

Sentry Boiler MasterSpec

SECTION 235223 – CAST-IRON BOILERS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section includes factory packaged, gas-fired, cast-iron boilers, trim, and accessories for closed heating water systems.

1.3 SUMMITTALS

- A. Product Data: Include performance data, operating characteristics, furnished specialties, and accessories.
- B. Shop Drawings: For boiler(s), boiler trim, and accessories. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Design Calculations signed and sealed by a professional engineer
 - 2. Wiring Diagrams: Power, signal, and control wiring.
- c. Warranty: 1 year full boiler and limited lifetime heat exchanger manufacturer's warranty.

1.4 INFORMATIONAL SUBMITTALS

- A. Operation and Maintenance: To include in operation and maintenance manuals.
- B. Other Informational Submittal:
 - 1. ASME Report: Submit ASME documentation as required by authorities having jurisdiction.
 - 2. Startup report

1.5 CLOSEOUT SUBMITTALS

- A. Operational and Maintenance Data: to include in boiler emergency, operation and maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70. Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. ASME Compliance: Fabricate and Label Boiler to comply with ASME Boiler and Pressure and Vessel Code.

- C. DOE Compliance: Minimum Efficiency shall comply with 10 CFR 430, Subpart B, Appendix N, "Uniform Test Method for Measuring the Energy Consumption of Furnaces and Boilers."
- D. AHRI Compliance: Boiler(s) shall be tested and rated according to AHRI's "Rating Procedure for Heating Boilers" and "Testing Standard for Commercial Boilers", with the AHRI Emblem on a rating plate affixed to the boiler.
- E. CSA Compliance: Boiler(s) to be compliant with CSA certification.

1.7 COORDINATION

- A. Coordinate boiler(s) placement on floor.

1.8 WARRANTY

- A. Standard Warranty: Manufacturer's standard warranty in which manufacturer agrees to repair or replace components and heat exchangers that fail due to failure in materials or workmanship within specified warranty period.

1. Warranty Period for Heat Exchangers: Limited lifetime.

2. Warranty Period for Other Factory Supplied Parts: 1 year from installation.

PART 2 – PRODUCTS

2.1 FIRE-TUBE BOILER(S)

- A. Basis of Design: Slant/Fin Sentry boiler(s) as specified on drawings. All others must be submitted as equal alternate.
- B. Furnish and install ____ (Quantity) Slant/Fin Model _____ (Choose S-34EDP; S-60EDP; S-90EDP; S-120EDP; S-150EDP) gas-fired boiler(s), (Choose Natural Gas-Fired or LP Gas-Fired). Install in accordance with code requirements and manufacturer's installation and start –up manual. Installer to include start up and set-up of boiler system in scope of work.

2.2 CONSTRUCTION

- A. Description: Factory fabricated and assembled free standing cast-iron gas-fired boiler(s) with stainless steel burners; integral draft hood;
- B. Electrical: The electrical service to the boiler(s) is 120 VAC 1 Phase 60 HZ. Boilers' main power is polarized. All electrical wiring must be installed according to all applicable codes, standards and regulations. In USA electrical installation must comply with NFPA 70, National Electric Code – latest edition.
- C. Heat Exchanger: Shall be a cast iron sectional heat exchanger manufactured in accordance with A.S.M.E. Code. Individual sections to be made in an A.S.M.E. approved foundry. Sections to be assembled in an A.S.M.E. approved assembly manufacturing facility. Individual sections to be hydrostatically tested to 100 pounds per square inch (PSI) at the foundry and assembled casting assemblies hydrostatically tested to 75 PSI at the assembly manufacturing facility. Water Seals between sections shall be permanent metal push nipples that will not be damaged by boiler water treatment. Rubber gasket seals between sections are not acceptable, rubber seals can be affected by water treatment chemicals or experience heat damage.

- D. Burners: Shall be stainless steel, lanced slot. Each burner shall have an air shutter to adjust the flame. Each boiler shall have one burner with a pilot bracket to give accurate location of the burner pilot.
- E. Boiler Controller: The boilers' control shall be a combination high limit, operating control with burner circuit and circulator circuit relays. The operational part of the control shall be either outdoor reset or thermal targeting. Thermal targeting is changing the boiler's target water temperature based on actual heating load. Outdoor reset is changing the boiler's water target temperature based on actual outdoor air temperature. Control shall have an adjustable target water temperature to use with an indirect water heater. Control shall have 24 volt burner relay circuit and line voltage circulator circuit with wiring terminals.
- F. Boiler(s) Venting: Boiler(s) is (are) Vent Category I. Venting and sizing must be in accordance with National Fuel Gas Code ANSI Z223.1, NFPA 54, -latest edition. Local codes apply.
- I. Gas Piping: Fuel gas piping must comply with all local codes and National Fuel Gas Code, ANSI Z223.1/NFPA 54. Gas supply pipes must be sized to provide sufficient gas to have less than a 1 inch water column gas pressure drop when boiler(s) starts with all appliances firing that are connected to the same fuel source as the boiler(s).
- J. Water Piping: Boiler(s) water piping must be installed following boiler manufacturer's instructions. Water quality must meet or exceed boiler manufacturer's instructions. Installing contractor shall follow manufacturer's instructions for cleaning heating system and boiler(s) piping. Use of Glycol must follow boiler manufacturer's instructions and boiler glycol will be checked and maintained at least once per year. The boiler(s) piping shall include a primary loop to ensure adequate water flow through the boilers' heat exchanger. Installer must follow all code requirements. Boiler(s) water quality must be maintained, especially if glycol is used in the system. All CHS boiler installation shall have be closed loop system. The boiler system should not be drained and refilled unless it is absolutely necessary. Any leaks in the boiler system shall be sealed immediately.
- K. General: Boiler(s) installation must comply with applicable code requirements. Installer must follow manufacturer's instructions. Installer to commission the boiler(s) following manufacturer's instructions and complete the "Installation/start-up checklist" contained in the boilers' IOM. There is a "Maintenance Checklist" in the boilers' IOM that must be kept up to date.
- L: Boiler Jacket: Boiler jacket to be painted steel with removable steel front cover. Boiler maintenance and programming may be performed from the front of the boiler(s).

2.3 TRIM

A. Safety Relief Valve

1. Size and Capacity: 30 PSI Factory set and sealed, installer to mount on the boiler(s) with full size drain pipe connected with discharge pipe ended approximately 6 inches from the floor. The end of the drain pipe shall not be threaded, to prohibit plugging the end of the discharge pipe.
2. Pressure Temperature Gauge: Factory supplied and mounted shall have a range that exceeds system normal operating pressure by 50%. Temperature range shall also exceed boilers maximum temperature

3. Boiler Drain Valve: Supplied by boiler manufacturer with end that accepts standard hose-end connection.

2.4 CONTROLS

A. Refer to Division 230900 "Instrumentation and Control for HVAC".

B. Boiler(s) controls shall have features including.

1. Backlit LCD screen with text information, programming and error messages.

2. Circulator Controls

A. Boiler circulator

3. Outdoor reset – Boiler(s) shall have optional factory supplied outdoor sensor to enable boiler control to automatically change boiler water target temperature based on changes in outdoor air temperature. This shall be an adjustable feature.

4. Thermal targeting - Boiler(s) shall have control that will adjust boiler water target temperature based on inferred heating load. Control shall also have a "thermal boost" to help satisfy call for heat in the event of coming out of set-back temperature of heated space.

C. Control shall have built-in automatic reset Low Water Cut-Off.

2.5 CAPCITIES AND CHARACTERISTICS

A. Heating Medium – Water or Glycol Mix

B. Maximum Pressure – 50 Pounds Per Square Inch (PSI) (30 PSI relief valve supplied)

C. Maximum Temperature – 220⁰ Fahrenheit (F)

D. Safety Relief Valve Setting – 30 PSI

E. Minimum Efficiency – AHRI Listed

1. 84% A.F.U.E. efficiency that is AHRI Listed

F. Fuel (Pick one – Natural Gas or LP Gas)

2.6 SOURCE QUALITY CONTROL

A. Factory assembled and tested in accordance with ASME Boiler and Pressure Vessel Code

B. CSA Tested and Listed in accordance with ANSI Z21.13 CSA 4.9 Latest Edition

PART 3 – EXECUTION

3.1 EXAMINATION

A. Before boiler(s) installation, examine rough-in for location, water piping, fuel piping, electrical, and exhaust venting.

B. Examine mechanical spaces for suitable conditions where boilers will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 BOILER INSTALLATION

- A. Install boiler(s) in accordance with manufacturer's instruction
- B. Install boiler(s) in accordance with code requirements including NFPA54.
- C. Install electrical and water moving and safety devices not factory mounted and wired.
- D. Install control wiring

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Sections.
Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to boiler(s) to allow service and maintenance.
- C. Connect fuel gas piping to boiler with a union. Gas piping to boiler(s) to be sized for total gas demand requirements with piping at least full size of gas connection to boiler(s). Provide and install reducer if required.
- D. Install condensate drain in accordance with boiler manufacturer's instructions. Supply and install condensate neutralizer properly sized to treat condensate from boiler system.
- E. Boiler Air Intake and Exhaust Vent
 - 1. Install in accordance to boiler manufacturer's instructions
 - 2. Install in accordance to code requirements
- F. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems"
- G. Connect wiring according to Section 260519 "Low Voltage Electrical Power Conductors and Cables"

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports
 - 1. Perform installation and startup checks according to boiler manufacturer's instructions.
 - 2. Leak test: Test water and fuel piping in accordance to code requirements. Repair as required.
 - 3. Test and adjust controls and safety controls. Replace and repair controls as required.
 - 4. Boiler Test: Startup and adjust boiler(s) to conform to manufacturer's instructions. Repair boiler if required.
 - 4. Operational test – Start boiler(s) to confirm proper rotation and operation.
 - 5. Complete "Installation checklist" contained within boiler manufacturer's installation instructions.
 - 6. Provide completed field quality documentation to building commissioning agent.

END OF SECTION 235223

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