INDOOR PREMANUFACTURED AIR HANDLING UNITS

1. GENERAL

1.1 Scope

.1 Indoor air handling units, custom pre-manufactured type.

.2 This section applies only to the Inlet Building air handling unit (AHU-H-242A).

.3 Provide one (1) air handling unit as indicated on drawings and in specifications. AHU-H-242A is a stacked horizontal unit where the supply fan section is stacked on top of the main air handling unit sections. This is to maintain a shorter overall unit length.

1.2 Quality Assurance

.1 It is the intent of this Specification that the Manufacturer provides air handling units designed and manufactured specifically to the requirements of this Project. Overall dimensions and configuration are to be as shown on the plans and as described in the Specifications. Take responsibility for the engineering and operational integrity of the air handling units.

.2 Unit construction shall be per the construction details included at the end of this Section, and as described herein.

.3 Provide unit produced by a recognized manufacturer who maintains a local service agency and parts stock.

.4 Air flow rates, external static pressures, water flow rates, coil face velocities, filter face velocities, water and air side pressure drops shall be the same or better than specified.

.5 Fans shall be to AMCA standards, and bear AMCA “certified” seal.

.6 Coils shall be ARI certified, and bear ARI seal.

.7 Provide all motors with thermal overload protection. Provide thermisters in motor windings. All motors shall be high efficiency type and shall be inverter duty for use with VFD’s.

.8 Start-up of unit shall be executed by Manufacturer's personnel.

.9 All components, paints and lining shall have a flame spread rating of not over 25 without evidence of continued progressive combustion and a smoke developed rating no higher than 50.

1.3 Submittals

.1 Submit Shop Drawing which shall include the following minimum information. Shop Drawings submitted without this information shall be automatically rejected.

.1 Construction details: submit unit construction drawings for the following components:

.1 Side panels, including connection details

.2 Top panel, including connection details

.3 Floor, including connection details

.4 Doors, hinges, latch, viewing port

.5 Fan, motor and drive, mounting and isolation

.6 Coil section

.7 Pipe and conduit penetration through casing or floor

.8 Drain pan

.9 Damper, linkage, and drive construction and mounting

.2 Materials of Construction: indicate material and gauge of all construction components.

.3 Mass Distribution Drawings: show point loads and recommended method of unit installation.

.4 Fan Performance Data: submit fan performance curves as well as performance tables.

.5 Coils: Selection criteria indicating air side and fluid side capacities, in and out conditions, velocities, pressure drops and fouling factors. Submit a drawing showing headers, circuiting arrangement, connection sizes, and materials of construction.

.6 Air Filters: media, efficiency rating, velocity, pressure drop charts and capacities. Indicate mounting method and arrangement.

.7 Vibration isolator Shop Drawings.

.8 Table indicating pressure drops through all components of the unit.

.9 Damper Shop Drawings.

.10 Detailed composite wiring diagrams showing factory installed wiring, including wiring of the control components.

.11 Sound Levels: submit sound power levels generated by the air handling unit at the inlet and outlet of the unit and outside the fan section. List for individual octave bands in dB referenced to A rating.

2. PRODUCTS

2.1 Components

.1 Air handling units shall consist of, but not be limited to, the following components:

.1 Supply fan

.2 Electric resistance heating coil

.3 Summer prefilter frame

.4 Winter prefilter frame

.5 Motorised outdoor air section

.6 Motorised return air section

.7 Access sections

.8 Mixing box

.9 Section for future preheat coil

2.2 Cabinet

.1 Exterior Panels: minimum 18 gauge satin coat galvanized steel with air-dried enamel finish.

.2 Walls and Ceilings: interlocking construction with at least two breaks at each interlocking joint. Wall and ceiling joints to be broken inward. All panel joints to be caulked. Casing depth to match the specified insulation thickness. Inside surfaces shall be clean and flush, free of exposed flanges.

.3 Base: construct from structural steel channel iron around perimeter with intermediate channel and angle iron supports. Provide a 14 gauge thick checker steel plate in all sections of the unit. Provide floor bracing channels at maximum 300 mm on centre.

.4 Insulation and Liner:

.1 Insulate all exterior walls and roof with 50 mm thick fibrous glass acoustic insulation, 48 kg/m³ (3 lb/ft^3) density. Line interior of all panels with 22 gauge perforated galvanized steel liner.

.2 Insulate underside of unit floor with 50 mm thick rigid fibrous glass insulation 48 kg/m³ (3 lb/ft^3) density. Hold in place insulation with welded pins 400 mm on centre.

2.3 Access Doors

.1 Provide hinged man sized access doors. Door construction to be the same as casing. Provide minimum two (2) ventlock latches per door openable from both sides. Door hinge to be continuous cadmium plated piano hinge with brass pin. Doors to be sealed with automotive type 13 mm closed cell hollow round black gasket with a metal encapsulated reinforced backing that mechanically fastens to the door frame. (Neoprene or foam gaskets are not acceptable). Door sizes to be 750 x 1800 mm or as limited by height of unit. Provide access doors for the following sections:

.1 Fan section

.2 Coil sections

.3 Summer filter section

.4 Winter section

.5 Mixing section

.6 Access sections

2.4 Finish

.1 Entire exterior is to be painted with two (2) coats primer paint followed by minimum two (2) coats of exterior application of air-dried enamel.

2.5 Drain Pans

.1 On units without stacked coils, provide a single fabricated 16 gauge galvanized steel drain pan under cooling coils. Prime coat pan inside and out with zinc chromate, iron oxide, phenolic resin paint and two coats of bitumastic paint. On units with stacked coils, provide a separate drain pan under each coil. On all units, provide a secondary drain pan extending under the entire access section downstream of the cooling coil and humidifier section. Provide a drain pan to drain the fresh air intake or mixing plenum. Pipe all drains to the exterior side of unit.

2.6 Fan

.1 Provide fans complete with motors and drives within the fan section of the AHU.

.2 Fans to be double width, forward curved centrifugal type. Fan to be both statically and dynamically balanced. Wheel shall be constructed of high strength steel, welded construction, with straight bored cast iron hub keyed and set screwed to a turned, ground and polished (TGP) solid steel shaft conforming to ASTM A-108 and QQ-S-637 for 1045 TGP rounds.

.3 Mount fans on steel shaft, on self-aligning ball bearings. Extend lubrication fittings to exterior of fan casing.

.4 Provide variable sheaves for motors 11 kW (15 hp) and under and fixed sheaves for motors 15 kW (20 hp) and over.

.5 Provide VSD's with matched motors, where scheduled.

.6 Entire fan assembly including fan scroll, wheel and motor to be integrally mounted on an inertia base and to be separated from unit casing with flexible connections and spring isolators. Concrete may be poured into steel base on site but fan and base must be factory mounted. Use concrete filled inertia bases on all fans 19 kW (25 hp) and over.

.7 Provide OSHA/WCB safety screens (removable) around plug fans, at fan inlets, around all drives and belts.

2.7 Filters

.1 Refer to Section 15865 – Air Filters, for detailed filter specifications.

.2 Summer Prefilter: 50 mm pleated filter, average efficiency 25 to 30% on ASHRAE Test Standard 52-76. Non-woven cotton and synthetic fabric media. FARR 30/30.

.3 Winter Prefilter: Frame only.

.4 Mounting racks to be galvanized, to suit specified filter type.

.5 Limit filter velocity based on face area to less than 2.5 m/s (500 fpm).

.6 Provide one Dwyer 2000 magnehelic filter gauge for each bank of filters, including for each position of prefilter. Flush mount gauge on the exterior of the unit.

2.8 Electric Heating Coil

.1 Electric heater shall be 600 V, 3 phase.

.2 Provide SCR control for modulating electric heating.

.3 Flamed tube, helical coil or expanded strip heating elements shall be easily accessible with protection against no flow or low air flows, shorts and grounds and failure or protection devices.

.4 High limit temperature control shall de-energize heating elements to protect against overheating.

.5 Start supply fan before electric elements are energized and continue operating until bonnet temperature reaches minimum setting. Include switch for continuous fan operation.

2.9 Mixing Section

.1 Configured to ensure complete mix of air. Arrange dampers to direct the air flow from set of blades into the other.

.2 Utilise damper sections which extend across unit width plane with maximum width not exceeding 1200 mm per section.

2.10 Dampers

.1 Low leakage type dampers.

.2 Blades shall be minimum 12 gauge extruded aluminum. Blades shall be of air foil design, 150 mm side. Maximum blade length 1200 mm.

.3 Damper seals shall be designed for minimum air leakage by means of overlapping seals.

.4 Frames shall be minimum 12 gauge extruded aluminum channel with grooved inserts for vinyl seal.

.5 Install blade linkage hardware in frame out of air stream. Use cadmium plated steel hardware.

.6 Arrange linkage and provide an adequate number of damper operators to ensure that the interconnected damper sections operate in unison without binding.

.7 The outdoor, return and supply dampers shall be integral part of the AHUs and shall be supplied and installed by the AHU manufacturer at the factory.

.8 Damper operators shall be supplied by control subcontractor and installed by the AHU manufacturer at the factory, in accordance with instructions from control subcontractor.

3. EXECUTION

3.1 Assembly

.1 Units are to be one-piece construction.

.2 Any piping or conduit passing through the unit casings must be sealed with rubber grommets and retaining plates to prevent air or water leakage.

.3 Insulate all piping as per Section 15200 – Piping Insulation.

3.2 Air Handling Unit Schedule

.1 Refer to Equipment Schedules.

END OF SECTION