUSTABLE) THE AIR HANDLING UNIT SHALL BE SWITCHED TO COOLING MODE AND THE COOLING CAPACITY SHALL MODULATE UP TO MAXIMUM TO MAINTAIN THE TEMPERATURE SETPOINT.

**UNOCCUPIED MODE:**  
**FAN OPERATION/OUTSIDE AIR DAMPER:** WHEN SCHEDULED BY THE TIME CLOCK TO BE IN UNOCCUPIED MODE, THE AIR HANDLER FANS ARE TO BE OFF AND THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED.  
**HEATING:** ON A FALL IN SPACE TEMPERATURE BELOW THE SETPOINT OF 65 DEGREES (ADJUSTABLE) THE AIR HANDLING UNIT FAN SHALL START AND THE UNIT SHALL BE SWITCHED TO HEATING MODE AND THE HEATING CAPACITY SHALL MODULATE UP TO MAXIMUM TO MAINTAIN THE TEMPERATURE SETPOINT.  
**COOLING:** ON A RISE IN SPACE TEMPERATURE ABOVE THE SETPOINT OF 85 DEGREES (ADJUSTABLE) THE AIR HANDLING UNIT FAN SHALL START AND THE UNIT SHALL BE SWITCHED TO COOLING MODE AND THE COOLING CAPACITY SHALL MODULATE UP TO MAXIMUM TO MAINTAIN THE TEMPERATURE SETPOINT.

**EMERGENCY MODE:**  
**FAN OPERATION/OUTSIDE AIR DAMPER:** UPON A SIGNAL FROM THE FIRE ALARM SYSTEM, THE FAN SHALL STOP.

### SEQUENCE OF OPERATIONS EF-1 & EF-2

**OCCUPIED MODE:**  
**FAN OPERATION:** WHEN SCHEDULED BY THE TIME CLOCK TO BE IN OCCUPIED MODE, THE FANS ARE TO START AND RUN CONTINUOUSLY.

**UNOCCUPIED MODE:**  
**FAN OPERATION:** WHEN SCHEDULED BY THE TIME CLOCK TO BE IN UNOCCUPIED MODE, THE FANS SHALL REMAIN OFF.

**EMERGENCY MODE:**  
**FAN OPERATION:** UPON A SIGNAL FROM THE FIRE ALARM SYSTEM, THE FANS SHALL STOP.

### SEQUENCE OF OPERATIONS DH-1 THRU DH-3

THE DUCT HEATER SHALL BE ENERGIZED WHEN ALL OF THE FOLLOWING ARE MET.

- THE HVAC SYSTEM IS IN OCCUPIED MODE
- THE AIR HANDLING UNIT SERVED BY THE DUCT HEATER IS NOT IN COOLING MODE AND THE OUTSIDE AIR DAMPER IS AT THE MINIMUM POSITION.
- THE OUTSIDE AIR TEMPERATURE IS BELOW 45F.
- THE OUTSIDE AIR DAMPER IS OPEN AND THE AIRFLOW PROVING SWITCH INDICATES AIRFLOW ACROSS THE COIL.

WHEN THE DUCT HEATER IS ENERGIZED:

- THE DUCT HEATER SHALL MODULATE VIA SCR CONTROLS UP TO MAXIMUM TO MAINTAIN A DISCHARGE-AIR SETPOINT OF 70°F.