METROLINX

Capital Projects Group

Fuel-Fired Heaters Specification

Specification 23 55 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 fuel fired 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

1.3. 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.

1.3.4. Section 23 51 23 - Flue Gas Vents.

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. ANSI Z83.20/CSA 2.34, Gas-Fired Tubular and Low-Intensity Infrared Heaters.

1.4.3. CAN/CSA-B149.1, Natural Gas and Propane Installation Codes.

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. Unless otherwise noted, products to be guaranteed by manufacturer, for a minimum of 2 years after acceptance by Metrolinx.

1.6.2. Include extended warranties as follows:

a) heater controls: 3 years;

b) combustion chamber and radiant tubes: 7 years;

c) stainless steel heat exchanger of each unit heater: 15 years.

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. Submit shop drawings/product data sheets for boilers, including accessories, and all required wiring schematics.

1.8.3. Submit with delivery of heaters, copies of the factory inspection report, and include a copy of each report with O & M Manual project close-out data.

1.8.4. Submit a site inspection and start-up report from manufacturer’s representative as specified in Part 3 of this Section.

1.8.5. 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.

1.8.6. Shop Drawings

a) Submit shop drawings including:

1) types and ratings;

2) dimensions;

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

4) control components and control wiring schematic;

5) extended warranties.

1.8.7. 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.

1.8.8. 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.

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) Heater installation tradesmen are to be journeyman tradesmen licensed to install gas fired equipment.

d) 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. GAS FIRED RADIANT HEATERS

2.1.1. Brant Radiant Heaters Ltd. "Re-Verber-Ray" or approved equivalent, modular, gas fired radiant heaters in accordance with drawing schedule, each factory assembled and pre-rewired and each in accordance with requirements of ANSI Z83.20/CSA 2.34 and CAN/CSA B149.1. Each heater is to consist of a control box and burner, a combustion chamber tube, a radiant emitter tube, a reflector, controls, hanging and support hardware, and any accessories specified or scheduled.

2.1.2. 2-stage stainless steel burner complete with a centrifugal direct drive fan assembly, factory pre-set fixed metering orifice burner, 15 mm (½") diameter inlet gas connection, gas piping train with valves and pressure regulator, a 600 mm (24") long flexible stainless steel gas inlet piping flexible connector, "globar" ignition system with flame sensing controls and 100 % safety shutdown of burner and fan, burner sight glass to permit visual observation of burner ignition and flame from floor level, and combustion vent connection collar. Enamelled steel control box is to include removable access panels and following:

a) terminal strips for power and control connections;

b) 24 volt secondary control transformer;

c) heating stage indicator lights;

d) dual safety pressure switches to continuously monitor burner operation;

e) self-diagnostic microprocessor-based control that incorporates pre- and post-purge firing, "hard" safety shutdown which can only be restarted by resetting thermostat, "soft" safety shutdown with 30 minute automatic restart if heater turns off due to environmental conditions such as high winds;

f) fresh air intake connection collar.

2.1.3. Heat exchanger assembly complete with a stainless steel combustion chamber tube, a Type 1 aluminized steel radiant emitter tube with stainless steel tabulator baffle, a connection system with stainless steel band clamps to maintain a continuous linear appearance, and a high emissive, black, corrosion resistant coating on exterior of exchanger.

2.1.4. Fully adjustable polished aluminium parabolic reflector complete with end caps.

2.1.5. Hanging hardware factory supplied with each heater and consisting of galvanized steel hangers and reflector tension springs.

2.1.6. Surface wall mounting, adjustable, 24 volt thermostat for securing to a recessed outlet box, factory supplied with each heater and complete with thermometer and, where required by mounting location, radiant heat reflector shields.

2.1.7. All required hardware to interface with building automation system in accordance with drawing control sequence and points list.

2.1.8. Seismic restraint anchors factory secured to heaters.

2.1.9. Standard of quality assurance manufacturers are:

a) Brant Radiant Heaters Ltd.;

b) Schwank Group;

c) Superior Radiant Products;

d) or approved equivalent.

2.2. GAS FIRED UNIT HEATERS

2.2.1. CSA or cETL certified horizontal air flow unit heaters, each factory assembled, pre-rewired, and test fired, each in accordance with drawing schedule, and with characteristics as follows:

a) noise: not to exceed 75dBA at 1 m (3');

b) efficiency: minimum steady state thermal efficiency of 80 % in accordance with ASHRAE 90.1;

c) electrical supply: 120 volts, 1-phase, 60 Hz;

d) gas supply: between 1.7 and 3.5 kPa (0.25 and 0.50 psi);

e) venting: horizontal or vertical.

2.2.2. Internally insulated cabinet constructed of heavy-gauge galvanized steel, finished with baked powder epoxy enamel, and complete with hinged access door, adjustable louvers, a wiring junction box mounted inside or on exterior of cabinet, mounting spot nuts for hanger rods secured to top of cabinet, or an accessory mounting bracket kit.

2.2.3. Tubular, curved design stainless steel heat exchanger, secured to a vest panel equipped with flue box and a motorized combustion air inducer to purge heat exchanger and positively vent combustion products, and aluminized steel inshot burners, each removable from assembly or all removable as a single component, and complete with a venturi to mix gas and air for proper combustion, and a burner view port.

2.2.4. Direct driven propeller type fan(s), depending on unit size, with permanently lubricated open drip-proof motor(s) conforming to requirements specified in Section entitled Basic Mechanical Materials and Methods, and a wire cage guard.

2.2.5. Factory installed and pre-wired controls and safeties complete with:

a) 24 volt redundant combination gas valve with 100 % safety shut-off, manual main shut-off valve, pressure regulator, and automatic solenoid valve;

b) solid-state, electronic, direct spark ignition and a separate electronic flame sensor to initiate 3 attempts to re-ignite after loss of flame, then locks out unit operation;

c) pressure switch to prove adequate flow through venting;

d) high temperature limit controls with a fixed temperature setting to protect from abnormal operating temperatures;

e) solid-state, integrated, combination ignition and fan control board with fan timer control, diagnostic LED for trouble shooting, and continuous fan operation control;

f) 120/24 volt control transformer;

g) terminal strip for 24 volt control connections;

h) all required hardware to interface unit heater control with building automation system in accordance with drawing control sequence and points list.

2.2.6. Heavy-gauge galvanized steel discharge nozzles selected by heater manufacturer to achieve scheduled air flow, finished to match cabinets.

2.2.7. Remote wall mounting, 24 volt, adjustable, tamper-proof thermostats with thermometers complete with guards, supplied loose for field installation.

2.2.8. Seismic restraint anchors factory secured to heaters.

2.2.9. Standard of quality assurance manufacturers are:

a) Lennox Industries (Canada) Ltd.;

b) Thomas & Betts Corp. "Reznor";

c) Sterling HVAC Products;

d) or approved equivalent.

3. EXECUTION

3.1. INSTALLATION OF GAS FIRED RADIANT HEATERS

3.1.1. Provide gas fired radiant heaters. Conform to requirements of CAN/CSA B149.1.

3.1.2. Secure heaters in place at proper height and with proper clearance from structure by means of hanging hardware supplied with heaters. Ensure heaters and reflectors are configured and positioned properly. Provide any supplemental structural steel necessary for installation where shown.

3.1.3. Brace and secure each heater in accordance with local building code and authority requirements for seismic control and restraint.

3.1.4. Connect with valved gas piping with drip leg. Use a length of flexible gas piping, supplied with each heater, for final connection.

3.1.5. Provide combustion air intakes and flue gas vents in accordance with requirements of Section entitled Flue Gas Vents. Confirm exact building penetration locations prior to installation.

3.1.6. Provide a thermostat for each heater and mount. Provide required 24 volt control wiring in conduit in accordance with electrical work wiring requirements and heater manufacturer's control wiring diagram. Provide radiant protection shields if required by thermostat mounting connection.

3.1.7. Refer to Section entitled Basic Mechanical Materials and Methods for equipment/system manufacturer certification requirements.

3.1.8. Refer to Section entitled Basic Mechanical Materials and Methods for equipment/system start-up requirements.

3.2. INSTALLATION OF GAS FIRED UNIT HEATERS

3.2.1. Provide gas fired unit heaters.

3.2.2. Secure unit heaters in place at proper height by means of hanger rods attached to structure. Ensure heaters are level and plumb. Provide any supplemental structural steel necessary for installation where shown. Ensure unit discharge is not obstructed.

3.2.3. Brace and restrain each unit heater in accordance with requirements of Section entitled Seismic Control and Restraint.

3.2.4. Connect with valved gas piping with drip leg. Use a length of flexible gas piping with 360° loop for final connection.

3.2.5. Provide a maximum of 1.5 m (5 ') of single wall stainless steel horizontal vent between unit heater and flue. Provide flues in accordance with requirements of Section entitled Flue Gas Vents.

3.2.6. Provide a thermostat for each heater and mount. Provide required 24 volt control wiring in conduit in accordance with the electrical work wiring requirements. Provide a guard for each thermostat.

3.2.7. Refer to Section entitled Basic Mechanical Materials and Methods for equipment/system manufacturer certification requirements.

3.2.8. Refer to Section entitled Basic Mechanical Materials and Methods for equipment/system start-up requirements.

END OF SECTION