

## SECTION 23XXXX - CONDENSING BOILERS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes packaged, factory-fabricated and -assembled, gas-fired, stainless steel condensing boilers, trim, and accessories for generating hot water.

#### 1.3 SUBMITTALS

- A. Product Data: Include performance data, operating characteristics, furnished specialties, and accessories.
- B. Shop Drawings: For boilers, boiler trim, and accessories. Include plans, elevations, sections, details, and attachments to other work.
- C. Source quality-control test reports.
- D. Field quality-control test reports.
- E. Operation and maintenance data.
- F. Warranty: Special warranty specified in this Section.
- G. Other Informational Submittals: Startup service reports specific to burner type as provided by manufacturer.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provides products manufactured in ASME-certified facilities.
- B. 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.
- C. ASME Compliance: Fabricate and label boilers to comply with ASME Boiler and Pressure Vessel Code.
- D. ASHRAE/IESNA 90.1 Compliance: Boilers shall have minimum efficiency according to "Gas and Oil Fired Boilers - Minimum Efficiency Requirements."

- E. UL Compliance: Test boilers for compliance with UL 795, "Commercial-Industrial Gas Heating Equipment." Boilers shall be listed and labeled by a testing agency acceptable to authorities having jurisdiction.
- F. AHRI Compliance: Boilers shall be tested and rated according to AHRI "Rating Procedure for Heating Boilers" and "Testing Standard for Commercial Boilers," with AHRI emblem on a nameplate affixed to boiler.

## 1.5 WARRANTY

- 1. Warranty Period for Fire-Tube Condensing Boilers:
  - a. Leakage and Materials: 10 years from date of Substantial Completion.
  - b. Heat Exchanger Damaged by Thermal Stress and Corrosion: Non-prorated for 10 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Bosch Thermotechnology Corp.; Bosch SB<XXX>WS Fire-Tube Condensing Boiler, or a comparable product by one of the following:
  - 1. Viessmann Manufacturing Co. (US) Inc.
  - 2. Fulton Boiler Works

### 2.2 MANUFACTURED UNITS

- A. Description: Factory-fabricated, assembled, and pressure tested, fire-tube, high mass condensing boiler with heat exchanger sealed pressure tight, built on a steel base; including insulated jacket; flue-gas vent; water supply, dual returns, and condensate drain connections.
- B. Heat Exchanger: Type 316ti, stainless steel first, second and third passes in contact with flue gases. Only boilers employing nonferrous materials on all flue gas passes will be considered.
- C. Pressure Vessel: Carbon steel with welded heads and tube connections, counter-flow design with low- and high-temperature returns.
- D. Burner: <Insert fuel>, forced draft.
- E. Blower: Centrifugal fan to operate during each burner firing sequence and to pre-purge and post-purge the combustion chamber.
  - 1. Motors: Comply with requirements specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."

- a. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
- F. Gas Train: Two gas valves with manual shutoff and pressure regulator.
- G. Ignition: Pilot ignition with 100 percent main-valve shutoff with electronic flame supervision.
- H. Casing:
  - 1. Jacket: Sheet metal, with snap-in or interlocking closures.
  - 2. Finish: Electrostatic powder-coated protective finish.
  - 3. Insulation: Minimum 80mm thick, glass fiber insulation surrounding the heat exchanger.
  - 4. Combustion Chamber and Other Flue Passage Access: Full-sized front access door, reversible hinged left or right.
  - 5. Access: For cleaning fire tubes on combustion side from front of boiler.
  - 6. Draft Hood: Flue canopy and rear flue connection constructed of stainless steel.
- I. Design Values and Capacities:
  - 1. Design Water Pressure Rating: 80 psig.
  - 2. Safety Relief Valve Setting: **75 psig**
  - 3. Minimum Entering-Water Temperature: No minimum temperature required.
  - 4. Entering-Water Temperature: **<Insert deg F.>**
  - 5. Leaving-Water Temperature: **<Insert deg F.>**
  - 6. Design Water Flow Rate: **<Insert gpm.>**
  - 7. Minimum Water Flow Rate: No minimum flow rate required.
  - 8. Design Pressure Drop: **<Insert psig.>**
  - 9. Minimum AHRI Thermal Efficiency: **94** percent.
  - 10. Gas Input: **<Insert mbh.>**
  - 11. Gross Output Capacity: **<Insert mbh.>**
  - 12. Blower:
    - a. Motor Horsepower: **<Insert value.>**
    - b. RPM: **<Insert value.>**
  - 13. Electrical Characteristics:
    - a. Volts: **[115] [208] [230] [460] <Insert value> V.**
    - b. Phase: **[Single] [Three].**
    - c. Hertz: **[50] [60].**
    - d. Full-Load Amperes: **<Insert value.>**
    - e. Minimum Circuit Ampacity: **<Insert value.>**
    - f. Maximum Overcurrent Protection: **<Insert amperage.>**

### 2.3 Trim

- A. Include devices sized to comply with ANSI B31.9, "Building Services Piping."
- B. Aquastat Controllers: Operating, firing rate, and high limit.

- C. Safety Relief Valve: ASME rated.
- D. Low Water Cut-off: Manual reset whenever boiler water level falls below safe level.
- E. Pressure and Temperature Gage: Minimum **3-inch**- diameter, combination water-pressure and -temperature gage. Gages shall have operating-pressure and -temperature ranges so normal operating range is about 50 percent of full range.
- F. Drain Valve: Minimum **NPS 3/4** hose-end gate valve.
- G. Condensate Neutralization System:

## 2.4 CONTROLS

**<Insert controls here>**

## 2.5 ELECTRICAL POWER

- A. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 26 Sections.

## 2.6 SOURCE QUALITY CONTROL

- A. Test and inspect factory-assembled boilers, before shipping, according to ASME Boiler and Pressure Vessel Code.

## PART 3 - EXECUTION

### 3.1 BOILER INSTALLATION

- A. Install boilers level on concrete base. Concrete base is specified in Division 23 Section "Common Work Results for HVAC," and concrete materials and installation requirements are specified in Division 03.
- B. Install gas-fired boilers according to NFPA 54.
- C. Assemble and install boiler trim.
- D. Install electrical devices furnished with boiler but not specified to be factory mounted.
- E. Install control wiring to field-mounted electrical devices.

### 3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to boiler to allow service and maintenance.
- C. Install piping from equipment drain connection to nearest floor drain. Piping shall be at least full size of connection. Provide an isolation valve if required.
- D. Connect gas piping to boiler gas-train inlet with union. Piping shall be at least full size of gas train connection. Provide a reducer if required.
- E. Connect hot-water piping to supply- and return-boiler connections with shutoff valve and union or flange at each connection.
- F. Install piping from safety relief valves to nearest floor drain.
- G. Boiler Venting:
  - 1. Install flue venting; materials 316L or AL29-4C.
  - 2. Connect full size to boiler connections.[ **Comply with requirements in** Division 23 Section "Breechings, Chimneys, and Stacks."]
- H. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- I. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

### 3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative or technician to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
  - 1. Perform installation and startup checks according to manufacturer's written instructions.
  - 2. Leak Test: Hydrostatic test. Repair leaks and retest until no leaks exist.
  - 3. Operational Test: Start units to confirm proper motor rotation and unit operation. Adjust air-fuel ratio and combustion.
  - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
    - a. Check and adjust initial operating set points and high- and low-limit safety set points of fuel supply, water level, and water temperature.
    - b. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

- C. Remove and replace malfunctioning units and retest as specified above.

#### 3.4 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain boilers. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 23XXXX