

Part 1 General

1.1 REFERENCES

- .1 American Boiler Manufacturer's Association (ABMA)
- .2 American National Standards Institute (ANSI)
 - .1 ANSI Z21.13-CSA 4.9, Gas-Fired Low-Pressure Steam and Hot Water Boilers.
- .3 American National Standards Institute (ANSI)/ American Society of Mechanical Engineers (ASME)
 - .1 ANSI/ASME Boiler and Pressure Vessel Code, Section IV,.
- .4 Canadian Gas Association (CGA)
 - .1 CAN1-3.1, Industrial and Commercial Gas-Fired Package Boilers.
 - .2 CAN/CSA-B149.1, Natural Gas and Propane Installation Code.
- .5 Canadian Standards Association (CSA International)
 - .1 CSA B51, Boiler, Pressure Vessel, and Pressure Piping Code.
- .6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.2 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.
 - .1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate the following:
 - .1 General arrangement showing terminal points, instrumentation test connections.
 - .2 Clearances for operation, maintenance, servicing, tube cleaning, tube replacement.
 - .3 Piping hook-ups.
 - .4 Equipment electrical drawings.
 - .5 Burners and controls.
 - .6 All miscellaneous equipment.
 - .7 Flame safety control system.
 - .3 Engineering data to include:

- .1 Boiler efficiency at 25%, 50%, 75%, 100%, of design capacity.
- .2 Radiant heat loss at 100% design capacity.
- .3 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Instructions: submit manufacturer's installation instructions.
- .4 Closeout Submittals:
 - .1 Submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.3 QUALITY ASSURANCE

- .1 Regulatory Requirements: work to be performed in compliance with CEPA, and applicable Provincial /Territorial regulations.
- .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.

1.5 MAINTENANCE

- .1 Extra materials:
 - .1 Special tools for burners, 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.

Part 2 Products

2.1 GENERAL

- .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 B149.7.

- .3 Ready for attachment to piping, electrical power, controls, flue gases exhaust.
- .4 Designed and constructed to ANSI/ASME Boiler and Pressure vessel Code.
- .2 Performance:
 - .1 In accordance with American Boiler Manufacturers Association (ABMA) testing procedures.
 - .2 Boiler efficiency: 90 % minimum at 30% to 100% firing rates.
 - .3 Flue gas temperature leaving boiler:
 - .1 Not to exceed 260 degrees C.
 - .2 Above dewpoint conditions at minimum firing rate.
- .3 Electrical:
 - .1 Power: 120V, 1 phase, 60 Hz.
 - .2 Controls: 120V, 1 phase, 60 Hz.
 - .3 Electrical components: CSA approved.
- .4 Controls: factory wired. Enclosed in Electrical and Electronic Manufacturers' Association of Canada (EEMAC) steel cabinet.
- .5 Jackets: heavy gauge metal, finished with heat resisting paint.
- .6 Start-up, instruction, on-site performance tests: 1 days per boiler.
- .7 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.
- .8 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.

2.2 MODULAR HOT WATER BOILER, NATURAL GAS FIRED, CONDENSING TYPE

- .1 Heating boiler seasonal efficiency rating: 90%. Flue gas exhaust temperature: 45 to 55 degrees C, when operating in condensing mode.
- .2 Flue gas: individually direct vented. Combustion air: individually drawn from outdoors through plastic pipes as indicated and as recommended by manufacturer.
- .3 Factory-assemble each module to include:
 - .1 Combustion air inlet chamber.
 - .2 Pre-purge blower assembly.
 - .3 Air-gas fuel control valve.
 - .4 Stainless Steel combustion chamber.

- .5 Welded absorption chamber with spiralled fire tubes and exhaust chamber.
- .6 House assembly in insulated jacket which includes boiler mounted electrical control panel enclosure with operation sequence indicator lights.
- .7 Provide coupling on combustion air inlet and exhaust chambers for connections of plastic piping, PVC for outside air intake and AL29-4C for outside exhaust.
- .8 Provide condensate drain fitting on exhaust chamber.
- .9 Boiler materials will enable operation with flue gas temperature below dewpoint without corrosion.
- .4 Absorption unit: stainless steel constructed in accordance with Section IV of ASME Boiler and Pressure Vessel Code for Low Pressure Heating Boilers for 207 kPa working pressure.
- .5 Controls for each module to include:
 - .1 Solid state controller with auxiliary relay.
 - .2 Fan prove 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.
- .6 Factory wire each module and operationally test.
 - .1 Each module suitable for individual firing.
 - .2 Step firing accomplished by firing individual modules without reducing their thermal efficiency.
 - .3 Control system: designed and provided for heating plant by manufacturer.
- .7 Boiler input to be 116.94KW natural gas.

2.3 AUXILIARIES

- .1 Provide auxiliaries for each boiler and to meet ANSI/ASME requirements.
- .2 Hot water boilers:
 - .1 Relief valves: ANSI/ASME rated, set at 207 kPa.
 - .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:
 - .6 Isolating gate valves: on supply and return connections.
 - .7 Drain valve: NPS 20.
 - .8 Stack thermometer: range 10 to 150 degrees C.
 - .9 Outdoor controller: to reset operating temperature controller.
 - .10 One set of cleaning tools.
 - .11 Condensate acid neutralizer.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

- .1 Install in accordance with ANSI/ASME Boiler and Pressure Vessels Code Section IV, 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.

3.3 MOUNTINGS AND ACCESSORIES

- .1 Safety valves and relief valves:
 - .1 Run separate discharge from each valve.
 - .2 Terminate discharge pipe as indicated.
 - .3 Run drain pipe from each valve outlet and drip pan elbow to above nearest drain.
- .2 Blowdown valves:
 - .1 Run discharge to terminate as indicated.
- .3 Boiler mounting:
 - .1 Boiler to be wall mounted.

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.
 - .5 Warranty direct vent installation to -40 degrees C.
 - .2 Provide Departmental Representative at least 48 hours notice prior to inspections, tests, and demonstrations. Submit written report of inspections and test results.

3.5 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.

- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION