METROLINX

Capital Projects Group

Wall Hung Condensing Hot Water Boilers Specification

Specification 23 52 19

Revision 1
Date: September 2018

Wall Hung Condensing Hot Water Boilers Specification

Specification 23 52 19

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. Revised title of specification to *Wall Hung Condensing Hot Water Boilers*.

LIST OF CONTENT

1. GENERAL

1.1. SCOPE OF WORK

1.1.1. Provide wall hung condensing hot water boilers for hydronic radiant floor heating system unless otherwise specified, 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.

1.3.5. Section 23 21 12 – Hydronic Radiant Floor Heating System.

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. Canadian Council of Ministers of the Environment Initiative N306, PN 1286.

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

1.4.4. CAN1-3.1, Industrial and Commercial Gas-Fired Package Boilers.

1.4.5. Technical Standards and Safety Act, 2000, Ontario Regulation 220/01, Boilers and Pressure Vessels.

1.5. TRAINING

1.5.1. 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.

1.5.2. Include for 3 training sessions of maximum 7 hours duration per session for 10 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, after acceptance by Metrolinx as follows:

a) Boiler shall carry a minimum 10 year warranty from project substantial completion, against any failure due to condensate corrosion, thermal stress, mechanical defects or workmanship. All boiler components including but not limited to burner, gastrain control, jacket and accessories shall have minimum 10 years parts and labor warranty which shall be submitted on boiler manufacturer letterhead with shop drawings for review and approval;

b) Manufacturer shall submit written confirmation of minimum 10 years complete parts and labor warranty as in boiler shop drawings; shop drawings will be rejected without confirmation letter on warranty;

c) Minimum 2 years for other product and labor requirements.

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. Include boiler flue product data sheets with the submission.

1.8.3. Submit with delivery of boiler(s) a copy of factory inspection and test report for each boiler, and include a copy of each report with O & M Manual project close-out data.

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

1.8.5. Submit signed copies of a manufacturer's extended warranty for stainless steel heat exchanger against corrosion, thermal stress, mechanical defects, and workmanship, and extended warranty for all other boiler components.

1.8.6. 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.

1.8.7. 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 control wiring schematic.

1.8.8. 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.

1.8.9. 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.

1.9. 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 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.

c) Manufacturers are to be current members of Air-Conditioning, Heating and Refrigeration Institute (AHRI),

d) Electrical Components, Devices and Accessories: Boilers must be listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

e) ASME Compliance: Condensing boilers must be constructed in accordance with ASME Boiler and Pressure Vessel Code, Section IV "Heating Boilers".

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) Boiler installation tradesmen are to be journeyman tradesmen licensed to install boiler 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. WALL HUNG CONDENSING HOT WATER BOILERS

2.1.1. Viessmann Manufacturing Co. "Vitodens 200-W" or approved equivalent, fully condensing, wall hung, zero clearance, factory assembled hot water boilers in accordance with drawing schedule.

2.1.2. Performance requirements are as follows:

a) boilers and burners, CSA certified and ULC listed and labelled as one unit, have a CRN, and comply with Provincial regulations;

b) NOx emissions, maximum 8.9 ppm and in accordance with Canadian Council of Ministers of the Environment Initiative N306, PN 1286, and Provincial guidelines;

c) 95.2% boiler annual fuel efficiency;

d) 420 kPa (60 psi) boiler operating pressure rating.

2.1.3. Each boiler complete with an enamelled steel accessible enclosure, and following construction features:

a) high alloy (SA240 316Ti) stainless steel radial design coil type heat exchanger with defined gaps between coils for efficient heat transfer;

b) factory calibrated, self-adjusting, fully modulating, stainless steel cylinder type burner capable of operating at altitudes of up to 3000 m (10,000') adjusting automatically to either natural gas or propane, and with a 3:1 turndown ratio, in accordance with CAN/CSA B149.1 or .2 as applicable, complete with variable speed DC blower for positive flue discharge, designed to return to the low fire position prior to ignition and to remain in the low fire position during ignition and until main flame has been proven and complete with:

1) automatic electric spark ignition, and 100% safety shut-down ionization flame detector to monitor flame to prevent primary fuel valves from opening until flame has been established;

2) microprocessor-based combustion manager to regulate gas butterfly valve, control ignition and safety shut-down, and display sequence of operation, safety lock-out error messages and codes, and information, service, and operating parameters;

3) gas piping train with ball type shut-off valve, main gas pressure regulator, low gas pressure switch, double main gas valves, secondary gas pressure regulator, ball type shut-off valve, and gas valve, controlled through combustion manager to start or stop burner excessive pressure or temperature, low gas pressure, or low water condition.

2.1.4. Boiler trim is to include the following:

a) integral flow switch and an ASME rated factory sized and set relief valve;

b) adjustable automatic reset high limit control and a manual rest high limit control in accordance with ASME Section IV;

c) boiler manufacturer supplied, site installed low loss header to decouple high flow rate systems and ensure low return boiler water temperatures at all times, factory insulated with insulation and jacket conforming to requirements specified in Section entitled Mechanical Insulation, and equipped with NPT pipe connections, air vent, and drain valve;

d) boiler manufacturer supplied, site installed distribution manifold with supply and return pipe connections, factory insulated with insulation and jacket conforming to requirements specified in Section entitled Mechanical Insulation.

2.1.5. Multi-function, self-diagnostic, outdoor reset, weather responsive, digital controls with menu-driven programmable unit factory installed on each boiler, capable of communicating via KM-BUS protocol to a "Vitocontrol-S WB2B" or approved equivalent, distribution manifold mounted cascade control with temperatures sensor, accepting remote 0 to 10 volt input, boiler sequencing and firing rate, indoor/outdoor reset and user interface with graphic output. Boiler control is to self-adjust to varying operating environments and have priority for both electrical and fuel savings in its self-learning, self-adaption logic, and is to include fault code and alarm indication. Self-diagnostic cascade control is to operate up to 4 boilers and, where applicable, be capable of interface to building automation system.

2.1.6. Boiler flue gas venting supplied with each boiler by boiler manufacturer for boiler operation under Category IV positive vent pressure conditions for room air dependent operation. Venting is to be complete with required installation and termination accessories, is to feature condensate disposal, and is to have zero clearance to combustibles.

2.1.7. Condensate acid neutralizer equal to JJM Boiler Works or Condensate Neutralizer or approved equivalent, condensate acid neutralizing PVC tube sized to suit boiler condensate discharge, supplied with boilers, filled with 12 mm (½") and 20 mm (¾") aggregate calcium carbonate and complete with floor mounting galvanized steel strut clamps, threaded PVC inlet and outlet fittings, and a spare charge of calcium.

2.1.8. Where seismic restraint required per OBC, provide factory installed and certified seismic restraint anchor points.

3. EXECUTION

3.1. INSTALLATION OF WALL HUNG CONDENSING HOT WATER BOILERS

3.1.1. Provide wall mounted condensing boilers.

3.1.2. Conform to requirements of CAN/CSA B149.1 or .2 as applicable.

3.1.3. Secure each boiler in place, level and plumb, on wall bracket assemblies supplied with boilers.

3.1.4. Anchor each boiler in accordance with requirements specified in Section entitled Seismic Control and Restraint. Provide flexible connections in all piping connections to each boiler.

3.1.5. Connect each boiler with a distribution manifold, cascade control, and other accessories supplied loose. Follow boiler manufacturer’s instructions when installing accessories supplied loose. Provide pressure gauges and thermometers in boiler water supply and return piping.

3.1.6. Install condensate acid neutralizers adjacent to boilers and connect with piping from boilers to neutralizers and from neutralizers to drain in accordance with manufacturer’s directions and drawing requirements;

3.1.7. Install control components shipped loose with boilers. Perform required control wiring in conduit to connect control components. Follow boiler manufacturer's control wiring schematics and conduit and conductor installation requirements specified as part of the electrical work.

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

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

END OF SECTION