

Part 1 General

1.1 REFERENCES

- .1 American National Standards Institute/Air-Conditioning, Heating and Refrigeration Institute (ANSI/AHRI)
 - .1 ANSI/AHRI 430-10, Performance Rating of Central Station Air-Handling Units.
- .2 American National Standards Institute/American Society of Heating, Refrigeration and Air Condition Engineers/Illuminating Engineering Society (ANSI/ASHRAE/IES)
 - .1 ANSI/ASHRAE 52.2-2012, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.
 - .2 ANSI/ASHRAE/IES 90.1-2010, Energy Standard for Buildings Except Low-Rise Residential Buildings.
- .3 Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.
 - .1 MPI #18.
- .4 South Coast Air Quality Management District (SCAQMD)
 - .1 SCAQMD Rule 1113-11, Architectural Coatings.
 - .2 SCAQMD Rule 1168-05, Adhesives and Sealants.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for insulation, filters, adhesives, and paints and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Shop Drawings:
 - .1 Indicate on drawings: fan curves showing point of operation, motor drive bearings, filters, mixing box, dampers and coil; include performance data.

1.3 CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data: submit operation and maintenance data for air handling equipment for incorporation into manual.
- .2 Include following: fan, bearings, motor, damper, air volume total cooling sensible cooling, EDB, EWB, OAT.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- .1 Provide 1 spare sets of filters.
- .2 Provide list of individual manufacturer's recommended spare parts for equipment such as bearings and seals, and addresses of suppliers, together with list of specialized tools necessary for adjusting, repairing or replacing, for placement into operating manual.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect air handling equipment from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 GENERAL

- .1 Factory assembled components to form units supplying air at designed conditions, as indicated.
- .2 Certify ratings: to ANSI/AHRI 430 with AHRI seal.
- .3 Horizontal or vertical type, as indicated, having air tight modular components, consisting of casing, fan section with motor and drive, filter section, dampers bypass section, heating coil, cooling coil, mixing box, blender air mixing device filter mixing box.

2.2 CASINGS

- .1 Galvanized steel 1.2 mm thickness reinforced and braced for rigidity.
 - .1 Inspection doors: provide access for maintenance of internal parts.
 - .2 Paint steel parts, where not galvanized, with corrosion resistant paint to MPI #18.
 - .1 Paint: maximum VOC limit 250 g/L
 - .3 Finish unit s, inside and out, with rust resistant enamel.
 - .1 Enamel Finish: maximum VOC limit 250 g/L.
- .2 Line casing with perforated solid steel liner.

2.3 ACOUSTIC LINER

- .1 Ensure that expanded polystyrene and polyurethane insulation materials were not produced with ozone depleting substances.
- .2 Insulate internal surface of panels with 50 mm neoprene coated rigid duct liner of 72 kg/m³ density.
 - .1 Apply with 100% coverage of adhesive with clip pins.
 - .1 Adhesives: maximum VOC limit 80 g/L .
 - .2 Cover with 0.8 mm thick perforated galvanized sheet metal.
 - .3 Cover leading and trailing edges with sheet metal nosing and at edges around access doors and panels complete with 15 mm overlap.

2.4 DRAIN PANS

- .1 Construction: stainless steel, rounded corners.
- .2 Insulation: external foam type, minimum 13 mm thick.
- .3 Drain connection: in bottom at low point.
- .4 Installation: slope without sag minimum 1% to ensure no standing water at any time or at any point.
- .5 Dimensions: minimum 75 mm from upstream face of coil to 150 mm beyond downstream face of coil or eliminator and to include return bends and headers.

2.5 FANS

- .1 Cabinet hung, AMCA-rated for sound and performance centrifugal fans with backward inclined or forward curved airfoil wheels, selected to operate in stable part of performance curve at times and heavy duty 100,000 hours' service self aligning split pillow block bearings.
 - .1 Provide mounted motor as indicated complete with adjustable V-belt drive and guard.
 - .2 Motor: to ANSI/ASHRAE/IES 90.1, r/min.
- .2 Maximum sound power levels, as indicated.
- .3 Internally mounted motor and fan.

2.6 VIBRATION ISOLATION

- .1 Flexible connections at inlet and outlet of fan:
- .2 Vibration isolators on fan section: in accordance with Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment.

2.7 FILTER BOX

- .1 Material to match casing. For flat type filter arrangement:
 - .1 Provide access to filter through hinged door with suitable hardware.
- .2 Provide blank-off plates and gaskets to prevent air bypass.
- .3 Filters: in accordance with:
 - .1 Minimum Efficiency Reporting Value (MERV) value 8 filtration media to ANSI/ASHRAE 52.2, to be used on return air section of air handling unit.
 - .2 Immediately prior to occupancy, replace filtration media with new filtration media with Minimum Efficiency Reporting Value (MERV) of 13 in accordance with ANSI/ASHRAE 52.2.

2.8 MIXING BOX

- .1 Material to match casing and produce uniformly mixed air temperature within plus or minus 5 degrees C of design across face of outlet.
- .2 Dampers for mixing boxes: Section 23 33 15 - Dampers - Operating.

2.9 COILS

- .1 Capacity: as indicated.
- .2 Ratings: AHRI certified.
- .3 Construction:
 - .1 Casings: 1.5 mm thick galvanized sheet steel.
 - .1 Supports of galvanized steel channel double angle frames.
 - .2 Blank-off plates. Insulated sandwich construction.
 - .2 Non-freeze steam coils: tube-in-tube type with internal perforated steam distributing tubes. Slope tubes to drain condensate.
 - .1 Tubes: copper.
 - .2 Fins: copper or aluminum.
 - .3 Headers: cast iron or steel or cast brass.
 - .4 Pressure tests: 1.7 MPa.
 - .3 Hot water coils: cleanable fins.
 - .1 Tubes: copper or brass or steel.
 - .2 Fins: copper or aluminum plate.
 - .3 Headers: cast iron or steel or cast brass.
 - .4 Pressure tests: 1.7 MPa.
 - .4 Direct expansion refrigerant coils:
 - .1 Serpentine type, Straight tube type arranged to prevent trapping of oil.
 - .1 Liquid distributors to ensure even distribution of liquid refrigerant to all circuits.
 - .2 Silver solder or braze joints in refrigerant tubing.
 - .3 Evacuate and charge coil with nitrogen and seal before sending to site.
 - .2 Tubes: copper.
 - .3 Fins: copper or aluminum plate.
 - .4 Headers: copper.
 - .5 Pressure tests: to Canadian Refrigeration Code. Dehydrated. Sealed with nitrogen charge.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for air handling equipment installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

- .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Provide appropriate protection apparatus.
- .2 Install units in accordance with manufacturer's instructions and as indicated.
- .3 Ensure adequate clearance for servicing and maintenance.
- .4 For CRTU-1 and CRTU-2: Locate on spring curb isolation base on roof curb. Spring curb shall be c/w 16 mm thick aluminum top rail all around, with 12 mm thick sponge rubber between roof curb and spring curb. VL series springs, neoprene seal system between roof curb and isolation base. Contractor shall submit detailed shop drawings indicating number and location of springs and static deflection. Acceptable product: Vibron, Vibro-acoustics curb mounted aluminum isolation base or equal.

3.3 FANS

- .1 Install fan sheaves required for final air balance.
- .2 Install flexible connections at fan inlet and fan outlets.
- .3 Install vibration isolators.

3.4 DRIP PANS

- .1 Install deep seal P-traps and trap seal primer on drip lines.
 - .1 Depth of water seal to be 1.5 times static pressure at this point.

3.5 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

3.6 PERFORMANCE

- .1 E-AHU1
 - .1 E-CC1: 10 ton nominal cooling, dual circuit to match E-CU1.
 - .2 E-CC2: 10 ton nominal cooling, dual circuit to match E-CU2.
- .2 C-RTU1: 1,605 L/s supply air at 125 PA ESP with 1,369 L/s return air. Input: 44 kW natural gas. Provide nominal cooling DX cooling coil capacity of 7.5 tons. Electrical 575V/3Ph.
- .3 C-RTU2: 1,605 L/s supply air at 125 PA ESP with 1,369 L/s return air. Input: 44 kW natural gas. Provide nominal cooling DX cooling coil capacity of 7.5 tons. Electrical 575V/3Ph.
- .4 M-RTU1: 1,133 L/s supply air at 249 PA ESP with 944 L/s return air. Input: 31 kW natural gas. Provide nominal cooling DX cooling coil capacity of 5 tons. Electrical 575V/3Ph.

- .5 P-RTU1: 1,888 L/s supply air at 186 PA ESP with 1,652 L/s return air. Input: 88 kW natural gas. Provide nominal cooling DX cooling coil capacity of 7.5 tons. Electrical 575V/3Ph.

END OF SECTION