

Part 1 General

1.1 REFERENCES

- .1 American Boiler Manufacturers Association (ABMA)
- .2 ASME
 - .1 ASME Boiler and Pressure Vessel Code (BPVC), Section VII-2013.
- .3 CSA Group
 - .1 CAN1-3.1-77(R2011), Industrial and Commercial Gas-Fired Package Boilers.
 - .2 CSA B51-09, Boiler, Pressure Vessel, and Pressure Piping Code.
 - .3 CSA B149.1-10, Natural Gas and Propane Installation Code.
 - .4 ANSI Z21.13-10/CSA 4.9-10, Gas-Fired Low-Pressure Steam and Hot Water Boilers.
- .4 Electrical and Electronic Manufacturers Association of Canada (EEMAC)

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 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.
- .2 Shop Drawings:
 - .1 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.
 - .10 Stack emission continuous monitoring system to measure CO, O, NOx, SO, stack temperature and smoke density of flue gases.
 - .2 Engineering data to include:
 - .1 Boiler efficiency at 25%, 50%, 75%, 100%, and 110% of design capacity.
 - .2 Radiant heat loss at 100% design capacity.

- .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.3 CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data: submit operation and maintenance data for heating boilers for incorporation into manual.

1.4 QUALITY ASSURANCE

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

1.5 MAINTENANCE MATERIAL SUBMITTALS

- .1 Extra materials:
 - .1 Submit maintenance materials:
 - .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.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance 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 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 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 B140.7 or CAN1-3. 1.
- .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.
- .2 Performance:
 - .1 In accordance with American Boiler Manufacturers Association (ABMA), or ANSI Z21.13/CSA 4.9 (gas burning) testing procedures.
 - .2 Firing rate:
 - .1 C-B1 & C-B2: Output: 73 kW each
 - .2 P-B1 & P-B2: Output: 89 kW each
 - .3 M-B1 & M-B2: Output 89 kW each
 - .4 E-B1 & E-B2: Output 106 kW each
 - .3 Boiler efficiency: 80% minimum at 30% to 100% firing rates.
 - .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.
- .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.

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 100 kPa.
 - .2 Pressure gauge: 90 mm diameter complete with shut-off cock.
 - .3 Thermometer: 115 mm diameter range 10 to 150 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 Isolating gate valves: on supply and return connections.
 - .7 Drain valve: NPS 2.
 - .8 Stack thermometer: range 65 to 400 degrees C.
 - .9 Outdoor controller: to reset operating temperature controller.
 - .10 1 set of cleaning tools.

2.3 GAS BURNERS

- .1 General:
 - .1 Forced draft with:
 - .1 Built-in blower to supply combustion air, complete with motor, silencer and damper.
 - .2 High voltage ignition transformer.
 - .3 Flame observation port.
 - .4 Easy access to nozzles and electrodes.
- .2 Gas pilot:
 - .1 To building code and provincial regulations including solenoid gas valve, pressure regulator, pressure gauge, manual shut-off valve.
- .3 Main gas train:
 - .1 To building code and provincial regulations including main shut-off valve, pressure regulator, motorized electric shut-off valve, downstream block-test valve with test connection and pressure gauge.
- .4 Controls:
 - .1 Electronic combustion control relay with flame rod ultra-violet infra-red flame detector for combustion control and flame supervision.
 - .2 Control to shut off fuel within 5 seconds upon pilot flame or main flame failure or upon signal of safety interlock and to ensure, when restarted, in sequence:

- .1 Pre-purge.
- .2 Pilot ignition and supervision.
- .3 Main gas valve opening.
- .4 Pilot cut-off. Pilot-proving period not to exceed 10 seconds.
- .5 Burner operation.
- .6 Post-purge burner shut-down.
- .3 Static pressure interlock. To shut off burner upon loss of combustion air pressure.
- .4 Fuel-air mixture: control through:
 - .1 2-position motor with end switch to provide for low-fire start and high fire run.
 - .2 2-position motor with linkage to control fuel and air and with end switches to prove low-fire start and energize high fire solenoid valve for high-low fire operation.
 - .3 Modulating motor with end switch to provide for low-fire start and fully modulating operation down to 20% of design capacity.
- .5 Immersion controllers:
 - .1 Operating: to start and stop burner, and operating between adjustable set points.
 - .2 High-low: to shift burner operation to high or low fire.
 - .3 Controller range: 30 to 121 degrees C.
- .6 Visual and audible alarms: to indicate burner shutdown due to flame failure, low water level, high temperature, low air pressure, low gas pressure.
- .7 Pilot lights: to indicate:
 - .1 Normal burner operation.
 - .2 All stages of burner operation.
- .8 Burner to start up in low fire position.

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.

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.
- .5 Pipe hot water relief valves full size to nearest drain.
- .6 Natural gas fired installations: in accordance with CSA B149.1.

3.4 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.

3.5 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.

3.6 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

END OF SECTION