

## **PART 1 - GENERAL**

### **1.1 REFERENCES**

- .1 Unless otherwise indicated, all the works must be done in accordance with the in force edition of the "Code de construction du Québec".
- .2 Furthermore, the works will be done in accordance with any other code or standard having jurisdiction, as per the latest edition, notably including, but not limited to:
  - .1 Canadian Standards Association/CSA International (CSA).
    - .1 CSA C22.2 No. 46-M1998 (R2001), Electric Air-Heaters.
    - .2 Department of Justice Canada (Jus).
      - .1 Canadian Environmental Protection Act, 1999, c. 33 (CEPA).
      - .2 Transportation of Dangerous Goods Act, 1992 c. 34 (LTMD).

### **1.2 SUBMITTALS**

- .1 Make submittals in accordance with prescription.
  - .2 Submit product data and include:
    - .1 Element support details;
    - .2 Heater: total kW rating, voltage, phase;
    - .3 Heating element power requirements and maximum duct temperature;
    - .4 Maximum air discharge temperature;
    - .5 Physical size;
    - .6 Unit support;
    - .7 Performance limitations;
    - .8 Clearance from combustible materials;
    - .9 Internal components wiring diagrams;
    - .10 Minimum operating airflow;
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- .11 Pressure drop operating airflow.

### **1.3 QUALITY ASSURANCE**

- .1 Health and Safety:
  - .1 Apply pertinent measures in accordance with Architectural Specifications.

### **1.4 WASTE MANAGEMENT AND DISPOSAL**

- .1 Remove from site packaging materials and route them to appropriate facilities for recycling.
- .2 Collect and separate paper packaging, plastic, polystyrene and corrugated cardboard and place them in appropriate on-site bins for recycling in accordance with the Waste Management Plan.
- .3 Sort steel scrap, metal and plastic for reuse / recycling and place in designated containers in accordance with the Waste Management Plan.
- .4 Route unused metal parts to a metal recycling facility approved by the Departmental Representative.

## **PART 2 - PRODUCTS**

### **2.1 ELECTRIC DUCT HEATERS**

- .1 Duct Heaters: Insert type.
    - .1 In accordance with CSA standards with certification label.
    - .2 Approved for zero spacing with combustible material.
  - .2 Heating elements made of NiCr 60 (Grade C) resistance wire with helical windings.
  - .3 Heating Element Power Density:
    - .1 Heating element power density must consider minimum air speed and maximum air temperature in order to assure durability and that the heater works properly. The density must not exceed the following values.
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- .2 When air speed through the coil is larger than 2.28 m/s (450 fpm), provide elements with maximum density of 6 W/cm<sup>2</sup> (40 W/po<sup>2</sup>). When air speed through the coil is smaller than 2.28 m/s (450 fpm), provide elements in accordance with the following table:

Minimum air speed m/s (ft/min)	0.5 (100)	1 (200)	1.5 (300)	2.28 (450)
Maximum element density W/cm <sup>2</sup> (W/in <sup>2</sup> )	1.1 (7)	2.8 (18)	4.5 (30)	6 (40)

- .4 Appropriate calibre galvanized steel frame with a flange that allows installation without opening the control panel.
- .5 Controls/Regulation.
- .1 Control/regulation device, factory prewired and assembled in a case. The supply and control circuits must be connected with tie-point blocks to thermostats and flow contactor.
- .2 Proportional or program signal control devices, assembled in a CSA approved type case are the following:
- .1 Magnetic contactor;
- .2 Proportional static relay (SSR) with passage detection and commutation at zero or a S.C.R. modulating controller;
- .3 Electronic controller (HEC) with temperature sensors;
- .4 Obligatory pressure differential switch that insures that elements are not activated if there is no passage of air;
- .5 Control transformers with protection fuse on control circuit;
- .6 Charge fuse;
- .7 Master switch without fuses;
- .8 Primary protection temperature sensor, auto-reset;
- .9 Secondary protection temperature sensor, manual reset.
- .6 Accessories:
- .1 Protection screen on each side.
- .7 Characteristics: As indicated in heating element table in drawings.

- .8 Acceptable Products: Delta; Neptronic; Thermolec.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- .1 Power supply and control panel connection in accordance with CSA C22.2 No. 46 Standards.

#### **3.2 FIELD QUALITY CONTROL**

- .1 Perform test with the Departmental Representative.
- .1 Submit a testing report and add one copy to the maintenance manual.

**END OF SECTION**

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