

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 23 05 00 - Common Work Results for HVAC
- .2 Section 23 05 49.01 - Seismic Protection Systems
- .3 Section 23 51 00 - Breeching, Chimneys and Stacks
- .4 Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment

1.2 REFERENCES

- .1 American Boiler Manufacturers Association (ABMA)
- .2 ASME
 - .1 ASME Boiler and Pressure Vessel Code (BPVC), Section VII-[2013].
- .3 CSA Group
 - .1 CAN1-3.1, Industrial and Commercial Gas-Fired Package Boilers.
 - .2 CSA B51, Boiler, Pressure Vessel, and Pressure Piping Code.
 - .3 CSA B139, Installation Code for Oil Burning Equipment.
 - .4 CSA B140.7, Oil Burning Equipment: Steam and Hot-Water Boilers.
 - .5 CSA B149.1, Natural Gas and Propane Installation Code.
 - .6 ANSI Z21.13/CSA 4.9, Gas-Fired Low-Pressure Steam and Hot Water Boilers.
- .4 Electrical and Electronic Manufacturers Association of Canada (EEMAC)

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for heating boilers and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Canada, OIQ member.
 - .2 Indicate on drawings:
 - .1 General arrangement showing terminal points, instrumentation test connections.
 - .2 Clearances for operation, maintenance, servicing, tube cleaning, tube replacement.
 - .3 Foundations with loadings, anchor bolt arrangements.
 - .4 Piping hook-ups.

- .5 Equipment electrical drawings.
- .6 Burners and controls.
- .7 All miscellaneous equipment.
- .8 Flame safety control system.
- .9 Breeching and stack configuration.
- .3 Engineering data to include:
 - .1 Boiler efficiency at 25%, 50%, 75%, 100%, and 110% of design capacity.
 - .2 Radiant heat loss at rated power.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for heating boilers for incorporation into manual.

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: work to be performed in compliance with TDGA, applicable Provincial /Territorial regulations.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- .1 Where materials or products are specified by their trademark, consult the Instructions to Bidders document for the procedures to follow regarding the request for approval for materials or product replacement.
- .2 Extra materials:
 - .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
 - .1 Special tools for burners, access opening, handholes and Operation and Maintenance.
 - .2 Spare parts for 1 year of operation.
 - .3 Spare gaskets.
 - .4 Spare gauge glass inserts.
 - .5 Probes and sealants for electronic indication.
 - .6 Spare burner tips.
 - .7 Spare burner gun.
 - .8 Safety valve test gauge.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.

- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect boiler and equipment from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 NATURAL GAS CONDENSATION BOILERS (CH1-CBT-A00 & CH2-CBT-A00)

- .1 Packaged boiler:
 - .1 Complete with burner and necessary accessories and controls.
 - .2 Factory tested at rated capacity to, and bearing seal or nameplate certifying compliance with, CSA B140.7, witnessed and certified by Departmental Representative.
 - .3 Ready for attachment to piping, electrical power, controls, flue gases exhaust.
 - .4 Designed and constructed to ASME Boiler and Pressure Vessel Code.
 - .5 CRN (Canadian Registration Number), to CSA B51.
 - .6 Boiler/burner package to bear ULC label.
- .2 Performance:
 - .1 In accordance with American Boiler Manufacturers Association (ABMA), or ANSI Z21.13/CSA 4.9 (gas burning) testing procedures.
 - .2 Hot water: 400 kW gross output. 48 degrees C supply. 43.3 degrees C return. 1200 kPa maximum operating pressure.
 - .3 Boiler efficiency: 85% minimum at 20% to 100% firing rates and gas temperatures between 30 et 100 degrees Celsius in condensation mode.
 - .4 Flue gas temperature leaving boiler:
 - .1 Not to exceed 260 degrees C.
 - .2 Above dewpoint conditions at minimum firing rate.
- .3 Electrical:
 - .1 Power: 120 V, 1 phase, 60 Hz.
 - .2 Controls: 120 V, 1 phase, 60 Hz.
 - .3 Electrical components: CSA approved.
- .4 Controls: factory wired. Enclosed in EEMAC 1 steel cabinet.
- .5 Thermal insulation:
 - .1 50 mm thick mineral fibre. Seal insulation at handholes, access opening, mudholes, piping connections with insulating cement or asphaltic paint. Finish with heat resisting paint.

-
- .6 Jackets: heavy gauge metal, finished with heat resisting paint.
 - .7 Mounting:
 - .1 Structural steel base, lifting lugs.
 - .8 Anchor bolts and templates:
 - .1 Supply for installation by other Divisions. Anchor bolts to be sized to Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment.
 - .9 Start-up, instruction, on-site performance tests: 3 days per boiler.
 - .10 Trial usage:
 - .1 Departmental Representative may use boilers for test purposes prior to acceptance and commencement of warranty period.
 - .2 Supply labour, materials and instruments required for tests.
 - .11 Temporary use by contractor:
 - .1 Contractor may use boilers only after written approval from Departmental Representative.
 - .2 Monitor and record performance continuously. Keep log of maintenance activities carried out.
 - .3 Refurbish to as-new condition before final inspection and acceptance.
 - .12 If necessary, boilers must be disassembled. A temporary opening of 1830mm x 1830 mm will be made in the masonry wall adjacent to the corridor to access the mechanical room. The mechanical room of this system is found at 1200 mm below the level of the corridor. If necessary, a lifting system must be provided.
 - .13 Modular blocks to allow an outside direct evacuation of the combustion gas through a stainless steel pipe in accordance with Section 23 51 00 – Breeching, Chimney and Stacks.
 - .14 The boiler must operate in sealed combustion with an outside direct suction using a PVC pipe in accordance with Section Section 23 51 00 - Breeching, Chimneys and Stacks.
 - .15 Certification for a common category II chimney.
 - .16 Factory-assemble each module to include:
 - .1 Combustion air inlet chamber.
 - .2 Pre-purge blower assembly.
 - .3 Air-gas fuel control valve.
 - .4 Cast pulse combustion chamber.
 - .5 Welded absorption chamber with spiralled fire tubes and exhaust chamber.
 - .6 Smoke tube (heat exchanger) in duplex stainless steel 316 Ti type or resistant to corrosion and restraint corrosion.
 - .7 House assembly in insulated jacket which includes boiler mounted electrical control panel enclosure with operation sequence indicator lights.
 - .8 Provide coupling on combustion air inlet and exhaust chambers for connections of plastic piping, PVC and galvanized steel.

- .9 Provide condensate drain fitting on exhaust chamber.
- .10 Boiler materials will enable operation with flue gas temperature below dewpoint without corrosion.
- .17 Absorption unit: constructed in accordance with ASME Boiler and Pressure Vessel Code for Low Pressure Heating Boilers for 207 kPa working pressure.
- .18 Controls for each module to include:
 - .1 Solid state controller with auxiliary relay.
 - .2 Fan pressure switch and pressure sensing flame safeguard system.
 - .3 Provide combination gas control with:
 - .1 Manual shut off valve.
 - .2 System pressure controlled regulator.
 - .3 Automatic redundant shut off valves.
 - .4 High limit water temperature control with adjustable differential.
 - .5 ASME approved pressure relief valve and temperature/pressure indicator.
- .19 Security system, functional devices and controls are fully configured, calibrated and tested at the factory.
- .20 Modules to be factory wired and operationally tested.
 - .1 Each module suitable for individual firing.
 - .2 Step firing accomplished by firing individual modules without reducing their thermal efficiency.
 - .3 Control system/control/security designed, supplied and installed by the heating system manufacturer.
- .21 Acceptable products : CleaverBrooks CFC 1500, Fulton Endura EDR 1500, Veissman Vitocrossal or a replacement product approved via addenda in accordance with Bidder instructions.

2.2 AUXILIARIES

- .1 Provide auxiliaries for each boiler and to meet ASME requirements.
- .2 Hot water boilers:
 - .1 Relief valves: ASME rated, set at 520kPa, to release entire boiler capacity.
 - .2 Pressure gauge: 90 mm diameter complete with shut-off cock.
 - .3 Thermometer: 115 mm diameter range 10 to 100 degrees C.
 - .4 Low water cut-off: with visual and audible alarms.
 - .5 Auxiliary low water cut-off: with separate cold water connection to boiler.
 - .6 Motorized damper for combustion air.
 - .7 Temperature sensor located at the exit for temperature and operation control modulation. The temperature sensor located at the header's exit (power) to modulate the power of the boilers in function of operation set points and to allow the irrigation of boilers to stop.

- .8 Temperature sensor located at the entrance of the temperature control and operation modulation. A temperature sensor at the opening of the header (return) to control the number of boilers in operation.
- .9 Isolating gate valves: on supply and return connections.
- .10 Drain valve: NPS 2.
- .11 Stack thermometer: range 20 to 300 degrees C.
- .12 Outdoor controller: to reset operating temperature controller.
- .13 1 set of cleaning tools.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for heating boiler installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.3 INSTALLATION

- .1 Install in accordance with ASME Boiler and Pressure Vessels Code, regulations of Province having jurisdiction, except where specified otherwise, and manufacturers recommendations.
- .2 Make required piping connections to inlets and outlets recommended by boiler manufacturer.
- .3 Maintain clearances as indicated or if not indicated, as recommended by manufacturer for operation, servicing and maintenance without disruption of operation of any other equipment/system.
- .4 Mount unit level using specified vibration isolation in Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment.
- .5 Pipe hot water relief valves full size to nearest drain.
- .6 Pipe blowdown/drain to blowdown tank/floor drain.
- .7 Natural gas fired installations: in accordance with CSA B149.1.

3.4 FIELD QUALITY CONTROL

- .1 Commissioning:
 - .1 Manufacturer to:
 - .1 Certify installation.
 - .2 Start up and commission installation.
 - .3 Carry out on-site performance verification tests.
 - .4 Demonstrate operation and maintenance.
 - .2 Provide Departmental Representative at least 24 hours notice prior to inspections, tests, and demonstrations. Submit written report of inspections and test results.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse/recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION