PART 1 - GENERAL

1.1 REFERENCES

.1 Definitions:

.1 Catalogued or published ratings: ratings obtained from tests carried out by manufacturer or manufacturer's designated independent testing agency which signify adherence to codes and standards in force.

.2 Reference Standards:

.1 American National Standards Institute/American Society of Heating, Refrigeration and Air Condition Engineers/Illuminating Engineering Society (ANSI/ASHRAE/IES)

.1 ANSI/ASHRAE 52.2-Latest Edition, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.

.2 ANSI/ASHRAE/IES 90.1-Latest Edition, Energy Standard for Buildings Except Low-Rise Residential Buildings.

.2 Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - current edition.

.1 MPI #18.

.3 National Fire Protection Association (NFPA)

.1 NFPA 90A-Latest Edition, Standard for the Installation of Air Conditioning and Ventilating Systems.

.4 Sheet Metal and Air-Conditioning Contractors' National Association (SMACNA)

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 refrigerant, insulation, filters, and paints and include product characteristics, performance criteria, physical size, finish and limitations.

1.2 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.

.2 Indicate on drawings:

.1 Fan performance curves for supply air, with system operating conditions indicated, as tested in an AMCA Certified Chamber.

.2 Sound performance data for supply air, as tested in an AMCA Certified chamber.

.3 Motor ratings, electrical characteristics and motor and fan accessories.

.4 Dimensioned drawings showing isometric and plan views, to include location of attached ductwork and service clearance requirements.

.5 Heating coil details including capacity, electrical requirements, etc.

.6 Cooling coil details including capacity, dimensions, etc.

.7 Outdoor condenser details including construction, capacity, etc.

.8 Estimated gross weight of each installed unit.

.9 Installation, Operating and Maintenance Manual (IOM) for each model.

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 make-up air system for incorporation into manual.

1.4 MAINTENANCE MATERIAL SUBMITTALS

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

.2 Furnish list of individual manufacturer's recommended spare parts for equipment such as bearings and seals, and addresses of

1.4 MAINTENANCE MATERIAL SUBMITTALS (Cont'd)

.2 (Cont'd) 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 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 indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect make-up air system from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 GENERAL

.1 Field and Factory assembled components to form units supplying air at design conditions as indicated.

2.2 FANS

.1 In accordance with Section 23 34 00 - HVAC Fans.

2.3 CASING

.1 Materials: formed, single wall metal cabinet, fabricated to permit access to internal components for maintenance.

2.3 CASING (Cont'd)

.1 Materials:(Cont'd)

.1 Outside casing: 18 gauge, galvanized (G90) steel meeting ASTM A653 for components that do not receive a painted finish. Pre-painted components as supplied by the factory shall have polyester urethane paint on 18 gauge G60 galvanized steel. Base rail is 12 gauge, galvanized (G90) steel.

.2 Internal assemblies: 24 gauge, galvanized (G90) steel except for motor supports which shall be a minimum 14 gauge galvanized (G90) steel.

.2 Cabinet Insulation: comply with NFPA 90A and NFPA 90B and erosion requirements of UL 181.

.1 Materials: fiberglass insulation. If insulation other than fiberglass is used, it must also meet the Fire Hazard Classification shown below.

.1 Thickness: 1 inch (25 mm).

.2 Fire Hazard Classification: maximum flame spread of 25 and smoke developed of 50, when tested in accordance with ASTM C411.

.3 Location and application: floor of each unit shall be insulated with fiberglass insulation.

.3 Access panels: unit shall be equipped with removable access panels to provide easy access to all major components. Access panels shall be fabricated of 18 gauge galvanized G90 steel. Removable access panels shall incorporate a formed drip edge.

.4 Supply air blower and assembly options: forward curve blower: blower assembly consists of an electric motor and a belt driven, double width, and double inlet forward curve blower. Assembly shall be mounted on heavy gauge galvanized rails and further mounted on spring isolation devices.

.5 Control centre/connections:

.1 Unit shall have an electrical control centre where all high and low voltage connections are made. Control centre shall be

2.3 CASING (Cont'd)

.5 Control centre/connections:(Cont'd)
.1 (Cont'd)
constructed to permit single-point high voltage power supply connections.

2.4 COILS AND OUTDOOR CONDENSER

.1 General:
.1 Electric heating coil: capacity as indicated on drawings. Electric Heating Coil is to be UL listed with open coil elements. Heater control cabinet is to be installed within the units heating section. Electric heater is to be provided with SCR controls. Electric heater is to be controlled off of SCR. Units with electric heat are to be provided with a centre that shall be constructed to permit single-point high voltage power supply connections.

.2 Cooling coil: capacity as indicated on drawings.
.1 Serpentine type, arranged to prevent trapping of oil.
.1 Liquid distributors to ensure even distribution of liquid refrigerant to 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 or spiral wound.
.4 Headers: copper.
.5 Pressure tests: to Canadian Refrigeration Code. Dehydrated. Sealed with nitrogen charge.
.3 Outdoor condenser: capacity as indicated on drawings.
.1 Refrigerant R410A.
.2 16 mm liquid line.
.3 29 mm suction line.
.4 Single compressor.
.5 Two stage cooling.
.6 Voltage: 575/3/60.

2.4 COILS AND OUTDOOR CONDENSER (Cont'd)

.1 General: (Cont'd)

.3 Outdoor condenser: (Cont'd)

.7 Casing: suitable for salt-laden air and all components corrosion resistant materials.

2.5 FILTERS

.1 Units shall have 50 mm thick MERV 8 disposable pleated filters following the outdoor air intake in a V-bank arrangement and shall be accessible from the exterior of the unit.

2.6 BLOWER - FC

.1 Blower section construction, Supply Air: belt drive motor and blower shall be assembled onto a minimum 14 gauge galvanized steel platform and must have helical coil spring vibration devices.

.2 Blower assemblies: shall be statically and dynamically balanced and designed for continuous operation at maximum rated fan speed and horsepower.

.3 Centrifugal blower housing: formed and reinforced steel panels to make curved scroll housing with shaped cutoff.

.4 Forward curved blower (fan) wheels: galvanized or aluminum construction with inlet flange and shallow blades curved forward in direction of airflow. Mechanically attached to shaft with set screws.

.5 Fan to be equipped with a variable speed drive (VSD) to operate at a reduced speed when EF-1 is not running.

2.7 MOTORS

.1 General: Blower motors greater than 3/4 horsepower shall be "NEMA Premium" unless otherwise indicated. Compliance with EPAct minimum energy=efficiency standards for single speed ODP and TE enclosures is not acceptable.

2.7 MOTORS (Cont'd)

.1 General:(Cont'd)
Motors shall be heavy-duty, permanently lubricated type to match the fan load and furnished at the specified voltage, phase and enclosure. Drives shall be sized for a minimum of 150% of driven horsepower and pulleys shall be fully machined cast-type, keyed and fully secured to the fan wheel and motor shafts. Electric motors of ten horsepower or less shall be supplied with an adjustable drive pulley. Comply with requirements in Division 23, matched with fan load.

2.8 UNIT CONTROLS

.1 The unit shall be constructed so it can be operated as a heating and cooling system controlled by the EMCS. See sequence of operations on drawings for details.

.2 Sensors to be provided with the unit:
.1 Dirty Filter Sensor.

2.9 VIBRATION ISOLATION

.1 Flexible connections in accordance with Section 23 33 00 - Air Duct Accessories.

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 Installation shall be accomplished in accordance with these written specifications, project drawings, manufacturer's installation instructions as documented in manufacturer's IOM, Best Practices and all applicable building codes.

3.3 CONNECTIONS

.1 In all cases, industry Best Practices shall be incorporated. Connections are to be made subject to the installation requirements shown above.

.1 Piping installation requirements are specified in Division 22(Plumbing). Drawings indicate general arrangement of piping, fittings and specialties.

.2 Duct installation and connection requirements are specified in Division 23 of this document.

.3 Electrical installation requirements are specified in Division 26 of this document.

3.4 FANS

.1 Provide sheaves and belts required for final air balance.

.2 Install flexible connections at fan inlets and outlets as indicated.

.1 Ensure metal bands of connectors are parallel and not touching.

.2 Ensure that fan outlet and duct are aligned when fan is running.

3.5 DRIP PAN

.1 Install deep deal P trap on drain lines.

.1 Depth of water seal to be 1.5 minimum times static pressure at this point.

3.6 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

3.6 CLEANING (Cont'd)

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling.

3.7 FIELD QUALITY CONTROL

.1 Manufacturer's Field Service: Engage a factory authorized service representative to inspect field assembled components and equipment installation, to include electrical and piping connections. Report results to A/E in writing. Inspection must include a complete startup checklist to include (as a minimum) the following: Completed Start-Up Checklists as found in manufacturer's IOM.

3.8 START-UP SERVICE

.1 Engage a factory authorized service representative to perform startup service. Clean entire unit, comb coil fins as necessary, and install clean filters. Verify water source for compliance with manufacturer's requirements for flow and temperature. Measure and record electrical values for voltage and amperage. Refer to Division 23 "Testing, Adjusting and Balancing" and comply with provisions therein.

3.9 DEMONSTRATION AND TRAINING

.1 Engage a factory authorized service representative to train Owner's maintenance personnel to adjust, operate and maintain the entire Make-Up Air unit.

END