METROLINX

Capital Projects Group

Heaters Specification

Specification 23 83 00

Revision 1
Date: September 2018

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Amendment Record Sheet

Amendment in Clause No.	Date of Amendment	Description of Changes
Various	Sept. 20, 2018	Revised to coordinate with corresponding specifications.

LIST OF CONTENT

1. GENERAL

1.1. SCOPE OF WORK

1.1.1. Provide heaters as detailed on drawings and as specified herein.

1.2. DESIGN REQUIREMENTS

1.2.1. Design requirements are based on Part 2 specified requirements of products

1.2.2. Heaters are controlled by wall mounted thermostat readily access.

1.2.3. All radiant heat system components shall be provided by one Manufacturer.

1.3. RELATED WORKS

1.3.1. Section 20 05 05 - Mechanical Work General Instructions.

1.3.2. Section 20 05 10 - Basic Mechanical Materials and Methods.

1.3.3. Section 20 05 40 – Mechanical Work Commissioning.

1.4. REFERENCE STANDARDS

1.4.1. Standards and codes to be latest editions adopted by and enforced by local governing authorities.

1.4.2. American National Standards Institute / Air Conditioning, Heating and Refrigeration Institute (ANSI/AHRI) 440 08 Performance Rating of Room Fan Coils.

1.4.3. CSA C22.2 No. 46 Electric Air-Heaters.

1.4.4. Underwriters Laboratories, Inc. (UL) Heating and Cooling Equipment.

1.5. TRAINING

1.5.1. Training is to be a full review of all components including but not limited to a full operation and maintenance demonstration, with abnormal events.

1.5.2. Include for 3 training sessions of maximum 7 hours duration per session for 7 Metrolinx people per session.

1.5.3. Refer to Section 20 05 05 for additional general requirements.

1.6. WARRANTY

1.6.1. Products to be guaranteed by manufacturer, for a minimum of 2 years after acceptance by Metrolinx.

1.6.2. For electric radiant heaters, provide 25 years Manufacturer's guarantee against manufacturing defects on materials installed within ceiling or topping. And installer shall provide five years warranty against faulty workmanship.

1.6.3. Electric radiant surface temperatures shall not exceed 91 °F (33 °C) at design heat output.

1.7. DELIVERY, STORAGE AND HANDLING

1.7.1. Handle and store products in accordance with manufacturer's instructions, in locations approved by Metrolinx. Include one copy of these instructions with product at time of shipment.

1.8. SUBMITTALS

1.8.1. Refer to submittal requirements in Section 20 05 05.

1.8.2. Product Data

a) Submit manufacturer's Product data indicating:

1) technical data, supplemented by bulletins, component illustrations, detailed views, technical descriptions of items, and parts lists;

2) performance criteria, compliance with appropriate reference standards, characteristics, limitations, and troubleshooting protocol;

3) product transportation, storage, handling, and installation requirements;

4) product identification in accordance with Metrolinx requirements.

1.8.3. Shop Drawings

a) Submit shop drawings for products and include following:

1) miscellaneous accessories;

2) ratings;

3) finishes;

4) dimensions;

5) mounting details to suit locations shown, indicating methods and hardware to be used;

6) electrical requirements and locations of power supply required;

7) transformer;

8) control components and control wiring schematic.

1.8.4. Commissioning Package

a) Submit the following in accordance with Sections 20 05 05 and 20 05 40:

1) Commissioning Plan;

2) Commissioning Procedures;

3) Certificate of Readiness;

4) complete test sheets specified in Section 20 05 40 and attach them to the Certificate of Readiness;

5) Source Quality Control inspection and test results and attach to the Certificate of Readiness.

1.8.5. Commissioning Closeout Package

a) Submit the following in accordance with Section 20 05 05:

1) Deficiency Report;

2) Commissioning Closeout Report;

3) submit the following for each Product for incorporation into the Operation and Maintenance Manuals in accordance with Section 20 05 05:

i) Identification: manufacturer's name, type, year, serial number, number of units, capacity, and identification to related systems;

ii) functional description detailing operation and control of components;

iii) performance criteria and maintenance data;

iv) safety precautions;

v) operating instructions and precautions;

vi) component parts availability, including names and addresses of spare part suppliers;

vii) maintenance and troubleshooting guidelines/protocol;

viii) product storage, preparation, handling, and installation requirements;

ix) Commissioning Report.

1.9. QUALITY ASSURANCE

1.9.1. Manufacturers Qualifications

a) Manufacturer shall be ISO 9000, 9001 or 9002 certified. Manufacturer of product shall have produced similar product for a minimum period of five years. When requested by Consultant, an acceptable list of installations with similar product shall be provided demonstrating compliance with this requirement.

b) Where manufacturers provide after installation onsite inspection of product installations, include for manufacturer's authorized representative to perform onsite inspection and certificate of approvals.

1.9.2. Installers Qualifications

a) Installers for work to be performed by or work under licensed Mechanical Contractor.

b) Installers of equipment, systems and associated work are to be fully qualified and experienced installers of respective products and work in which they are installing.

c) Where manufacturers provide training sessions to installers and certificates upon successful completion, installers to have obtained such certificates and submit copies with shop drawings.

1.9.3. Regulatory Requirements

a) Products and work to comply with applicable local governing authority regulations, bylaws and directives.

b) Include for required inspections and certificate of approvals of installation work from local governing authorities.

2. PRODUCTS

2.1. ELECTRIC RADIANT INFRARED HEATERS

2.1.1. Narrow beam comfort heater with metal sheath tubular element.

2.1.2. Highly-corrosion resistance, 2500 watts, 208V input, or otherwise specified.

2.1.3. Mesh guard to protect heater against accidental contact and vandalism.

2.1.4. Heater Controls

a) Delay Off timing relay:

1) 24VAC input voltage.

2) 240VAC, 11A output power.

3) When input power turns on output load will turn on.

4) Output load will remain on for 10 minutes after input power turns off.

b) Low voltage thermostat:

1) Exterior rated thermostat.

2) 24VAC operating voltage.

3) Thermostat to transmit 24V signal when space temperature is below 0 °C.

c) Low voltage push button:

1) Exterior rated pushbutton.

2) 24VAC operating voltage.

3) Momentary contact switch.

4) Internal LED illumination.

5) Light will turn on when heater is activated, will be off when heater is inactive.

d) Standard of quality assurance manufacturers are:

1) Sprecher + Schuh catalogue # D7M-LE4PN5RX10;

2) Or approved equilvant.

2.1.5. Standard of quality assurance manufacturers are:

a) Infratech W2524.

b) or approved equivalent.

2.2. ELECTRIC UNIT HEATERS

2.2.1. Electric heaters are to be certified and labelled in accordance with CSA C22.2 No. 46.

2.2.2. Output: 2 kW to 60 kW.

2.2.3. Finish: epoxy-polyester powder coat. Colour: almond.

2.2.4. Cabinet construction: heavy-duty, 18-gauge steel cabinet, adjustable louvers and protective screen.

2.2.5. Fan motor: permanently lubricated ball bearing motor for long lasting operation. Thermal protection with automatic reset.

2.2.6. Heating element: nickel-chrome element producing instant heat.

2.2.7. Installation: wall or ceiling-mounted with universal mounting bracket.

2.2.8. Complete with local disconnect.

2.2.9. Minimum distance from adjacent walls: 150 mm / 6 in. (2 to 30 kW units) - 300 mm / 12 in. (40 to 60 kW units).

2.2.10. Mounting heights: 2.1 m / 8 ft (2 to 10 kW units) - 3 m / 10 ft (15 to 30 kW units) - 5 m /15 ft (40 to 60 kW units).

2.2.11. Warranty: 10 years for the element and one year for other components.

2.2.12. Standard of quality assurance manufacturers are:

a) Dimplex;

b) Stelpro;

c) Ouellet;

d) or approved equivalent.

2.3. HYDRONIC UNIT HEATERS

2.3.1. Casing

a) High quality, die formed, cold rolled steel, degreased, phosphatized, etched and finished in aluminium semi-gloss finish.

2.3.2. Coil

a) Aluminum plate fins on mechanically expanded copper tubes, welded to steel headers and tested with 200 PSIG air pressure under water.

2.3.3. Motors

a) Totally enclosed, with permanent split capacitor and thermally protected and permanently lubricated for a minimum of 20,000 hours. Motors or supports shall be resiliently mounted. Mounted on formed, welded and plated heavy gauge wire support. Motors and blades shall be removable through fan opening.

2.3.4. Fans

a) Fan blades shall be aluminum and balanced.

2.3.5. Air Flow

a) Louver fins diffusers shall have individually adjustable blades for maximum air distribution flexibility.

2.4. WALL - MOUNTED ELECTRIC FORCED FLOW HEATERS

2.4.1. Output: 2 kW to 12 kW.

2.4.2. Suitable for recessed or surface mount.

2.4.3. Epoxy-polyester powder coat.

2.4.4. Cabinet: stainless steel 20-gauge steel cabinet, 18-gauge steel grille. Top air intake with bottom air discharge.

2.4.5. Fan motor: permanently lubricated ball bearing motor for long lasting operation. Thermal protection with automatic reset.

2.4.6. Heating element: high quality nickel chrome element producing instant heat.

2.4.7. Installation: wall mounted, recessed or surface mounted with surface adapter.

2.5. WALL - MOUNTED HYDRONIC FORCED FLOW HEATER

2.5.1. Cabinet

a) Heavy 16 gauge furniture steel with removable fronts to provide access to motor, blower and heating element. The cabinets are rust proofed and then finished with a prime coat followed by a factory enamel finish.

b) ½" flexible fiber glass duct liner on back and sides off external box (for recess arrangement only)

2.5.2. Coils

a) The heating coils are of 5/8" O.D. seamless copper tubes expanded into aluminum fins to form a permanent mechanical bond. Female pipe coil connections.

2.5.3. Blowers

a) The blowers consist of two double inlet type centrifugal aluminum fans mounted directly on a double ended motor shaft.

2.5.4. Hinged Access Door

a) Provides access to controls and valves.

2.5.5. Motors

a) Permanent split capacitor type. Steel shell, die cast aluminium shields, galvanized steel cradle. Resilient mount. Self-aligning sleeve bearings, horizontal mount, class "B" insulation, thermally protected.

b) Speed Switch: integral part with Solid state three speed control with off position.

2.5.6. Filters

a) Filters in the cabinet heaters are removable without tools. Permanent type, made of durable aluminum which has an average arrestance of 61%.

2.5.7. Control

a) Fan control by air temperature. Return air temperature sensor monitors incoming air to unit, starting blower, if the return air temperature drops below set point. Fan is turned off when room (return air) temperature is satisfactory. Optional to incorporate into existing and/or BAS.

2.6. ELECTRIC BASEBOARD HEATERS

2.6.1. Output: 0.5 kW to 2.5 kW.

2.6.2. Finish: top quality 100% polyester paint, baked enamel, glossy finish. Colors: standard: white, almond.

2.6.3. Casing: 22-gauge steel casing able to support 22 kg in its center, 16-gauge steel connection boxes at each end. Diffuser located above the element in order to ensure good air diffusion. Steel end caps with soft, rounded corner.

2.6.4. Floating in nylon sleeves at each end, eliminating expansion and contraction noises.

2.6.5. Heating elements: single tubular, stainless steel sheathed element with boxed aluminum fins for improved heat dissipation securely fastened at its center, full-length thermal protection with automatic reset. Full-length wire way.

2.6.6. BX & NMD cable clamps: mounting holes spaced at 1-inch intervals along the top and the bottom of the unit. Knockouts located at the back of the heater, and at each end.

2.6.7. Installation: surface mount.

2.6.8. Warranty: lifetime warranty for the element and minimum two years for other components.

2.7. HOT WATER BASEBOARD HEATERS

2.7.1. Enclosure

a) Enclosures are made of quality cold rolled steel, 16 gauge, formed and reinforced with top supports, degreased, phosphatized and coated inside and out with a corrosion resistant tan primer.

b) Panels are manufactured in lengths of 600 mm to 2,400 mm in 150 mm increments. Enclosure complete with components for wall to wall installation, following the contour of the wall, complete with end caps, wall trim, concealed joiners, inside corners, outside corners, access doors and pipe covers as required. Joints and filler pieces to be recessed. Support rigidly top and bottom, on wall mounted brackets.

2.7.2. Heating Elements

a) Elements are seamless copper tube with aluminum fins. The tubes are expanded within the fins to obtain a permanent thermal bond between the two. These are manufactured in lengths of 350 mm to 2,000 mm in 150 mm increments.

b) The aluminum fins are square 100 mm x 100 mm (4" x 4"), min. 150 fins/meter (52 fins/linear foot) of heating element.

c) All tubes are manufactured to receive standard sweat fittings. The elements are designed for use at 150 °C (300 °F) entry water temperature maximum working conditions.

2.7.3. Accessories

a) End Piece: End pieces are used to close off enclosure ends when cabinets do not terminate on an adjacent wall. The end piece is manufactured with rounded corners and protrudes 1@ beyond enclosure to give a neat finished appearance.

b) Wall Trim: Joiners are manufactured to overlap enclosures and cover the gap between cabinet end and adjacent wall or columns. These are usually supplied in 4@, 5@, 6@ or 8@ lengths.

c) Concealed Joiner (Butt Joint): This piece fits between two enclosure lengths to give a clean hairline joint appearance to the installation.

d) Inside Corner: Inside corners are manufactured to overlap enclosures and are used when piping runs on two or more inside walls to meet heating requirements. These are usually supplied at 90 deg. angles, however may be modified to meet project conditions.

e) Outside Corner: Outside corners are manufactured to overlap enclosures and are used when piping runs on two or more outside walls to meet heating requirements. These are usually supplied at 90 deg. angles, however may be modified to meet project requirements

f) Access Doors: Access doors are manufactured to permit access to valves or other controls located inside enclosure. They are supplied as standard with a screw lock, however a camlock type is also available. For field mounted access doors, the contractor is required to perforate the enclosure.

2.7.4. Control Valves - Wall Fin Heaters

a) Automatic control valves, unless otherwise specified, shall be globe type valves. Valves and actuators shall be ordered as one factory assembled and tested unit.

b) The water control valves shall be sized for a pressure drop of six feet water column or as indicated on mechanical drawings.

c) Each automatic control valve must provide the design output and flow rates at pressure drops compatible with equipment selected.

d) Each automatic control valve must be suitable for the particular system working pressure.

e) Unless otherwise indicated, control valves for proportional operation shall have equal percentage characteristics.

2.7.5. Heating valves shall be normally open.

3. EXECUTION

3.1. INSTALLATION

3.1.1. Supply heaters, complete with all required accessories.

3.1.2. Install equipment to manufacturer's instructions and recommendations.

3.1.3. Make all necessary adjustments to the radiant heating equipment and controls and ensure system is properly tested, balanced and operating.

3.1.4. Locate electric heaters for electrical trade so accurate electrical rough-in can be made. Coordinate ratings for electrical connections with electrical trades.

3.1.5. Where required, brace and secure heaters in accordance with local governing code requirements for seismic control and restraint.

3.1.6. Where remote thermostats are indicated, provide thermostats and required control wiring and accessories.

3.1.7. Refer to Section 20 05 10 for equipment/system start-up requirements.

END OF SECTION