

SECTION 235233
FINNED WATER TUBE BOILERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Boilers.
- B. Controls and boiler trim.
- C. Hot water connections.
- D. Fuel connection.
- E. Collector, draft hood, and chimney connection.
- F. Collector, induced draft fan, and chimney connection.
- G. Circulator.
- H. Expansion tank.

1.2 RELATED SECTIONS

- A. Division 03 - Cast-In-Place Concrete.
- B. Section 23 21 16 - Hydronic Specialties.
- C. Section 26 05 05 - Equipment Wiring Systems: Electrical characteristics and wiring connections.

1.3 REFERENCES

- A. AGA - Directory of Certified Appliances and Accessories.
- B. AGA Z21.13 - Gas-Fired Low-Pressure Steam and Hot Water Boilers.
- C. ASME SEC 4 - Boiler and Pressure Vessel Codes - Rules for Construction of Heating Boilers.
- D. ASME SEC 8D - Boilers and Pressure Vessel Codes - Rules for Construction of Pressure Vessels.
- E. HI (Hydronics Institute) - Testing and Rating Standard for Cast Iron and Steel Heating Boilers.
- F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- G. NFPA 54 (AGA Z223.1) - National Fuel Gas Code.
- H. NFPA 70 - National Electrical Code.
- I. UL - Gas and Oil Equipment Directory.

1.4 SUBMITTALS

- A. Submit under the provisions of Division 01.
- B. Product Data: Provide data indicating general assembly, components, controls, safety controls, and wiring diagrams with electrical characteristics and connection requirements.
- C. Submit manufacturer's installation instructions. Indicate assembly, support details, connection requirements, and include start-up instructions.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

- A. Submit under the provisions of Division 01.
- B. Manufacturer's Field Reports: Indicate condition of equipment after start-up including control settings and performance chart of control system.
- C. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, cleaning procedures, replacement parts list, and maintenance and repair data.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with a minimum of three (3) years' documented experience.

1.7 REGULATORY REQUIREMENTS

- A. Conform to applicable code for internal wiring of factory wired equipment.
- B. Conform to ASME SEC 4 and SEC 8D for boiler construction.
- C. Units: AGA certified.
- D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

1.8 DELIVERY, STORAGE, AND PROTECTION

- A. Section 23 05 00 - Material and Equipment: Transport, handle, store, and protect products.
- B. Protect units before, during, and after installation from damage to casing by leaving factory shipping packaging in place until immediately prior to final acceptance.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Lochinvar.
- B. Raypak.
- C. Teledyne Laars.
- D. Substitutions: Under the provisions of Division 01.

2.2 MANUFACTURED UNITS

- A. Hot water natural draft boiler with horizontal grid, finned tube heat exchanger, gas burning system, refractory combustion chamber, controls, and boiler trim including circulator.

2.3 FABRICATION

- A. Assembly: Finned copper tube heat exchanger assembled within combustion chamber conforming to ASME SEC 4 requirements and tested for maximum working pressure of 160-psi.
- B. Combustion Chamber: Line with interlocking refractory insulating panels of vermiculite, high temperature cements, asbestos fiber, and refractory clay for service temperatures to 2100 degrees F.
- C. Exchanger: Fabricate of finned copper tubing with stainless steel baffles and sealed into bronze, steel, or cast-iron headers with silicone O-ring gaskets.
- D. Jacket: Galvanized steel with factory applied baked enamel, insulated with foil faced fiberglass insulation.

2.4 FUEL BURNING SYSTEM

- A. Induced Draft Gas Burner: Stainless steel burners for modulating firing and natural gas with adjustable combustion air supply, gas pressure regulator, diaphragm gas valves, manual shut-off, intermittent spark or glow coil ignition, thermistor flame sensing device, and automatic 100% safety gas shut-off.
- B. Safety Controls: Energize ignition, limit time for establishment of flame, prevent opening of gas valve until pilot flame is proven, stop gas flow on ignition failure, energize blower motor, and after air flow proven.
- C. Flue Gas Collector and Draft Hood: Integral with boiler casing.
- D. The specified boiler's thermal efficiency, as listed by A.G.A., shall be the minimum acceptable level.

2.5 TRIM

- A. ASME rated pressure relief valve set at 45-psi.
- B. Low water cut-off and inlet flow switch to automatically prevent burner operation when water falls below safe level or on low flow through boiler.

2.6 CONTROLS

- A. Operating Controls: Pre-wired, factory assembled electric control including pilot safety and thermocouple transformer, 24-volt gas valve, manual main and pilot valves, and junction box.
- B. Operating temperature controller with outdoor reset to control burner operation to maintain supply water temperature.
- C. High limit temperature controller with automatic reset for burner to prevent boiler water temperature from exceeding safe system temperature.
- D. Low water cut-off or flow switch to automatically prevent burner operation when water flow falls below safe level or on low water flow through boiler.

2.7 PERFORMANCE

- A. Performance rating shall be in accordance with HI - Testing and Rating Standard for Cast Iron and Steel Heating Boilers.
- B. Rating: See drawings.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with the manufacturer's instructions.
- B. Install in accordance with NFPA 54.
- C. Install boiler on concrete housekeeping base, sized minimum 4 inches larger than boiler base. Refer to Division 03.
- D. Provide connection of natural gas service in accordance with NFPA 54 (AGA Z223.1).
- E. Provide piping connections and accessories as indicated; refer to Section 23 21 16.
- F. Pipe relief valves to nearest floor drain.
- G. Install circulator and diaphragm expansion tank on boiler.
- H. Provide for connection to electrical service. Refer to Section 26 05 05.

3.2 MANUFACTURER'S FIELD SERVICES

- A. Prepare and start systems under the provisions of Division 01.
- B. Instruct operating personnel in operation and maintenance of units.

END OF SECTION