METROLINX

Capital Projects Group

# Gas Fired Warm Air Furnace Specification

Specification 23 54 16

Revision 1
Date: September 2018

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Publication Date: September, 2018

## Amendment Record Sheet

| Amendment in Clause No. | Date of Amendment | Description of Changes |
|---|---|---|
| Various | Sept. 20, 2018 | Revised to coordinate with corresponding specifications. |
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## LIST OF CONTENT

## 1. GENERAL

### 1.1. SCOPE OF WORK

1.1.1. Provide gas fired warm air furnace 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. CAN/CSA B149.1, Natural Gas and Propane Installation Codes.

### 1.5. SPARE PARTS

1.5.1. Supply one spare filter of each type.

### 1.6. TRAINING

1.6.1. Training is to be a full review of all components including but not limited to a full boiler internal inspection, construction details, burner operation, maintenance, flame characteristics, and adjustments, gas train maintenance, boiler normal operation, abnormal events, normal shut-down, emergency shut-down, and setting up controls.

1.6.2. Include for 2 training sessions of maximum 7 hours duration per session for 6 Metrolinx people per session.

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

## 1.7. WARRANTY

1.7.1. Products to be guaranteed by manufacturer, after acceptance by Metrolinx as follows:

a) heat exchanger shall carry a minimum 20 year limited warranty from project substantial completion, against any failure due to corrosion, thermal stress, mechanical defects or workmanship;

b) components including but not limited to burner, gastrain control, jacket and accessories shall have minimum 5 years limited warranty.

## 1.8. DELIVERY, STORAGE AND HANDLING

1.8.1. 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.

## 1.9. SUBMITTALS

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

1.9.2. Submit shop drawings/product data sheets for furnace, including accessories, and all required wiring schematics. Include exhaust flue product data sheets with the submission.

1.9.3. Submit with delivery of each furnace a copy of factory inspection and test report, and include a copy of each report with O&M Manual project close-out data.

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

1.9.5. Submit signed copies of a manufacturer's non-prorated 5 year extended warranty for heat exchanger against corrosion, thermal stress, mechanical defects, and workmanship, and 2 year extended warranty for all other components.

1.9.6. 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.

1.9.7. Shop Drawings

a) Submit shop drawings including:

1) capacity and ratings;

2) dimensions;

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

4) control components and certified power and control wiring schematics.

1.9.8. 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.

1.9.9. 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.

## 1.10. QUALITY ASSURANCE

1.10.1. 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 and similar application shall be provided demonstrating compliance with this requirement.

b) Manufacturer shall have a facility in Ontario with qualified manufacturing/ combustion technicians and spare parts readily available within GTA region.

1.10.2. 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) Installation tradesmen are to be journeyman tradesmen licensed to install equipment.

1.10.3. 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 WARM AIR FURNACE

2.1.1. Lennox Industries (Canada) Ltd., series SLV98V or approved equivalent, minimum 98% AFUE efficient, CSA certified gas fired warm air furnace, factory assembled, pre-wired and in accordance with drawing schedule.

2.1.2. Internally insulated cabinet constructed of steel, finished with baked powder epoxy enamel and complete with access panels.

2.1.3. Tubular design aluminized steel heat exchanger, equipped with flue box and secondary stainless steel heat exchanger to capture additional heat.

2.1.4. Variable speed drive controlled, statically and dynamically balanced, resiliently mounted blower with permanently lubricated open drip-proof motor. Blower control to precisely adjust flow of heat to prevent temperature swings and control humidity levels.

2.1.5. Modulating heating to operate more efficiently at low capacity to maintain set temperatures and ramps up to speed for additional capacity when more heat is required during colder temperatures.

2.1.6. Factory installed and pre-wired controls complete with:

a) variable capacity gas valve that adjusts capacity output in as small as 1% increments;

b) silicone nitride ignitor;

c) self calibrating variable speed inducer;

d) solid-state, integrated, control board with controls for furnace operations and direct readout diagnostics for status and troubleshooting;

e) control transformer;

f) terminal strips for power and low voltage control connections;

g) required hardware to interface furnace control with building automation system in accordance with drawing control sequence and points list.

2.1.7. Slide-in filter framing with minimum MERV 8 disposable filter as well as a spare filter supplied loose in original packaging.

2.1.8. Factory supplied power venting kit complete with power venter, controls, pressure switch, barometric damper, and through-wall fitting.

2.1.9. Remote wall mounting, 24 volt, Wi-Fi connection, adjustable, multi-day programmable, tamper-proof thermostat supplied loose for site installation, complete with thermometer, digital display, timed and continuous override, and battery back-up.

2.1.10. Dry contact for connection for alarm/monitoring BAS.

2.1.11. Factory secured seismic restraint connection hardware.

2.1.12. Standard of quality of acceptance manufacturers are:

a) Lennox Industries (Canada) Ltd.;

b) Trane Canada Inc.;

c) Carrier Corp;

d) or approved equivalent.

## 3. EXECUTION

### 3.1. INSTALLATION OF GAS FIRED WARM AIR FURNACES

3.1.1. Secure furnaces in place, level and plumb. Install all components and accessories supplied loose. Comply with local governing codes and standards including CAN/CSA B149.1.

3.1.2. Brace and secure each furnace in accordance with applicable local governing code requirements for seismic control and restraint.

3.1.3. Connect with valved gas piping with drip leg, and a length of flexible gas piping with 360° loop for final connection.

3.1.4. Vent each furnace as shown and/or specified in Section entitled Flue Gas Vents.

3.1.5. Provide a thermostat for each furnace and wall mount. Confirm exact locations prior to roughing-in. Provide required control wiring in conduit in accordance with certified wiring schematics supplied with furnaces and electrical work wiring requirements.

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

**END OF SECTION**