

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

- .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 Green Seal (GS)
 - .1 GS-11-11, Standard for Paints and Coatings.
 - .2 GS-36-11, Standard for Adhesives for Commercial Use.
- .4 Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.
 - .1 MPI #18.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 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.
- .3 Shop Drawings:
 - .1 Indicate on drawings: fan fan curves showing point of operation, motor drive, bearings, filters, mixing box, dampers, VAV, coil; include performance data.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
-

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

1.4 MAINTENANCE MATERIAL SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide 1 spare sets of filters after commissioning plus commissioning set.
- .3 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.
- .4 Spare filters: in addition to filters installed immediately prior to acceptance by Departmental Representative, supply 1 complete set of filters for each filter unit or filter bank.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and 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 off ground 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 Vertical type, as indicated, having air tight modular components, consisting of casing, fan section with motor and drive, filter section, electric heating coil, cooling coil, filter. Units to be shipped in sections that can fit through a 914 mm door.

2.2 CASINGS

- .1 Zinc coated, heavy gauge galvanized steel, baked enamel finish.
- .2 Access panes.
- .3 Insulated with foil facets cleanable, fire retardent glass fiber material.
- .4 Sealed insulated edges.
- .5 Electrical and refrigerant connections.

2.3 DRAIN PANS

- .1 Construction: composite.
- .2 Insulation: external foam type, minimum 13 mm thick.
- .3 Drain connection: in four positions.
- .4 Installation: double scoped, removable, cleanable drain pan.

2.4 FANS

- .1 Double inlet, double width, forward curve centrifugal type.
 - .2 Adjustable belt drive, permanently lubricated bearings.
 - .3 Motor with thermal overload protection, fan contactors, permanently lubricated bearings.
-

2.5 VIBRATION ISOLATION

- .1 Flexible connections at inlet and outlet of fan: to Section 23 33 00 - Air Duct Accessories.
- .2 Flexible spring for floor mounting.

2.6 VARIABLE VOLUME DEVICES

- .1 Variable speed drives.

2.7 FILTER BOX

- .1 Material to match casing. For 100 mm flat type final filter arrangement:
 - .1 Provide access to filter through side panels.
- .2 Provide blank-off plates and gaskets to prevent air bypass. Filter slide rack for 50 mm filters.
- .3 Filters: in accordance with Section 23 44 00 - HVAC Air Filtration.
 - .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 COILS

- .1 Ratings: AHRI certified.
 - .2 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 Direct expansion refrigerant coils:
 - .1 Serpentine type, Straight tube type arranged to prevent trapping of oil, draw through.
 - .1 Liquid distributors to ensure even distribution of liquid refrigerant to all circuits, TX valve, single circuit.
 - .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: lanced aluminum plate.
- .4 Headers: copper.
- .5 Pressure tests: to Canadian Refrigeration Code. Dehydrated. Sealed with nitrogen charge.
- .3 Electric heaters: to 23 55 01.
 - .1 AHU-1: 24 kW with SCR.
 - .2 AHU-2: 34 kW with SCR.

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 in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

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.

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: clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.