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.
A. VERIFY ALL CODE REQUIREMENTS AND LOCAL AMENDMENTS WITH THE AUTHORITY HAVING JURISDICTION PRIOR TO BID.
B. WHEN THERE IS A DISCREPANCY BETWEEN THE ADOPTED CODES AND THESE DRAWINGS, THE MORE STRINGENT REQUIREMENT SHALL APPLY.
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 WITHOUT IMPACT TO THE PROJECT SCHEDULE.
6. PROVIDE REQUESTS FOR INFORMATION TO THE TENANT'S CONSTRUCTION MANAGER.
A. REQUESTS FOR INFORMATION SHALL PROVIDE A DETAILED DESCRIPTION OF THE SITE CONDITION OR DISCREPANCY AND THE CONTRACTORS PROPOSED REMEDY.
B. REQUESTS FOR INFORMATION SHALL BE SUBMITTED TO ALLOW FOR FIVE BUSINESS DAYS OF REVIEW TIME.
7. UPON COMPLETION OF WORK, THE GENERAL CONTRACTOR SHALL PROVIDE THE TENANT'S CONSTRUCTION MANAGER WITH A BOUND RECORD OF ALL MECHANICAL EQUIPMENT UTILIZED IN THE JOB. THE GENERAL CONTRACTOR SHALL PROVIDE THE SAME INFORMATION IN AN ELECTRONIC FORMAT AS DIRECTED BY THE OWNER. THE BINDER SHALL CONTAIN:
A. COVER SHEET INDICATING THE PROJECT NAME, ADDRESS AND TURNOVER DATE.
B. COMPANY NAME AND CONTACT INFORMATION OF THE CONTRACTORS UTILIZED FOR THE MECHANICAL SCOPE OF WORK.
C. CUTSHEETS, INSTALLATION MANUALS AND MAINTENANCE REQUIREMENTS FOR ALL MECHANICAL EQUIPMENT.
8. 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 AT THE GENERAL CONTRACTOR'S EXPENSE, 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/MIXED 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 AND WATER 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 T&B 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 OVEN AND 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” STAPLING FLANGE AND AN INSTALLED THICKNESS OF 1-1/2" WITH AN R-VALUE OF 6.0.
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 JACKET 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 OUTSIDE OF WALL 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. SHEET METAL MATERIALS
D. SEALANTS AND GASKETS
E. 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 ANSI/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. MATERIALS: GALVANIZED SHEET STEEL. COMPLY WITH ASTM A 653/A 653M. G90 COATING DESIGNATION.
4. 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 3” TAPE CONSTRUCTED OF WOVEN COTTON FIBER IMPREGNATED WITH MINERAL GYPSUM AND MODIFIED ACRYLIC/SILICONE TO FORM A HARD, DURABLE AIRTIGHT 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).
5. HANGERS AND SUPPORT:
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 AIRCRAFT 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 AIRCRAFT 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 RADIUSED ELBOWS WITH INSIDE RADIUS NO SMALLER THAN 1/2 OF THE DUCT WIDTH.
B. ROUND DUCT ELBOWS: PROVIDE RADIUSED 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. FIRE DAMPERS
E. TURNING VANES
F. FLEXIBLE CONNECTORS
G. 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, THICKNESS AND DUCT CONSTRUCTION METHODS UNLESS NOTED OTHERWISE. SHEET METAL MATERIALS SHALL BE FREE FROM PITTING, 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 BALANCED. 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. TIE BARS AND BRACKETS: GALVANIZED STEEL.
F. JACKSHAFT: 1/2" DIAMETER CONSTRUCTED OF GALVANIZED STEEL WITHIN 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 RUBBER SEALS.
C. BLADE AXLES: 1/2" DIAMETER. BLADE LINKAGE HARDWARE OF ZINC-PLATED STEEL AND BRASS; ENDS SEALED AGAINST BLADE BEARING.
D. BEARINGS: MOLDED SYNTHETIC.
7. FIRE DAMPERS
A. TYPE: STATIC; RATED AND LABELED ACCORDING TO UL 555.
B. CLOSING RATINGS IN DUCTS UP TO 4” STATIC PRESSURE CLASS AND MAXIMUM 2,000 FPM VELOCITY.
C. FIRE RATING: 1-1/2 HOURS, OR AS NOTED IN THE SCHEDULES.
D. FRAME: CURTAIN TYPE WITH BLADES INSIDE AIRSTREAM. CONSTRUCTED OF GALVANIZED STEEL.
E. MOUNTING SLEEVE: FACTORY FURNISHED.
F. MOUNTING ORIENTATION: AS NOTED ON PLANS.
G. BLADES: INTERLOCKING, CONSTRUCTED OF GALVANIZED STEEL.
H. HEAT-RESPONSIVE DEVICE: 165 DEGREE F RATED FUSIBLE LINK OR AS NOTED IN THE SCHEDULES.
8. 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.
9. 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.
PART 3 - EXECUTION
1. INSTALLATION
A. INSTALL DUCT ACCESSORIES ACCORDING TO APPLICABLE DETAILS IN SMACNA'S “HVAC DUCT CONSTRUCTION STANDARDS-METAL AND FLEXIBLE.”
B. INSTALL VOLUME DAMPERS AT POINTS NOTED ON PLANS AND AS REQUIRED FOR SYSTEM BALANCING. WHERE DAMPERS ARE INSTALLED IN DUCTS WITH DUCT LINER, INSTALL DAMPERS WITH HAT CHANNELS OF SAME DEPTH AS LINER AND TERMINATE LINER WITH NOSING AT HAT CHANNEL.
C. WHERE DAMPERS ARE INSTALLED IN WRAPPED DUCT, PROVIDE INSULATION STAND-OFF'S AS REQUIRED.
D. SET DAMPERS TO FULLY OPEN POSITION BEFORE TESTING, ADJUSTING AND BALANCING.
E. INSTALL TEST HOLES AT FAN INLETS AND OUTLETS AND WHERE REQUIRED FOR TESTING AND BALANCING PURPOSES.
F. INSTALL FIRE DAMPERS ACCORDING TO UL LISTING.
G. INSTALL FLEXIBLE CONNECTORS TO CONNECT DUCTS TO EQUIPMENT.
2. TESTS AND INSPECTIONS
A. OPERATE DAMPERS TO VERIFY FULL RANGE OF MOVEMENT.
B. OPERATE FIRE DAMPERS TO VERIFY FULL RANGE OF MOVEMENT AND VERIFY THAT PROPER HEAT-RESPONSE DEVICE IS INSTALLED.
C. INSPECT TURNING VANES FOR PROPER AND SECURE INSTALLATION.

(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 96/E 96M.
4. INSULATED, FLEXIBLE DUCT 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: R6.0
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. SPACING BETWEEN THESE ELEMENTS SHALL NOT EXCEED 48 INCHES.

(END OF SECTION 23 33 46)

SECTION 23 34 02 - POWER VENTILATORS
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 FANS THAT FAIL IN MATERIALS OR WORKMANSHIP WITHIN THE MANUFACTURER'S STANDARD WARRANTY PERIOD.

PART 2 - PRODUCTS
1. DESCRIPTION
A. CENTRIFUGAL ROOF EXHAUSTER. UPBLAST OR DOWNBLAST.
2. MANUFACTURERS: AS NOTED IN THE MECHANICAL SCHEDULES. NO SUBSTITUTIONS SHALL BE PERMITTED.
3. CHARACTERISTICS. PROVIDED WITH:
A. CURB: CONSTRUCTED OF GALVANIZED STEEL WITH FULLY WELDED CORNERS AND AS NOTED IN THE MECHANICAL SCHEDULES.
B. FAN: CONSTRUCTED OF SPUN ALUMINUM AND GALVANIZED STEEL, CENTRIFUGAL AND DIRECT DRIVE. FAN SHALL BEAR A PERMANENTLY ATTACHED NAMEPLATE DISPLAYING THE MODEL AND SERIAL NUMBER OF THE UNIT.
C. HOUSING: THE BASE SHALL BE CONSTRUCTED OF GALVANIZED STEEL WITH WELDED CORNERS AND SUPPORT FOR HINGING AND CLEANING AND TO PREVENT LEAKAGE INTO THE BUILDING. FAN WINDBAND SHALL BE CONSTRUCTED OF HEAVY GAUGE ALUMINUM OR GALVANIZED STEEL, SECURELY FASTENED TO THE WINDBAND WITH HORIZONTAL AND VERTICAL SUPPORTS .
D. WHEEL: CENTRIFUGAL, BACKWARD-INCLINED AND NON-OVERLOADING.,WHEEL SHALL BE BALANCED IN TWO PLANES AND COMPLETED IN ACCORDANCE WITH AMCA STANDARD 204-96. WHEEL BLADES SHALL BE DESIGNED TO MINIMIZE TURBULANCE AND REDUCE NOISE. BLADES SHALL BE WELDED TO THE WHEEL INLET CONE. BALANCING WEIGHTS SHALL BE RIVETED TO THE BLADES OR WHEEL. WHEEL SHALL BE ATTACHED TO THE MOTOR SHAFT WITH TWO SET SCREWS.
E. MOTOR: PERMANENTLY LUBRICATED, RATED FOR CONTINUOUS DUTY, THERMALLY PROTECTED AND MOUNTED OUTSIDE THE AIRSTREAM. MOTOR MOUNTING PLATE SHALL BE CONSTRUCTED OF HEAVY GAUGE GALVANIZED STEEL. THE MOTOR COMPARTMENT SHALL BE COOLED BY OUTSIDE AIR. THE MOTOR COMPARTMENT SHALL BE OF A TWO-PIECE CONSTRUCTION WITH THE CAP HAVING QUICK RELEASE CLIPS.
F. ACCESSORIES: AS NOTED ON THE MECHANICAL SCHEDULES.

PART 3 - EXECUTION
1. INSTALLATION
A. ROOF CURB: INSTALL ON ROOF STRUCTURE, LEVEL, SECURE, PER STRUCTURAL DETAILS AND PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
B. UNIT SUPPORT: INSTALL UNIT LEVEL ON STRUCTURAL CURBS PER STRUCTURAL DETAILS AND PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
2. CONNECTIONS
A. COMPLY WITH DUCT INSTALLATION REQUIREMENTS SPECIFIED IN OTHER HVAC SECTIONS. DRAWINGS INDICATE GENERAL ARRANGEMENTS OF DUCTS.
B. INSTALL DUCTS TO TERMINATION TO TOP OF ROOF CURB. REMOVE ROOF DECKING ONLY AS REQUIRED FOR PASSAGE OF DUCTS. DO NOT CUT OUT DECKING UNDER ENTIRE ROOF CURB. CONNECT TO FANS WITH FLEXIBLE DUCT CONNECTORS.
C. WHERE INSTALLING PIPING ADJACENT TO FANS, ALLOW SPACE FOR SERVICE AND MAINTENANCE.
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. INSPECT OR AND REMOVE SHIPPING BOLTS, BLOCKS AND TIE-DOWN STRAPS.
C. CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATIONS.
D. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.
E. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATION.

(END OF SECTION 23 34 02)

SECTION 23 34 33 - AIR CURTAINS
PART 1 - GENERAL
1. SECTION REQUIREMENTS
A. SUBMITTALS: PROVIDE SHOP DRAWINGS INDICATING THE HEATING WATTAGE, ELECTRICAL CHARACTERISTICS, AIRFLOW CHARACTERISTICS, DIMENSIONS, WEIGHTS AND ACCESSORIES.
B. WARRANTY: PROVIDE MANUFACTURER'S WARRANTY EFFECTIVE FOR FIVE YEARS FOR UNHEATED UNITS, AND TWO YEARS FOR HEATED UNITS. THE GENERAL CONTRACTOR SHALL PROVIDE A 12 MONTH WARRANTY ON ALL WORKMANSHIP.

PART 2 - PRODUCTS
1. MANUFACTURERS: AS NOTED IN THE MECHANICAL SCHEDULES.
2. CHARACTERISTICS. PROVIDED WITH:
A. CABINET: ALUMINIZED STEEL CABINET WITH STAINLESS STEEL RIVETED CONSTRUCTION AND WHITE POWDER COATED FINISH.
B. MOUNTING: PROVIDE WALL OR SUSPENDED MOUNTING AS REQUIRED.
C. SERVICE ACCESS: REMOVABLE SCREEN AND REMOVABLE BOTTOM ACCESS PANEL.
D. MOTORS: DIRECT DRIVE, RESILIENT MOUNTED, RATED FOR CONTINUOUS DUTY WITH INTERNAL THERMAL-OVERLOAD PROTECTION AND PERMANENTLY LUBRICATED SEALED BALL BEARINGS.
E. FANS: BALANCED, FORWARD CURVED CROSS FLOW MADE OF ALUMINUM.
F. DISCHARGE NOZZLES: PROVIDE UNIFORM VELOCITY ACROSS WIDTH OF AIR CURTAIN.
G. INLET: PROVIDED WITH PERFORATED PATTERN SCREEN.
H. HEATING ELEMENTS (WHEN NOTED ON PLANS): UL-APPROVED, FACTORY-MOUNTED, FACTORY WIRED, THERMALLY PROTECTED, IN GALVANIZED STEEL FRAME. HELICAL COIL DESIGN WITH THERMAL CUTOUT.
I. PROVIDE ALL ACCESSORIES AS NOTED IN THE SCHEDULES.
3. CONTROLS:
A. MANUAL SWITCH: FACTORY INSTALLED “FAN-OFF-FAN & HEAT” AND “HIGH-LOW” SWITCHES.
B. CONTROL PACKAGE: AIR CURTAIN SHALL TURN ON WHEN DOOR IS OPENED AND SHUT OFF WHEN DOOR IS CLOSED.
C. OUTDOOR AIR TEMPERATURE SENSOR (WHEN PROVIDED WITH A HEATING ELEMENT AND INDICATED ON PLANS).

PART 3 - EXECUTION
1. INSTALLATION
A. INSTALL AIR CURTAIN WHERE INDICATED ON DRAWINGS IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE CLEARANCE TO PERMIT SERVICING AND MAINTENANCE.
B. INSTALL LEVEL, PLUMB AND AS CLOSE AS PRACTICAL TO TOP OF OPENING AND FACE OF WALL.
C. INSTALL ALL ACCESSORIES.
2. CONNECTIONS
A. CONNECT ELECTRICAL WIRING IN ACCORDANCE WITH THE ELECTRICAL SPECIFICATIONS.
B. GROUND EQUIPMENT IN ACCORDANCE WITH THE ELECTRICAL SPECIFICATIONS.
3. FIELD QUALITY AND CONTROL
A. TEST AND OPERATE AIR CURTAIN TO VERIFY PERFORMANCE AS INDICATED.
4. ADJUSTING
A. ADJUST MOTOR AND FAN SPEED TO PERFORM AS INDICATED.
B. ADJUST NOZZLES TO DEFLECT AIR OUTWARD UNLESS NOTED OTHERWISE.

(END OF SECTION 23 34 33)

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. WHEN INDICATED ON THE PLANS, PAINT THE GRILLES, REGISTERS & DIFFUSERS PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS WITH AN ENAMEL PAINT, COLOR AS INDICATED.
E. 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 74 16 - PACKAGED ROOFTOP AIR-CONDITIONING UNITS
PART 1 - GENERAL
1. SECTION REQUIREMENTS
A. SUBMITTALS: PROVIDE SHOP DRAWINGS INDICATING THE DIMENSIONS, WEIGHTS, REQUIRED CLEARANCES, COMPONENTS, EFFICIENCIES, CAPACITIES, ELECTRICAL CHARACTERISTICS AND LOCATION AND SIZE OF EACH FIELD CONNECTION FOR EACH RTU.
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 5 YEARS OF SUBSTANTIAL COMPLETION.

PART 2 - PRODUCTS
1. DESCRIPTION
A. ASHRAE COMPLIANCE: COMPLY WITH ASHRAE 15 FOR REFRIGERATION SAFETY.
B. ENERGY COMPLIANCE: COMPLY WITH THE APPLICABLE REQUIREMENTS OF THE ENERGY CODE LISTED ON THE COVER SHEET.
C. 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 YORK OR CARRIER. 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. CASING: GALVANIZED STEEL AND FACTORY-PAINTED FINISH. LINED WITH NEOPRENE-COATED FIBERGLASS. HINGED DOORS WITH TOOLLESS OPERATION.
B. SUPPLY AIR FAN: BELT DRIVEN, FORWARD CURVED CENTRIFUGAL.
C. CONDENSER-COIL FAN: PROPELLER, MOUNTED ON SHAFT OF PERMANENTLY LUBRICATED MOTOR.
D. SUPPLY-AIR REFRIGERANT COIL: ALUMINUM-PLATE FIN AND SEAMLESS COPPER TUBE IN STEEL CASING. CAPACITIES AS NOTED IN MECHANICAL SCHEDULES.
E. OUTDOOR-AIR REFRIGERANT COIL: ALUMINUM-PLATE FIN AND SEAMLESS COPPER TUBE IN STEEL CASING. AMBIENT TEMPERATURE AS NOTED IN MECHANICAL SCHEDULES.
F. ELECTRIC HEATING COIL: FACTORY PROVIDED. CAPACITY AND STEPS AS NOTED IN THE MECHANICAL SCHEDULES.
G. COMPRESSORS: HERMETIC, SCROLL MOUNTED ON VIBRATION ISOLATORS. REFER TO MECHANICAL SCHEDULES FOR NUMBER OF CIRCUITS.
H. GAS FURNACE: NATURAL GAS FIRED WITH CONTROLS, ELECTRONIC IGNITION, HIGH LIMIT CUTOUT AND PROVING SWITCH. CAPACITIES AS NOTED IN THE MECHANICAL SCHEDULES.
I. DAMPERS: PROVIDE WITH OUTDOOR AIR, RETURN AIR AND BAROMETRIC RELIEF DAMPERS. MODULATING MOTORS WITH ADJUSTABLE MINIMUM POSITION. COMPLY WITH ENERGY CODE REQUIREMENTS.
J. FILTERS: FILTER RACK WITH MERV 8 FILTERS.
K. ELECTRICAL CONNECTIONS: SINGLE POINT OF CONNECTION WITH UNIT-MOUNTED DISCONNECT SWITCH AND CONTROL-CIRCUIT TRANSFORMER WITH BUILT-IN OVERCURRENT PROTECTION.
L. ECONOMIZER: AS NOTED IN THE MECHANICAL SCHEDULES.
M.ACCESSORIES: AS NOTED IN THE MECHANICAL SCHEDULES.
4. CONTROLS:
A. SCHEDULED OPERATION: OCCUPIED AND UNOCCUPIED PERIODS ON SEVEN-DAY CLOCK WITH A MINIMUM OF TWO PROGRAMMABLE PERIODS PER DAY.
B. SUPPLY FAN OPERATION: AS NOTED IN THE SEQUENCE OF OPERATIONS.
C. REFRIGERANT CIRCUIT OPERATION: AS NOTED IN THE SEQUENCE OF OPERATIONS.
D. GAS FURNACE / ELECTRIC HEATING COIL OPERATION: AS NOTED IN THE SEQUENCE OF OPERATIONS.
E. OUTDOOR-AIR DAMPER OPERATION: AS NOTED IN THE SEQUENCE OF OPERATIONS.

PART 3 - EXECUTION
1. INSTALLATION
A. ROOF CURB: INSTALL ON ROOF STRUCTURE, LEVEL, SECURE, PER STRUCTURAL DETAILS AND PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
B. UNIT SUPPORT: INSTALL UNIT LEVEL ON STRUCTURAL CURBS PER STRUCTURAL DETAILS AND PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
2. CONNECTIONS
A. COMPLY WITH DUCT INSTALLATION REQUIREMENTS SPECIFIED IN OTHER HVAC SECTIONS. DRAWINGS INDICATE GENERAL ARRANGEMENTS OF DUCTS.
B. INSTALL DUCTS TO TERMINATION TO TOP OF ROOF CURB. REMOVE ROOF DECKING ONLY AS REQUIRED FOR PASSAGE OF DUCTS. DO NOT CUT OUT DECKING UNDER ENTIRE ROOF CURB. CONNECT SUPPLY AND RETURN DUCTS TO RTUS WITH FLEXIBLE DUCT CONNECTORS.
C. INSTALL CONDENSATE DRAIN WITH TRAP AND INDIRECT CONNECTION AS NOTED ON THE PLANS.
D. WHERE INSTALLING PIPING ADJACENT TO RTUS, ALLOW SPACE FOR SERVICE AND MAINTENANCE.
E. CONNECT GAS PIPING TO BURNER, FULL SIZE OF GAS TRAIN INLET. CONNECT WITH UNION, SHUTOFF VALVE AND DIRT LEG WITH SUFFICIENT CLEARANCE FOR BURNER REMOVAL AND SERVICE.
F. CONNECT ELECTRICAL WIRING IN ACCORDANCE WITH THE ELECTRICAL SPECIFICATIONS.
G. GROUND EQUIPMENT IN ACCORDANCE WITH THE ELECTRICAL SPECIFICATIONS.
3. FIELD QUALITY CONTROL
A. AFTER INSTALLING RTUS, TEST UNITS FOR COMPLIANCE WITH REQUIREMENTS.
B. INSPECT AND REMOVE SHIPPING BOLTS, BLOCKS, TIE-DOWN STRAPS AND ANY OTHER SHIPPING RELATED MATERIALS INSIDE OR OUTSIDE OF THE UNIT PRIOR TO OPERATION.
C. CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATIONS.
D. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.
E. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATION.
F. CLEAN FILTER HOUSINGS AND CHANGE FILTERS PRIOR TO AIR BALANCE AND IMMEDIATELY PRIOR TO TURNOVER.

(END OF SECTION 23 74 16)

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 DRAWING 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 NATIONAL ACCOUNT INFORMATION BLOCKS FOR REPRESENTATIVE CONTACT INFORMATION.
P CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY UNIT CONFIGURATIONS, COORDINATE DELIVERY WITH TRANE, RECEIVE AND UNLOAD EQUIPMENT, INSPECT EQUIPMENT AND PROPERLY INSTALL EQUIPMENT INCLUDING FIELD-INSTALLED ITEMS. PROVIDE EQUIPMENT STARTUP AND 1ST YEAR LABOR WARRANTY AND ADMINISTRATION.
Q PROVIDE LABELING FOR ALL HVAC EQUIPMENT USING ENGRAVED PHENOLIC PLATES OR AS REQUIRED BY THE LANDLORD.

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sg

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STAMP:

CONSTRUCTION
ISSUE SET

03/16/2023

PROJECT INFORMATION:
UNIVERSITY OF WI, MADISON

PROJECT INFORMATION:
652 STATE STREET
MADISON, WI 53703

DRAWN BY: JAE
CHECKED BY: MK
PROJECT MANAGER: JAE
SG DESIGN MANAGER: DZ
SG CONSTR. MANAGER: JB
PROJECT NO: 220064
TEMPLATE VERSION: 05/20/2022

REVISIONS

REV.	DATE	DESCRIPTION

MECHANICAL SPECIFICATIONS

M-010

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SYMBOLS & ABBREVIATIONS

HVAC SYMBOLS

MITERED CORNER WITH TURNING VANES

W/H DUCTWORK INTERNAL FREE DIMENSIONS (WIDTH/HEIGHT)

RECTANGULAR TO ROUND DUCT TRANSITION

S DUCT-MOUNTED SMOKE DETECTOR

M MOTOR-OPERATED DAMPER

MANUAL VOLUME DAMPER

GREASE DUCT CLEANOUT

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

XX-# EQUIPMENT TAG: SEE EQUIPMENT SCHEDULE ON SHEET M-300 FOR EQUIPMENT INFORMATION

A/V AUDIO/VISUAL REMOTE SMOKE DETECTOR ANNUNCIATOR WITH REMOTE KEY OPERATED RESET

CD1 / 12"Ø / 350 — 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
EXT'G	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

CODED NOTES

1 INSTALL EQUIPMENT PER MANUFACTURER'S INSTALLATION INSTRUCTION AND PER THE STRUCTURAL DETAILS.

2 PROVIDE SUPPLY DIFFUSER CONNECTION PER DETAIL 1/SHEET M-400.

3 REFER TO THE ARCHITECTURAL RCP FOR CEILING MOUNTED EQUIPMENT LOCATION. TYPICAL.

4 PROVIDE AUDIO/VISUAL REMOTE SMOKE DETECTOR ANNUNCIATOR WITH REMOTE KEY OPERATED RESET. WIRE A UNIT BACK TO EACH SMOKE DETECTOR. MOUNT UNIT 60" AFF. TYPICAL.

5 PROVIDE HONEYWELL TH8321R1001 THERMOSTATS WITH LOCKABLE COVERS (HONEYWELL CG511A1000 OR EQUAL) FOR THE MECHANICAL EQUIPMENT AT THIS LOCATION AT 48" AFF. COORDINATE WITH ELECTRICAL SWITCHING IN THE AREA AND EXTEND WIRING TO REMOTE TEMPERATURE SENSOR AND UNITS. LABEL EACH THERMOSTAT ACCORDINGLY. COORDINATE THERMOSTAT LOCATION WITH WALL-MOUNTED EQUIPMENT SO THAT THE THERMOSTATS ARE NOT BLOCKED BY SHELVING, COAT RACKS OR DOORS.

6 INSTALL THE TEMPERATURE SENSOR 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.

7 PROVIDE DUCTED TRANSFER GRILLE IN LOCATION AS SHOWN.

8 INSTALL THE TYPE II HOOD, HD-2 IN LOCATION SHOWN. SUPPORT PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. INSTALL HOOD ACCORDING TO THE REQUIREMENTS OF IT'S LISTING, THE BUILDING CODE, ALL NFPA REQUIREMENTS AND THE LOCAL AUTHORITY HAVING JURISDICTIONS REQUIREMENTS.

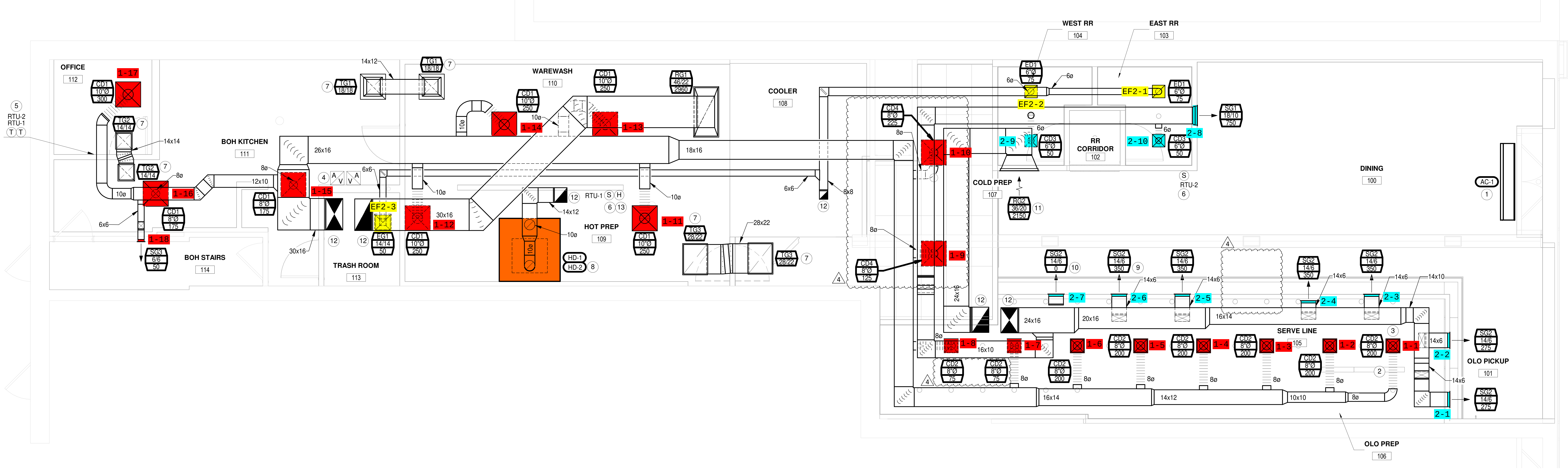
9 PAINT ALL DUCTWORK VISIBLE THROUGH THE GRILLES IN THE DINING AREA BLACK. TYPICAL.

4 10 NOT USED.

11 INSTALL RETURN GRILLE WITH BLADES FACING UP SO THAT THE INTERIOR OF THE DUCTWORK ISN'T VISIBLE IN THE DINING AREA.

12 DUCTWORK UP/DOWN FROM ROOF-MOUNTED EQUIPMENT. REFER TO SHEET M-200 FOR CONTINUATION.

13 INSTALL THE REMOTE HUMIDISTAT FOR THE HVAC EQUIPMENT NOTED AT THIS LOCATION IMMEDIATELY ABOVE THE TEMPERATURE SENSOR. COORDINATION LOCATION WITH EQUIPMENT AND WALL-MOUNTED FIXTURES AS REQUIRED SUCH THAT THE SENSOR IS NOT BLOCKED. ADJUST THE SENSOR FOR A DEADBAND TO ENERGIZE HOT GAS REHEAT WHEN THE HUMIDITY EXCEEDS 60% RELATIVE HUMIDITY AND TO DE-ENERGIZE WHEN THE HUMIDITY DROPS BELOW 50%.



NORTH

1 HVAC PLAN

1/4" = 1'-0"

sg

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03/16/2023

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UNIVERSITY OF WI, MADISON

PROJECT INFORMATION:
652 STATE STREET
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DRAWN BY:	JAE
CHECKED BY:	MK
PROJECT MANAGER:	JAE
SG DESIGN MANAGER:	DZ
SG CONSTR. MANAGER:	JB
PROJECT NO:	220064

TEMPLATE VERSION: 05/20/2022

REVISIONS

REV.	DATE	DESCRIPTION
4	03/02/2023	OWNER REVISIONS

HVAC PLAN

M-100

3/16/2023 3:23:16 PM

SYMBOLS & ABBREVIATIONS

HVAC SYMBOLS

W/H	MITERED CORNER WITH TURNING VANES
	DUCTWORK INTERNAL FREE DIMENSIONS (WIDTH/HEIGHT)
	RECTANGULAR TO ROUND DUCT TRANSITION
S	DUCT-MOUNTED SMOKE DETECTOR
M	MOTOR-OPERATED DAMPER
	MANUAL VOLUME DAMPER
	GREASE DUCT CLEANOUT
	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
XX-#	EQUIPMENT TAG: SEE EQUIPMENT SCHEDULE ON SHEET M-300 FOR EQUIPMENT INFORMATION
A/V	AUDIO/VISUAL REMOTE SMOKE DETECTOR ANNUNCIATOR WITH REMOTE KEY OPERATED RESET
CD1	TAG
12"Ø	NECK SIZE
350	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
EXT'G	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

CODED NOTES

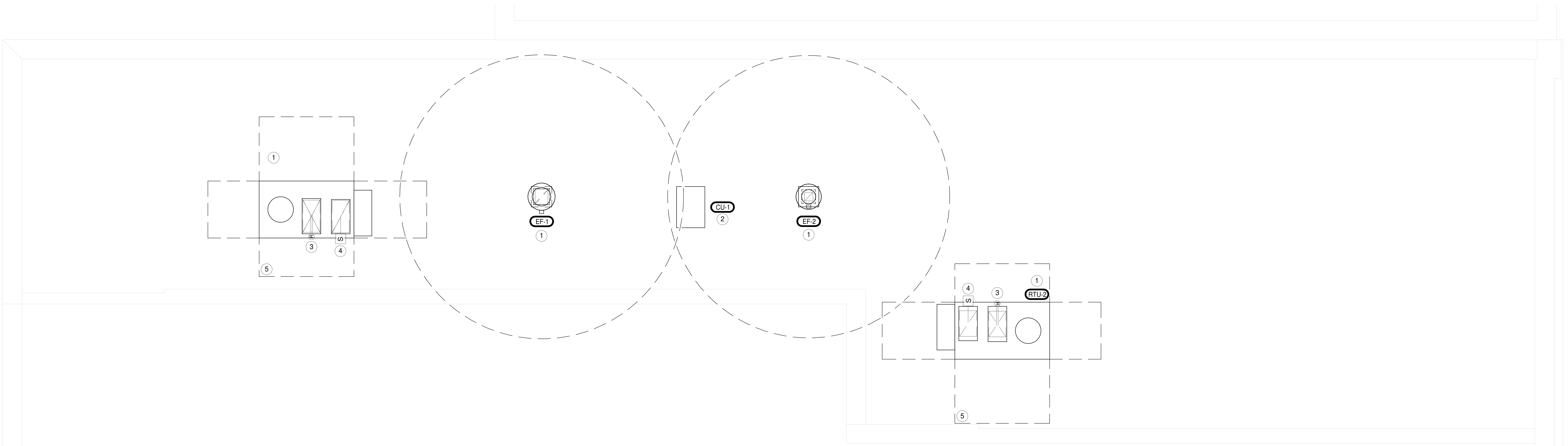
1 INSTALL THE EQUIPMENT PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND PER THE STRUCTURAL DETAILS.

2 COORDINATE MOUNTING LOCATION FOR WALK-IN COOLER CONDENSING UNIT, CU-1 ON THE ROOF WITH THE KITCHEN EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN. ENSURE ALL CLEARANCE REQUIREMENTS FOR THE UNIT ARE MAINTAINED THROUGH CONSTRUCTION. INSTALL THE CONDENSING UNIT ON THE ROOF PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. THE KITCHEN EQUIPMENT SUPPLIER SHALL PROVIDE LINESET, SPECIALTIES AND MAKE ALL FINAL CONNECTIONS BETWEEN THE CONDENSING UNIT AND EVAPORATOR COIL.

3 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 PLENUM OF THE RTU AND PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. ADJUST AS REQUIRED FOR THE SUPPLY AIRFLOW.

4 SMOKE DETECTOR FURNISHED IN THE RETURN AIR STREAM OF THE EQUIPMENT. UPON DETECTION OF SMOKE, THE SUPPLY AIR FAN SHALL DE-ENERGIZE. COORDINATE ALL REQUIREMENTS WITH THE LANDLORD AND ALARM PROVIDER.

5 MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCE ZONES. NO DUCTWORK, PIPING, CONDUIT OR OTHER SYSTEMS SHALL BER PERMITTED IN THIS AREA. COORDINATE WITH SITE CONDITIONS AND WORK OF OTHER TRADES AS REQUIRED. TYPICAL.



NORTH

1 **HVAC ROOF PLAN**
1/4" = 1'-0"

sweetgreen

3101 W. EXPOSITION BLVD.
LOS ANGELES, CALIFORNIA 90018

ENGINEER OF RECORD:

EVERJ ENGINEERING, INC.
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WORTHINGTON, OH 43085
240-319-0822
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STAMP:

CONSTRUCTION
ISSUE SET

03/16/2023

PROJECT INFORMATION:
UNIVERSITY OF WI, MADISON

PROJECT INFORMATION:
652 STATE STREET
MADISON, WI 53703

DRAWN BY:	JAE
CHECKED BY:	MK
PROJECT MANAGER:	JAE
SG DESIGN MANAGER:	DZ
SG CONSTR. MANAGER:	JB
PROJECT NO:	220064
TEMPLATE VERSION:	05/20/2022

REVISIONS

REV.	DATE	DESCRIPTION

HVAC ROOF PLAN

M-200

3/16/2023 3:23:18 PM

AIR BALANCE SCHEDULE

TAG	SUPPLY AIRFLOW (CFM)	RETURN AIRFLOW (CFM)	OUTSIDE AIRFLOW (CFM)	EXHAUST AIRFLOW (CFM)	SUBTOTAL (CFM)
EF-1	0	0	0	790	-790
EF-2	0	0	0	200	-200
RTU-1	3400	2960	440	0	440
RTU-2	2800	2150	650	0	650
NET PRESSURIZATION (CFM):					100

TRANE NATIONAL ACCOUNT - HVAC SYSTEM INFORMATION

EQUIPMENT SHALL BE PROCURED THROUGH A TRANE NATIONAL ACCOUNT. CONTACT THE TRANE NATIONAL ACCOUNT TEAM FOR HVAC SYSTEM INFORMATION:

DEREK VAN RIPER	DANNY SCHEER
(714)227-9366	(866)986-4822
DEREK.VANRIPER@TRANE.COM	DAN.SCHEER@TRANETECHNOLOGIES.COM

- HVAC EQUIPMENT IS OWNER PURCHASED AND ASSIGNED TO THE INSTALLING CONTRACTOR.

- INSTALLING CONTRACTOR RESPONSIBLE TO: VERIFY UNIT CONFIGURATIONS, COORDINATE DELIVERY WITH TRANE, RECEIVE & UNLOAD EQUIPMENT, INSPECT EQUIPMENT, PROPERLY INSTALL EQUIPMENT INCLUDING FIELD INSTALLED ITEMS, STARTUP, AND 1ST YEAR LABOR WARRANTY & ADMINISTRATION.

- ANY CHANGES OR VARIATION TO THE EQUIPMENT PACKAGE THAT WOULD AFFECT THE HVAC EQUIPMENT PACKAGE SHOULD BE BROUGHT TO THE ATTENTION OF THE TRANE NATIONAL ACCOUNT TEAM AT THE TIME OF QUOTATION.

MATERIAL SCHEDULE

CATEGORY	APPLICATION	ALLOWABLE MATERIAL
DUCT	EXPOSED, SUPPLY	ROUND AS SHOWN. PAINTED TO MATCH ROOF DECK.
	EXPOSED, RETURN	ROUND AS SHOWN. PAINTED TO MATCH ROOF DECK.
	EXPOSED, GEN. EXHAUST	DOUBLE-WALL INSULATED ROUND AS SHOWN. PAINTED TO MATCH ROOF DECK.
	CONCEALED, SUPPLY	RECTANGULAR OR ROUND AS SHOWN. INSULATED.
	CONCEALED, RETURN	RECTANGULAR OR ROUND AS SHOWN. INSULATED.
	CONCEALED, GEN. EXHAUST	RECTANGULAR OR ROUND AS SHOWN. INSULATED.

EXHAUST SCHEDULE

PER TABLE 403.1.1 OF THE 2015 WISCONSIN MECHANICAL CODE

CATEGORY	AREA (SF)	NUMBER OF FIXTURES	AIR RATE		EXHAUST REQUIRED (CFM)		EXHAUST REQUIRED (CFM)	EXHAUST PROVIDED (CFM)
			CFM / FIXTURE	CFM / SF	FIXTURES	FLOOR AREA		
KITCHEN	1118.0	0	0.00	-0.70	0.0	-782.6	-782.6	-790.0
RESTROOMS	94.3	2	-50.00	0.00	-100.0	0.0	-100.0	-150.0
TOTAL							-882.6	-940.0

VENTILATION SCHEDULE

PER TABLE 403.1.1 OF THE 2015 WISCONSIN MECHANICAL CODE

CATEGORY	OCCUPANT DENSITY (# / 1000 SF)	AREA (SF)	OCCUPANCY BY AREA (PEOPLE)	AIR RATE (CFM)		VENTILATION REQUIRED (CFM)		EFFECTIVENESS	VENTILATION REQUIRED (CFM)	VENTILATION PROVIDED (CFM)
				CFM / PERSON	CFM / SF	OCCUPANCY	FLOOR AREA			
BREAK AREA	30	53.0	2	7.50	0.06	15.0	3.2	0.8	22.7	22.7
CORRIDOR	0	17.5	0	0.00	0.06	0.0	1.1	0.8	1.3	1.5
DINING ROOM	70	686.0	49	7.50	0.18	367.5	123.5	0.8	613.7	648.5
OFFICE	5	58.3	1	5.00	0.06	5.0	3.5	0.8	10.6	10.6
STORAGE AREAS	0	301.9	0	0.00	0.12	0.0	36.2	0.8	45.3	50.8
TOTAL									693.7	734.1

GRILLS, REGISTERS, AND DIFFUSERS SCHEDULE

TAG	DESCRIPTION	FACE SIZE	MATERIAL	FINISH	MOUNTING	SUPPLIER	INSTALLER	MANUFACTURER	MODEL	REMARKS
CD1	PERFORATED CEILING DIFFUSER	24'' x 24''	ALUMINUM	WHITE	GYPSUM BOARD	GC	GC	TITUS	PCS-AA	PROVIDE WITH INTEGRAL OBD
CD2	PERFORATED CEILING DIFFUSER	12'' x 12''	ALUMINUM	WHITE	GYPSUM BOARD	GC	GC	TITUS	PCS-AA	PROVIDE WITH INTEGRAL OBD
CD3	PLAQUE FACE DIFFUSER	12"x12"	ALUMINUM	WHITE	GYPSUM BOARD	GC	GC	TITUS	OMNI-AA	PROVIDE WITH INTEGRAL OBD
CD4	PERFORATED CEILING DIFFUSER	24'' x 24''	ALUMINUM	WHITE	LAY-IN	GC	GC	TITUS	PCS-AA	PROVIDE INTEGRAL OBD
ED1	PLAQUE FACE EXHAUST DIFFUSER	12"x12"	ALUMINUM	WHITE	GYPSUM BOARD	GC	GC	TITUS	OMNI-AA	PROVIDE WITH INTEGRAL OBD
EG1	PERFORATED CEILING EXHAUST	16"x16"	ALUMINUM	WHITE	GYPSUM BOARD	GC	GC	TITUS	PAR-AA	PROVIDE WITH INTEGRAL OBD
RG1	PERFORATED CEILING RETURN	48'' x 24''	ALUMINUM	WHITE	GYPSUM BOARD	GC	GC	TITUS	PAR-AA	
RG2	3/4" SPACING, 35° DEGREE DEFLECTION RETURN GRILLE	38"x22"	STEEL	WHITE	GYPSUM BOARD	GC	GC	TITUS	350RL	
SG1	DOUBLE DIRECTIONAL SUPPLY GRILLE	20" x 12"	STEEL	TO MATCH WALL	GYPSUM BOARD	GC	GC	TITUS	300FL	PROVIDE WITH INTEGRAL OBD
SG2	DOUBLE DIRECTIONAL SUPPLY GRILLE	16"x8"	STEEL	TO MATCH WALL	GYPSUM BOARD	GC	GC	TITUS	300FL	PROVIDE WITH INTEGRAL OBD
SG3	DOUBLE DIRECTIONAL SUPPLY GRILLE	8" x 8"	STEEL	WHITE	GYPSUM BOARD	GC	GC	TITUS	300FL	PROVIDE WITH INTEGRAL OBD
TG1	PERFORATED CEILING TRANSFER GRILLE	24'' x 24''	ALUMINUM	WHITE	GYPSUM BOARD	GC	GC	TITUS	PAR-AA	
TG2	PERFORATED CEILING TRANSFER GRILLE	16"x16"	ALUMINUM	WHITE	GYPSUM BOARD	GC	GC	TITUS	PAR-AA	
TG3	3/4" SPACING, 35° DEGREE DEFLECTION TRANSFER GRILLE	30"x24"	STEEL	WHITE	GYPSUM BOARD	GC	GC	TITUS	350RL	

RECIRCULATING HOOD SCHEDULE

TAG	DESCRIPTION	MAX COOKING TEMP.	EXHAUST PLENUM	APPROXIMATE WEIGHT [lbs]	SUPPLIER	INSTALLER	ELECTRICAL DATA		BASIS FOR DESIGN		REMARKS
			AIRFLOW [CFM]				WATTS	V/P/H	MANUFACTURER	MODEL	
HD-1	VENTLESS CANOPY RECIRCULATING HOOD	N/A	415	175	KES	KES	170 W	120/1/60	RATIONAL	60.76.177	UL 710B COOKING APPLIANCE WITH A GREASE DISCHARGE LESS THAN 5.0 E-06 KG/CUBIC METER WHERE OPERATED WITH A TOTAL AIRFLOW OF 500 CFM

FAN SCHEDULE

TAG	EXHAUST AIRFLOW (CFM)	E.S.P. (IN. W.C.)	DRIVE TYPE	MOTOR POWER (HP)	WEIGHT (LB)	ELECTRICAL			SUPPLIER	INSTALLER	MANUFACTURER	MODEL	REMARKS
						MCA (A)	MOCP (A)	V/P/H					
EF-1	790	0.6	DIRECT	0.33	125	5.4	15	120/1/60	GC	GC	CAPTIVEAIRE	DU33HFA	FURNISHED WITH DISCONNECT, SPEED CONTROLLER, BACKDRAFT DAMPER AND 18" TALL ROOF CURB.
EF-2	200	0.7	DIRECT	0.25	100	3.7	15	120/1/60	GC	GC	CAPTIVEAIRE	DR12HFA	FURNISHED WITH DISCONNECT, SPEED CONTROLLER, BACKDRAFT DAMPER AND 22" TALL ROOF CURB.

TYPE II HOOD SCHEDULE

TAG	DESCRIPTION	HOOD CONSTRUCTION			MAXIMUM COOKING TEMPERATURE (DEG. F)	EXHAUST COLLARS			WEIGHT (LB)	SUPPLIER	INSTALLER	MANUFACTURER	MODEL	REMARKS
		WIDTH	DEPTH	MATERIAL		AIRFLOW (CFM)	DIAMETER (IN)	PRESSURE DROP (IN. W.G.)						
HD-2	TYPE II CANOPY HOOD	58"	60"	430 STAINLESS STEEL	700	790	10"	0.09	200	GC	GC	CAPTIVEAIRE	6012 VHB	

CONDENSING UNIT SCHEDULE

TAG	DESCRIPTION	NOMINAL CAPACITY (TONS)	NUMBER OF COMPRESSORS	REFRIGERANT TYPE	WEIGHT (LB)	ELECTRICAL			SUPPLIER	INSTALLER	MANUFACTURER	MODEL	REMARKS
						MOCP	FLA	V/P/H					
CU-1	WALK-IN COOLER REMOTE CONDENSING UNIT	0	1	R448A	260	25	16.3	208/1/60	KES	GC / KES	BY KES	BY KES	FURNISHED WITH THE WALK-IN COOLER.

HEATED AIR CURTAIN SCHEDULE

TAG	DESCRIPTION	OPENING WIDTH	AIRFLOW			ELECTRICAL				SUPPLIER	INSTALLER	MANUFACTURER	MODEL	REMARKS
			MAX VELOCITY (FPM)	AVERAGE VELOCITY (FPM)	AIRFLOW (CFM)	HEATING kW	MOCP (A)	MCA (A)	V/P/H					
AC-1	AIR DOOR	72"	2870	1707	2010	15	60	43.3	208/3/60	GC	GC	BERNER	CLC08-1072E	FURNISHED WITH DOOR SWITCH, FACTORY INSTALLED FAN SPEED/HEAT SWITCH AND THERMAL OVERLOAD PROTECTION.

ROOFTOP UNIT SCHEDULE

TAG	DESCRIPTION	COOLING CAPACITY (TONS)	EER	AIRFLOW				COOLING					HEATING			NUMBER OF COMPRESSORS	NUMBER OF CIRCUITS	REFRIGERANT CHARGE (LB)	WEIGHT (LB)	ELECTRICAL			SUPPLIER	INSTALLER	MANUFACTURER	MODEL	REMARKS
				TOTAL (CFM)	RETURN (CFM)	OA (CFM)	E.S.P. (IN. W.C.)	NET TOTAL (MBH)	NET SENSIBLE (MBH)	EAT (DEG. F) DB	EAT (DEG. F) WB	OAT (DEG. F)	INPUT (BTU/H)	OUTPUT (BTU/H)	EAT (DEG. F)					MOCP (A)	MCA (A)	V/P/H					
RTU-1	KITCHEN ROOFTOP UNIT	8.5	11.0	3400	2960	440	0.8	98.3	65.1	75.1	64.8	95.0	150,000	121,500	59.0	2	1	10.1	1300	60	48.0	208/3/60	OWNER	GC	TRANE	YSJ-102	FURNISHED WITH HOT GAS REHEAT WITH REMOTE HUMIDISTAT, COMPARATIVE ENTHALPY ECONOMIZER WITH FAULT DETECTION AND DIAGNOSTICS AND BAROMETRIC RELIEF, MULTI-SPEED FAN, HINGED PANELS, MERV 8 FILTERS, HAIL GUARD, DISCONNECT, UNPOWERED CONVENIENCE RECEPTACLE, SMOKE DETECTOR IN THE RETURN AIR STREAM AND 24" TALL ROOF CURB.
RTU-2	DINING ROOM ROOFTOP UNIT	7.5	11.0	2800	2150	650	0.8	89.6	58.8	77.0	66.1	95.0	150,000	121,500	50.7	2	1	9.0	1300	50	42.0	208/3/60	OWNER	GC	TRANE	YSJ-090	FURNISHED WITH COMPARATIVE ENTHALPY ECONOMIZER WITH FAULT DETECTION AND DIAGNOSTICS AND BAROMETRIC RELIEF, MULTI-SPEED FAN, HINGED PANELS, MERV 8 FILTERS, HAIL GUARD, DISCONNECT, UNPOWERED CONVENIENCE RECEPTACLE, SMOKE DETECTOR IN THE RETURN AIR STREAM AND 24" TALL ROOF CURB.

sg

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ENGINEER OF RECORD:

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STAMP:

CONSTRUCTION ISSUE SET

03/16/2023

PROJECT INFORMATION:
UNIVERSITY OF WI, MADISON

PROJECT INFORMATION:
652 STATE STREET
MADISON, WI 53703

DRAWN BY: JAE
CHECKED BY: MK
PROJECT MANAGER: JAE
SG DESIGN MANAGER: DZ
SG CONSTR. MANAGER: JB
PROJECT NO: 220064
TEMPLATE VERSION: 05/20/2022

REVISIONS

REV.	DATE	DESCRIPTION
1	12/28/2022	CODE COMMENTS
4	03/02/2023	OWNER REVISIONS

HVAC SCHEDULES

M-300

3/16/2023 3:23:22 PM

SEQUENCE OF OPERATIONS
RTU-1

OCCUPIED MODE:
FAN OPERATION/OUTSIDE AIR DAMPER: WHEN SCHEDULED BY THE THERMOSTAT TO BE IN OCCUPIED MODE, THE ROOFTOP UNIT FAN SHALL START AND RUN CONTINUOUSLY AND THE OUTSIDE AIR DAMPERS SHALL MODULATE TO THE MINIMUM POSITION.
HEATING: ON A FALL IN SPACE TEMPERATURE BELOW THE SETPOINT OF 70 DEGREES (ADJUSTABLE) THE FIRST STAGE OF HEATING SHALL BE ENERGIZED TO MAINTAIN THE SETPOINT. UPON A CONTINUED FALL IN SPACE TEMPERATURE, THE SECOND STAGE SHALL BE ENERGIZED (WHERE APPLICABLE) TO MAINTAIN THE 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% TO PROVIDE COOLING FOR THE SPACE. WHEN THE ENTHALPY OF THE OUTSIDE AIR IS NOT FAVORABLE, OR THERE IS A SUDDEN DEMAND FOR SPACE COOLING, THE OUTSIDE AIR DAMPER SHALL MODULATE TO THE MINIMUM POSITION AND THE COOLING SHALL BE ENERGIZED AS REQUIRED TO MAINTAIN THE SETPOINT.
DEHUMIDIFICATION: UPON A SIGNAL FROM THE HUMIDISTAT THAT DEHUMIDIFICATION IS REQUIRED, THE COOLING COIL SHALL BE ENERGIZED TO SATISFACTORILY DEHUMIDIFY THE AIR AND THE HOT GAS REHEAT COIL SHALL BE ENGAGED AS REQUIRED TO MAINTAIN THE SPACE SETPOINT.

UNOCCUPIED MODE:
FAN OPERATION/OUTSIDE AIR DAMPER: WHEN SCHEDULED BY THE THERMOSTAT TO BE IN UNOCCUPIED MODE, THE ROOFTOP UNIT FANS ARE TO BE OFF AND THE OUTSIDE AIR DAMPERS SHALL REMAIN CLOSED.
HEATING: ON A FALL IN SPACE TEMPERATURE BELOW THE SETPOINT OF 55 DEGREES (ADJUSTABLE) THE ROOFTOP UNIT FAN SHALL START AND THE FIRST STAGE OF HEATING SHALL BE ENERGIZED TO MAINTAIN THE SETPOINT. UPON A CONTINUED FALL IN SPACE TEMPERATURE, THE SECOND STAGE SHALL BE ENERGIZED (WHERE APPLICABLE) TO MAINTAIN THE SETPOINT.
COOLING: ON A RISE IN SPACE TEMPERATURE ABOVE THE SETPOINT OF 85 DEGREES (ADJUSTABLE) THE ROOFTOP UNIT FAN SHALL START. WHEN THE ENTHALPY OF THE OUTSIDE AIR IS FAVORABLE, THE OUTSIDE AIR DAMPER SHALL MODULATE OPEN UP TO 100% TO PROVIDE COOLING FOR THE SPACE. WHEN THE ENTHALPY OF THE OUTSIDE AIR IS NOT FAVORABLE, OR THERE IS A SUDDEN DEMAND FOR SPACE COOLING, THE OUTSIDE AIR DAMPER SHALL REMAIN IN THE CLOSED POSITION AND THE COOLING SHALL BE ENERGIZED AS REQUIRED TO MAINTAIN THE SETPOINT.
DEHUMIDIFICATION: UPON A SIGNAL FROM THE HUMIDISTAT THAT DEHUMIDIFICATION IS REQUIRED THE ROOFTOP UNIT FAN SHALL START, THE COOLING COIL SHALL BE ENERGIZED TO SATISFACTORILY DEHUMIDIFY THE AIR AND THE HOT GAS REHEAT COIL SHALL BE ENGAGED AS REQUIRED TO MAINTAIN THE SPACE SETPOINT.

EMERGENCY MODE:
FAN OPERATION/OUTSIDE AIR DAMPER: UPON A SIGNAL FROM THE SMOKE DETECTOR IN THE RETURN AIR STREAM, THE FAN SHALL STOP AND THE OUTSIDE AIR DAMPER SHALL CLOSE.

SEQUENCE OF OPERATIONS
RTU-2

OCCUPIED MODE:
FAN OPERATION/OUTSIDE AIR DAMPER: WHEN SCHEDULED BY THE THERMOSTAT TO BE IN OCCUPIED MODE, THE ROOFTOP UNIT FANS SHALL START AND RUN CONTINUOUSLY AND THE OUTSIDE AIR DAMPERS SHALL MODULATE TO THE MINIMUM POSITION.
HEATING: ON A FALL IN SPACE TEMPERATURE BELOW THE SETPOINT OF 70 DEGREES (ADJUSTABLE) THE FIRST STAGE OF HEATING SHALL BE ENERGIZED TO MAINTAIN THE SETPOINT. UPON A CONTINUED FALL IN SPACE TEMPERATURE, THE SECOND STAGE SHALL BE ENERGIZED (WHERE APPLICABLE) TO MAINTAIN THE 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% TO PROVIDE COOLING FOR THE SPACE. WHEN THE ENTHALPY OF THE OUTSIDE AIR IS NOT FAVORABLE, OR THERE IS A SUDDEN DEMAND FOR SPACE COOLING, THE OUTSIDE AIR DAMPER SHALL MODULATE TO THE MINIMUM POSITION AND THE COOLING SHALL BE ENERGIZED AS REQUIRED TO MAINTAIN THE SETPOINT.

UNOCCUPIED MODE:
FAN OPERATION/OUTSIDE AIR DAMPER: WHEN SCHEDULED BY THE THERMOSTAT TO BE IN UNOCCUPIED MODE, THE ROOFTOP UNIT FANS ARE TO BE OFF AND THE OUTSIDE AIR DAMPERS SHALL REMAIN CLOSED.
HEATING: ON A FALL IN SPACE TEMPERATURE BELOW THE SETPOINT OF 55 DEGREES (ADJUSTABLE) THE ROOFTOP UNIT FAN SHALL START AND THE FIRST STAGE OF HEATING SHALL BE ENERGIZED TO MAINTAIN THE SETPOINT. UPON A CONTINUED FALL IN SPACE TEMPERATURE, THE SECOND STAGE SHALL BE ENERGIZED (WHERE APPLICABLE) TO MAINTAIN THE SETPOINT.
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EMERGENCY MODE:
FAN OPERATION/OUTSIDE AIR DAMPER: UPON A SIGNAL FROM THE SMOKE DETECTOR IN THE RETURN AIR STREAM, THE FAN SHALL STOP AND THE OUTSIDE AIR DAMPER SHALL CLOSE.

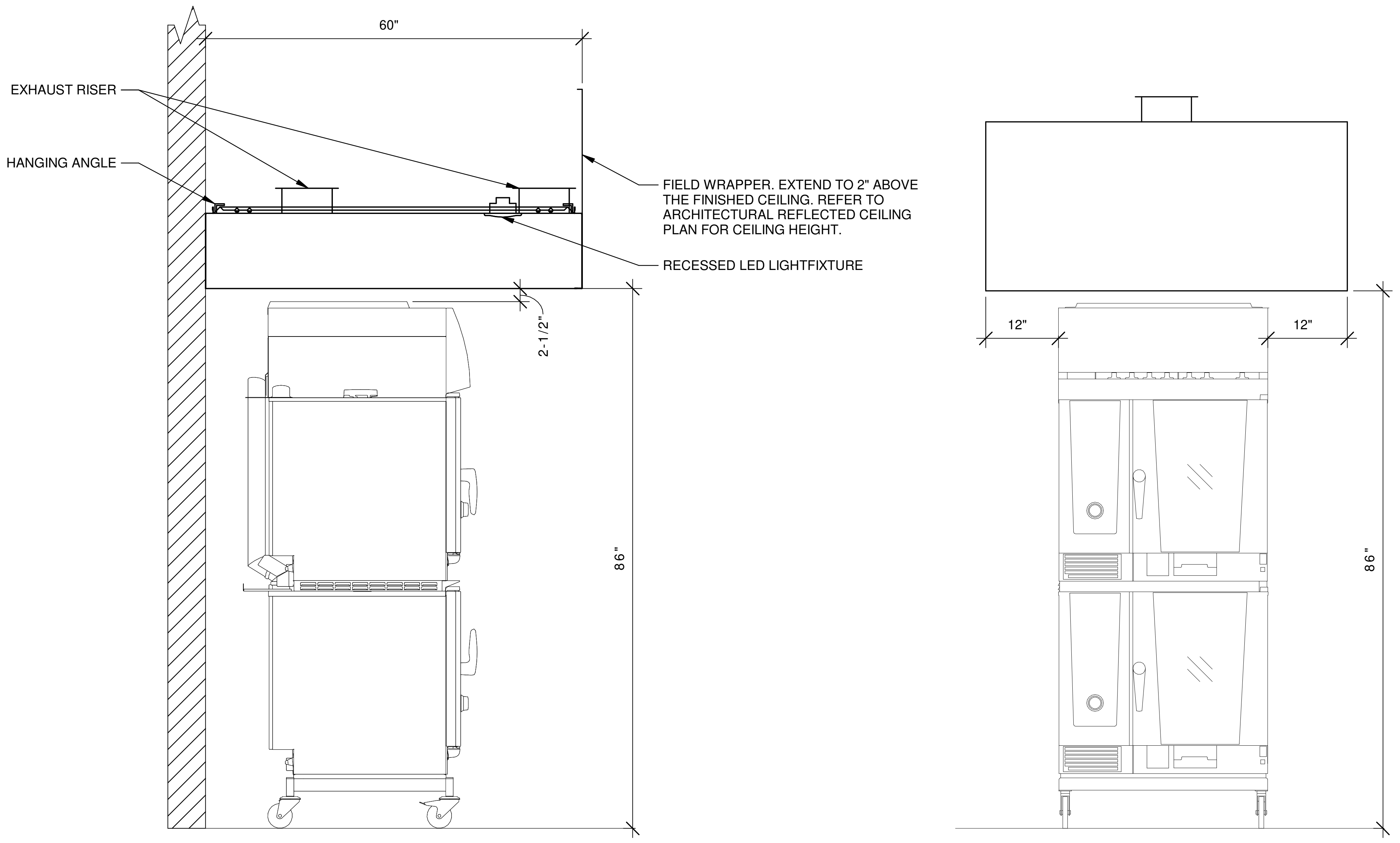
SEQUENCE OF OPERATIONS
EF-1 & EF-2

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

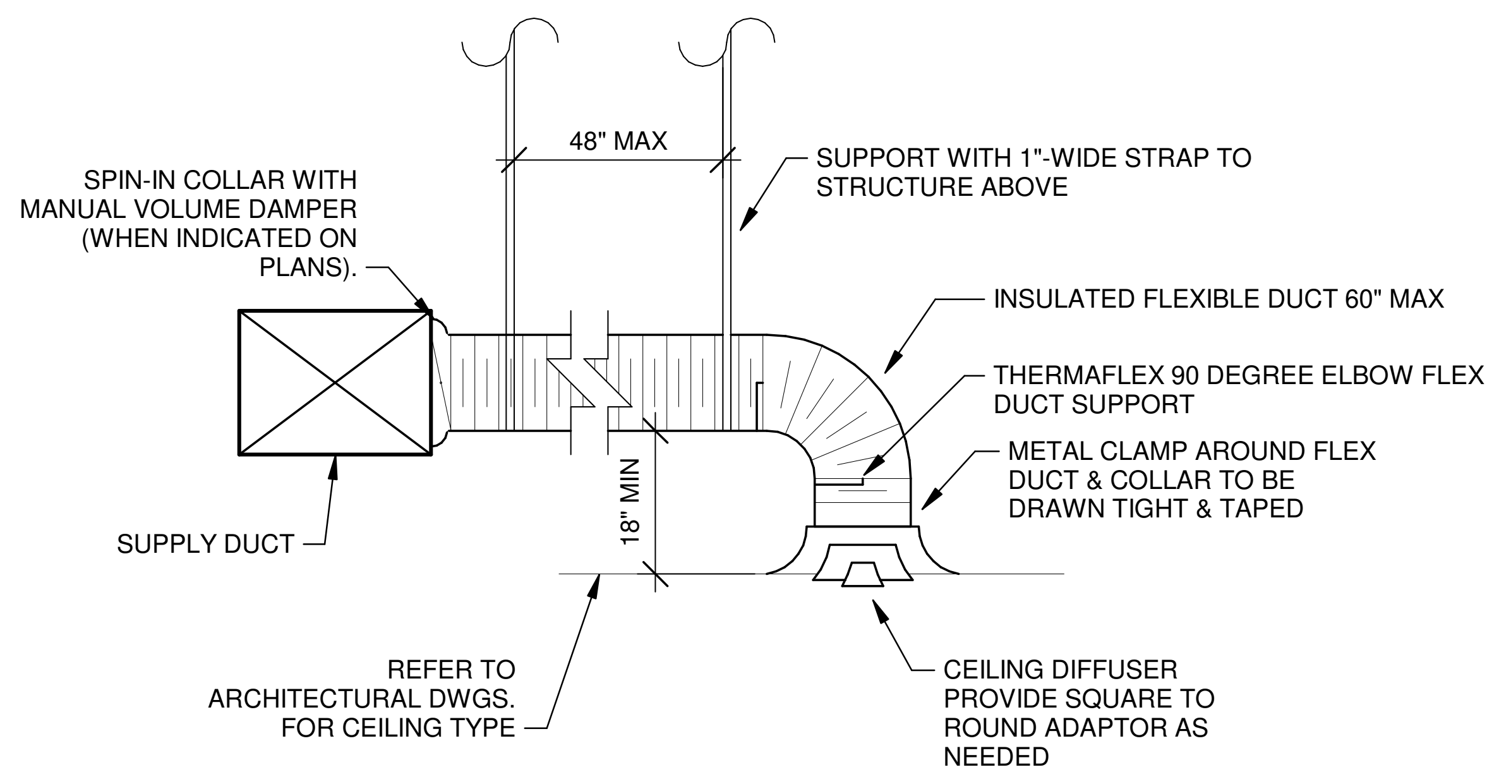
UNOCCUPIED MODE:
FAN OPERATION: WHEN SCHEDULED BY THE TIME CLOCK TO BE IN UNOCCUPIED MODE, THE EXHAUST FAN SHALL REMAIN OFF.

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

3 **SEQUENCE OF OPERATIONS**
N.T.S.



2 **HOOD ELEVATIONS**
N.T.S.



NOTE:
1. METHOD OF INSTALLATION FOR AIRTIGHT SEAL IS TYPICAL FOR ALL FLEX CONNECTIONS TO AIR DISTRIBUTION DEVICES.

1 **DIFFUSER CONNECTION**
N.T.S.

3/16/2023 3:23:24 PM

sg

sweetgreen®

3101 W. EXPOSITION BLVD.
LOS ANGELES, CALIFORNIA 90018

ENGINEER OF RECORD:

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SG CONSTR. MANAGER: JB
PROJECT NO: 220064
TEMPLATE VERSION: 05/20/2022

REVISIONS

REV.	DATE	DESCRIPTION

HVAC DETAILS

M-400