

SECTION 15732 - PACKAGED ROOFTOP AIR-CONDITIONING UNITS

PART 1 - GENERAL

- 1.1 SECTION REQUIREMENTS
- A. SUBMITTALS: PRODUCT DATA AND SHOP DRAWINGS.
 - B. COMPLY WITH ASHRAE 15.
 - C. EER: EQUAL TO OR GREATER THAN PRESCRIBED BY THE ENERGY CODE ADOPTED BY THE AUTHORITY HAVING JURISDICTION.
 - D. WARRANTIES: SUBMIT A WRITTEN WARRANTY, SIGNED BY THE MANUFACTURER, AGREEING TO THE REPAIR OR REPLACEMENT OF COMPONENTS THAT FAIL WITHIN 5 YEARS OF SUBSTANTIAL COMPLETION.

PART 2 - PRODUCTS

- 2.1 PACKAGED UNITS, 5 TO 20 TONS
- A. FACTORY ASSEMBLED AND TESTED, CONSISTING OF COMPRESSORS, CONDENSERS, EVAPORATOR COILS, CONDENSER AND EVAPORATOR FANS, REFRIGERATION AND TEMPERATURE CONTROLS, FILTERS, AND DAMPERS.
 - 1. REFER TO ROOFTOP HEATING/COOLING UNIT SCHEDULE ON DRAWING M600 FOR CAPACITIES, AND MANUFACTURERS.
 - 2. EVAPORATOR FANS: BELT OR DIRECT DRIVEN, FORWARD CURVED CENTRIFUGAL.
 - 3. EXHAUST/RELIEF FANS: DIRECT DRIVE, FORWARD CURVED CENTRIFUGAL OR PROPELLER.
 - 4. CONDENSER FANS: DIRECT DRIVE PROPELLER.
 - 5. REFRIGERANT COILS: ALUMINUM FINS AND COPPER COIL.
 - 6. COMPRESSORS: SERVICEABLE HERMETIC OR FULLY HERMETIC, WITH SAFETY CONTROLS, HOT GAS BYPASS, AND TIMED OFF CONTROLS.
 - 7. HEAT EXCHANGERS: GAS FIRED, WITH GAS CONTROLS, ELECTRONIC IGNITION, HIGH LIMIT CUTOUT, AND FORCED DRAFT PROVING SWITCH.
 - 8. ECONOMIZER CONTROLS (COMPARATIVE ENTHALPY, 100% CAPACITY).
 - 9. SMOKE DETECTORS: PHOTOELECTRIC IN SUPPLY AND/OR RETURN AS CALLED FOR IN SCHEDULE ON SHEET M600.
 - 10. OPERATING CONTROLS: TWO STAGE HEATING AND TWO STAGE COOLING ON UNITS 7-1/2 TONS AND OVER.
 - 11. ROOF CURB.
 - 12. CONTROL WIRING FROM T-STAT TO ROOFTOP UNIT: SHALL BE 18GA / 7 CONDUCTOR, RATED FOR PLENUM APPLICATIONS.
 - 13. CONTROL WIRING FROM T-STAT TO REMOTE SENSOR: SHALL BE A SEPARATE 18GA / 2 CONDUCTOR SHIELDED, RATED FOR PLENUM APPLICATIONS.

PART 3 - EXECUTION

- 3.1 INSTALLATION
- A. INSTALL UNITS LEVEL AND PLUMB AND FIRMLY ANCHORED.
 - B. CONNECT GAS PIPING TO BURNER WITH PIPE SAME SIZE AS GAS TRAIN INLET, AND PROVIDE UNION WITH SUFFICIENT CLEARANCE FOR BURNER REMOVAL AND SERVICE.
 - C. INSTALL DUCTS TO TERMINATION IN ROOF MOUNTING FRAMES. TERMINATE DUCTS THROUGH ROOF STRUCTURE.
 - D. CONNECT UNITS TO WIRING SYSTEMS AND TO GROUND.

END OF SECTION 15732

SECTION 15810 - DUCTS AND ACCESSORIES

PART 1 - GENERAL

- 1.1 SECTION REQUIREMENTS
- A. SUBMITTALS: PRODUCT DATA FOR FIRE AND SMOKE DAMPERS.
 - B. COMPLY WITH NFPA 90A FOR SYSTEMS SERVING SPACES MORE THAN 25,000 CU. FT. IN VOLUME OR BUILDING TYPES II, IV, AND V CONSTRUCTION MORE THAN 3 STORIES IN HEIGHT.
 - C. COMPLY WITH NFPA 90B FOR SYSTEMS SERVING SPACES IN 1 OR 2 FAMILY DWELLINGS OR SERVING SPACES LESS THAN 25,000 CU. FT..
 - D. COMPLY WITH NFPA 96, "VENTILATION CONTROL AND FIRE PROTECTION OF COMMERCIAL COOKING OPERATIONS," FOR KITCHEN HOOD DUCTS.
 - E. COMPLY WITH UL 181 AND UL 181A FOR DUCTS AND CLOSURES.
 - F. TESTING, ADJUSTING, AND BALANCING AGENCY QUALIFICATIONS: AABC CERTIFIED (TO BE FURNISHED BY OWNER).

PART 2 - PRODUCTS

- 2.1 DUCTS
- A. SPIRAL DUCT: SPIRAL LOCK SEAM, WITHOUT INSULATION, G90 GALVANIZED FINISH, ASTM A-653/924
 - 1. BASIS OF DESIGN MANUFACTURERS: LINDAB SPIROSAFE, ALTERNATES TO THE BASIS OF DESIGN MUST BE SUBMITTED FOR REVIEW.
 - 2. FITTINGS: FACTORY PRODUCED STANDING SEAM CONSTRUCTION WITH INTERNAL SEALING. FITTINGS WITH A MAJOR AXIS OF 36" OR SMALLER SHALL BE 20 GAUGE. FITTINGS WITH A MAJOR AXIS OF 37"-48" SHALL BE 18 GAUGE.
 - B. GALVANIZED STEEL SHEET: FORMING STEEL, ASTM A 653/653M, G90 COATING DESIGNATION.
 - C. DUCT LINER: ASTM C 1071, TYPE II, WITH AN AIRSTREAM SURFACE COATED WITH A TEMPERATURE RESISTANT COATING. THICKNESS: 1-1/2 INCH. R-VALUE : 8.
 - 1. ADHESIVE: ASTM C 916, TYPE I.
 - 2. MECHANICAL FASTENERS: GALVANIZED STEEL PIN, LENGTH AS REQUIRED TO PENETRATE LINER PLUS A 1/8 INCH PROJECTION MAXIMUM INTO THE AIRSTREAM.
 - D. JOINT AND SEAM TAPE: COMPLY WITH UL 181A.
 - E. JOINT AND SEAM SEALANT: COMPLY WITH UL 181A.
 - F. RECTANGULAR METAL DUCT FABRICATION: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARD" FOR METAL THICKNESS, REINFORCING TYPES AND INTERVALS, TIE ROD APPLICATIONS, AND JOINT TYPES AND INTERVALS.
- 2.2 ACCESSORIES
- A. VOLUME-CONTROL DAMPERS: FACTORY FABRICATED VOLUME CONTROL DAMPERS, COMPLETE WITH REQUIRED HARDWARE AND ACCESSORIES. SINGLE BLADE AND MULTIPLE OPPOSED BLADE, STANDARD LEAKAGE RATING, AND SUITABLE FOR HORIZONTAL OR VERTICAL APPLICATIONS.
 - B. FIRE DAMPERS: FACTORY-FABRICATED FIRE DAMPERS, COMPLETE WITH REQUIRED HARDWARE AND ACCESSORIES. UL LABELED ACCORDING TO UL 555, "FIRE DAMPERS".
 - C. FLEXIBLE CONNECTORS: FLAME RETARDANT OR NONCOMBUSTIBLE FABRICS, COATINGS, AND ADHESIVES COMPLYING WITH UL 181, CLASS 1.
 - D. FLEXIBLE DUCTS: FACTORY FABRICATED, INSULATED, ROUND DUCT, WITH AN OUTER JACKET ENCLOSING 2 INCH THICK, GLASS FIBER INSULATION, R-VALUE: 6.0, AROUND A CONTINUOUS INNER LINER.

PART 3 - EXECUTION

- 3.1 INSTALLATION
- A. DUCT SYSTEM PRESSURE CLASS: CONSTRUCT AND INSTALL EACH DUCT SYSTEM WITH 2 INCH POSITIVE AND NEGATIVE DUCT PRESSURE CLASSIFICATIONS.
 - B. CONCEAL DUCTS FROM VIEW IN FINISHED AND OCCUPIED SPACES. EXCEPT WHERE NOTED AS EXPOSED.
 - C. AVOID PASSING THROUGH ELECTRICAL EQUIPMENT SPACES AND ENCLOSURES.
 - D. SUPPORT AND CONNECT METAL DUCTS ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARD".
 - E. INSTALL DUCT ACCESSORIES ACCORDING TO APPLICABLE PORTIONS OF DETAILS OF CONSTRUCTION AS SHOWN IN SMACNA STANDARDS.
 - F. INSTALL LINER AND/OR INSULATION ON DUCTWORK PER THE MATERIAL SCHEDULE ON SHEET M010.
 - G. INSTALL VOLUME CONTROL DAMPERS IN LINED DUCT WITH METHODS TO AVOID DAMAGE TO LINER AND TO AVOID EROSION OF DUCT LINER.
 - H. INSTALL FIRE AND SMOKE DAMPERS ACCORDING TO MANUFACTURER'S UL APPROVED WRITTEN INSTRUCTIONS.
 - I. INSTALL FUSIBLE LINKS IN FIRE DAMPERS.
 - J. PROVIDE SADDLE TAPS AT TEES FOR EXPOSED DUCTWORK.
- 3.2 TESTING, ADJUSTING, AND BALANCING
- A. THE OWNER WILL SUPPLY AN INDEPENDENT BALANCE AGENT TO TO BALANCE AND ADJUST THE HVAC INSTALLATION. THE BALANCE AGENT WILL BE RESPONSIBLE FOR ANY PULLEY OR BELT CHANGES REQUIRED.
 - B. THE GC IS TO HAVE TRAINED STAFFED AVAILABLE DURING THE BALANCING TO CORRECT ISSUES NOTED BY THE BALANCE AGENT.
 - C. THE BALANCE AGENT IS TO BALANCE AIRFLOW WITHIN DISTRIBUTION SYSTEMS, INCLUDING SUBMANS, BRANCHES, AND TERMINALS TO INDICATED QUANTITIES +/- 10%. THE HOOD EXHAUST SYSTEM SHALL BE BALANCED TO A TOLERANCE OF: -0+10% AND THE MAKE-UP AIR SYSTEM TO A TOLERANCE OF -10+0%.
 - D. THE BALANCE AGENT IS TO SUPPLY A COPY OF THE BALANCE REPORT TO THE OWNER, ENGINEER AND GENERAL CONTRACTOR FOR REVIEW.

END OF SECTION 15810

SECTION 15855 - DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

- 1.1 SECTION REQUIREMENTS
- A. SUBMITTALS: NONE.

PART 2 - PRODUCTS

- 2.1 OUTLETS AND INLETS
- A. DIFFUSERS:
 - 1. REFER TO GRILLS, REGISTERS, AND DIFFUSERS SCHEDULE FOR EQUIPMENT SCHEDULE
 - 2. MANUFACTURER: AS SCHEDULED (NO SUBSTITUTIONS)
 - 3. MATERIAL: AS SCHEDULED.
 - 4. FINISH: AS SCHEDULED.
 - 5. MOUNTING: AS SCHEDULED.
 - B. WALL AND CEILING REGISTERS:
 - 1. REFER TO GRILLS, REGISTERS, AND DIFFUSERS SCHEDULE FOR EQUIPMENT SCHEDULE
 - 2. MANUFACTURER: AS SCHEDULED (NO SUBSTITUTIONS)
 - 3. MATERIAL: AS SCHEDULED.
 - 4. FINISH: AS SCHEDULED.
 - 5. MOUNTING: COUNTERSUNK SCREW.
 - C. WALL AND CEILING GRILLES:
 - 1. REFER TO GRILLS, REGISTERS, AND DIFFUSERS SCHEDULE FOR EQUIPMENT SCHEDULE
 - 2. MANUFACTURER: AS SCHEDULED (NO SUBSTITUTIONS)
 - 3. MATERIAL: AS SCHEDULED.
 - 4. FINISH: AS SCHEDULED.
 - 5. MOUNTING: COUNTERSUNK SCREW OR LAY IN DEPENDING LOCATION.

PART 3 - EXECUTION

- 3.1 INSTALLATION
- A. COORDINATE LOCATION AND INSTALLATION WITH DUCT INSTALLATION AND INSTALLATION OF OTHER CEILING AND WALL MOUNTED ITEMS.
 - B. LOCATE CEILING DIFFUSERS, REGISTERS, AND GRILLES, AS INDICATED ON THE ARCHITECTURAL "REFLECTED CEILING PLANS." UNLESS OTHERWISE INDICATED, LOCATE UNITS IN CENTER OF ACOUSTICAL CEILING PANELS.

END OF SECTION 15855

HVAC MATERIAL SCHEDULE		
CATEGORY	APPLICATION	ALLOWABLE MATERIAL
DUCT	EXPOSED SUPPLY	RECT. LINED OR ROUND AS SHOWN, NO EXPOSED DUCT-SEALING MASTIC
	EXPOSED RETURN	RECTANGULAR, NO EXPOSED DUCT-SEALING MASTIC
	EXPOSED GENERAL EXHAUST	RECTANGULAR, NO EXPOSED DUCT-SEALING MASTIC
	CONCEALED, SUPPLY	RECT. OR ROUND AS SHOWN, LINED OR INSULATED
	CONCEALED RETURN	RECT. OR ROUND AS SHOWN, LINED OR INSULATED
	CONCEALED GENERAL EXHAUST	RECT. OR ROUND AS SHOWN, LINED OR INSULATED
	CONCEALED, TYPE I HOOD EXHAUST.	RECT. 16 GA. BLACK IRON W/WRAP OR UL 1978 FACTORY-MANUFACTURED DUCT W/ WRAP. (SUBMIT SHOP DRAWINGS FOR FACTORY-MANUFACTURED DUCT PRIOR TO ORDERING FOR APPROVAL.)

HVAC ABBREVIATIONS

- AFF ABOVE FINISHED FLOOR
- CD CONDENSATE
- CU CONDENSING UNIT
- EF EXHAUST FAN
- EXT'G EXISTING
- HD HOOD
- MUA MAKEUP AIR UNIT
- OPD OPPOSED BLADE DAMPER
- RG RETURN GRILLE
- RTU ROOFTOP UNIT
- SR SUPPLY REGISTER
- VSC VARIABLE SPEED CONTROL
- CO2AS TENANT'S CO2 ALARM SUPPLIER
- GC GENERAL CONTRACTOR
- HES TENANT'S HVAC EQUIPMENT SUPPLIER
- TAB TENANT'S TEST AND BALANCE VENDOR
- TCC TENANT'S CABLING CONTRACTOR
- KES TENANT'S KITCHEN EQUIPMENT SUPPLIER
- HS TENANT'S HOOD SUPPLIER
- TDG TENANT DUCT CLEANER
- TEMS TENANT'S ENERGY MANAGEMENT SYSTEM SUPPLIER
- TENANT'S LIGHT/LAMP SUPPLIER
- TMB TENANT'S MENU BOARD SUPPLIER
- TMS TENANT'S MILLWORK SUPPLIER
- TP TENANT'S PHONE SUPPLIER
- TRS TENANT'S RAILING SUPPLIER
- TSV TENANT'S SIGN VENDOR
- TUV TENANT'S UV SANITIZER SUPPLIER
- WCS TENANT'S WALK-IN COOLER SUPPLIER
- WHS TENANT'S WATER HEATER SUPPLIER

HVAC SYMBOLS

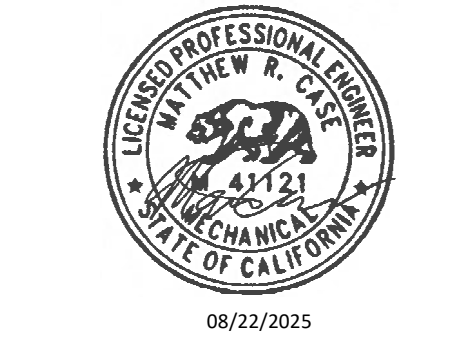
- CEILING SUPPLY DIFFUSER
- CEILING RETURN DIFFUSER
- SUPPLY REGISTER
- RETURN REGISTER
- FLEXIBLE DUCT
- MITERED CORNER WITH TURNING VANES
- DUCTWORK INTERNAL FREE DIMENSIONS
- RECTANGULAR TO ROUND TRANSITION
- GREASE DUCT CLEANOUT
- MITERED CORNER WITHOUT TURNING VANES
- GRIDPOINT THERMOSTAT
- GRIDPOINT ZONE SENSOR MODULE
- PLAN NOTE: SEE PLAN NOTES LISTED ON THE SAME SHEET FOR NOTE MEANING
- EQUIPMENT TAG: SEE EQUIPMENT SCHEDULE ON SHEET M600 FOR EQUIPMENT INFORMATION.
- GRILL, REGISTER, OF DIFFUSER TAG: TAG NECK SIZE AIRFLOW (CFM)
- TAG NECK SIZE AIRFLOW (CFM)

HVAC GENERAL NOTES

- A. GENERAL NOTES APPLY TO 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 G000 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 OWNER'S CONSTRUCTION MANAGER PRIOR TO CONSTRUCTION.
- I. UNLESS NOTED OTHERWISE RECTANGULAR DUCT ELBOWS GREATER THAN 45° SHALL BE MITERED ELBOWS WITH DOUBLE-THICKNESS TURNING VANES AND RECTANGULAR DUCT ELBOWS 45° OR LESS SHALL BE RADIUSSED ELBOWS WITH AN INSIDE RADIUS OF AT LEAST 1/2 THE WIDTH OF THE DUCT.
- J. REPLACE AIR FILTERS WITH NEW, CLEAN MERV 8 AIR FILTERS AT TURNOVER.
- K. THE TERM "FURNISH" 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. PROVIDE LABELING CALLED FOR IN THE HVAC DRAWINGS USING ENGRAVED PHENOLIC PLATES.
- M. PROVIDE P3000 12 GA. UNISTRUT WITH PG FINISH FOR DUCT SUPPORTS AND OTHER UNISTRUT IN AREAS EXPOSED TO VIEW. SLOTTED UNISTRUT AND OTHER UNISTRUT WITH HOLES IS NOT ACCEPTABLE.



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HVAC SPECIFICATIONS

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