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**PART 1 GENERAL**

**1.1 REFERENCE STANDARDS**

- .1 ASTM International
  - .1 ASTM E 84 (Latest Edition), Standard Test Method for Surface Burning Characteristics of Building Materials.
  - .2 ASTM C916 (Latest Edition), Standard Specification for Adhesives for Duct Thermal Insulation.
  - .3 ASTM C 1071 (Latest Edition), Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material).
- .2 National Fire Protection Association (NFPA)
  - .1 NFPA 90A (Latest Edition), Standard for the Installation of Air Conditioning and Ventilating Systems.
  - .2 NFPA 90B (Latest Edition), Standard for the Installation of Warm Air Heating and Air Conditioning Systems (ANSI).

**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 unit heaters and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Manufacturer's Instructions: provide to indicate special handling criteria, installation sequence, and cleaning procedures.
- .4 Shop Drawings:
  - .1 Indicate on drawings:
    - .1 Equipment, capacity and piping connections.
    - .2 Dimensions, internal and external construction details, recommended method of installation with proposed structural steel support, sizes and location of mounting bolt holes.

**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 unit heaters for incorporation into manual.

**1.4 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 unit heaters from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

## **PART 2 PRODUCTS**

### **2.1 VERTICAL UNIT HEATERS**

- .1 Vertical Unit Heaters: to UL 2021.
- .2 Casing: 1.0 mm thick cold rolled steel, glossed enamel finish or lead-free paint, with threaded connections for hanger rods.
- .3 Coils: hydrostatically test to 1 MPa.
  - .1 Hot water coil: copper tube, mechanically bonded aluminum fins spaced 25 mm maximum rated 1378 kPa minimum working pressure and 104°C maximum entering-water temperature. Include manual air vent and drain.
- .4 Fan: direct drive propeller type, factory balanced, with anti-corrosive finish.
- .5 Motor: speed 1075 RPM, continuous duty, ball bearing motor with built-in overload protection, and resilient motor supports.
- .6 Air outlet: adjustable multi-vane diffuser with finish to match casing.
- .7 Capacity: base hot water heating capacity on 93°C E.W.T. and 11°C temperature drop, 34.5 kW, 0.76 L/s water flow, 0.27m pressure drop, final air temperature 40.5 degree C, 1133 L/s air flow.

## **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 unit heaters 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 Install in accordance with manufacturer's instructions.
- .2 Include double swing pipe joints as indicated.
- .3 Check final location with Departmental Representative if different from that indicated prior to installation.
  - .1 Should deviations beyond allowable clearances arise, request and follow Departmental Representative's directive.
- .4 Hot water units: for each unit, install gate or ball valve on inlet and calibrated balancing valve on outlet of each unit. Install drain valve at low point.
  - .1 Install manual air vent at high point.
- .5 Clean finned tubes and comb straight.
- .6 Provide supplementary suspension steel as required.
- .7 Install thermostats in locations indicated.
- .8 Before acceptance, set discharge patterns and fan speeds to suit requirements.

**3.3 CLEANING**

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

**3.4 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by unit heaters installation.

**END OF SECTION**