



SECTION 235239 – ALDRICH SERIES AVR FIRETUBE WATER BOILERS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes packaged, factory-fabricated and assembled, gas-fired, vertical firetube boilers, trim, and accessories for generating hot water for pressure as noted on plans.
 - 1. Vertical firetube boiler, Minimum efficiency of 85 – 87%
 - 2. Natural gas burner

1.2 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.
 - 1. Wiring Diagrams: Power, signal, and control wiring.
 - 2. Fuel Train Schematic

1.3 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For boilers, components, and accessories to include in emergency, operation and maintenance manuals.
- B. Warranties: As specified in this section.

1.4 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.
- B. ASME Compliance: Fabricate and label boilers to comply with ASME Section IV Boiler and Pressure Vessel Code.
- C. ASHRAE/IESA 90.1 Compliance: Boilers shall have minimum efficiency according to: Gas and Oil Fired Boilers – Minimum Efficiency Requirements.”
- D. UL Compliance: Control devices and control sequences according to requirements of UL.
- E. CSD-1 Compliance: Boilers/burners equipped to meet current state code.
- F. For quality purposes the boiler must be manufactured by a company having at least ten (10) years documented boiler manufacturing experience in accordance to ASME Section IV Boiler and Pressure Vessel Code.

1.5 COORDINATION

- A. Furnish and coordinate size and location of concrete bases.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer warrants the Boiler Pressure Vessel for five (5) years pro-rated after date of shipment with the first two (2) years non pro-rated. This warranty is to cover tube leaks and other possible damages to boiler tubes, tube sheets, furnace, and main shell due to thermal shock expansion stresses ("shock"). In addition to the above pressure vessel warranty the burner, trim, and controls are warranted for a period of one (1) year after installation.

PART 2 – PRODUCTS

2.1 VERTICAL FIRETUBE BOILER (AVR SERIES)

- A. Basis of Design Product: Subject to compliance with requirements, provide products as listed:
 - 1. Aldrich Company – Manufactured in Wyoming, IL, Model: AVR-
- B. The boiler must be manufactured by a company having at least ten (10) years documented boiler manufacturing experience in accordance to ASME Section IV Boiler and Pressure Vessel Code.
- C. Description: Factory packaged and firetested firetube boiler complete with gas burner, gas train, and controls mounted and wired, skid mounted requiring only supply, return, fuel, drain, electrical and vent connections.
- D. Fabricate base and attachment to pressure vessel with reinforcement strong enough to resist boiler movement during a seismic event when boiler base is anchored to building structure.
- E. Design: Vertical firetube design with steel tubes with a minimum wall thickness of .105". The boilers combustion chamber shall be water jacketed including a water surrounded furnace. Refractory sides or tube sheet protection is not allowed as these reduce the heat transfer. Boiler shall be sealed to permit positive combustion chamber pressure with turbulators installed in the firetubes. Boiler to have a minimum efficiency of 85 - 87%. 85% efficiency for AVR-G/M models and 87% efficiency for AVR-G/E models.
- F. Include the following:
 - 1. Handholes or inspection tappings for water-side inspection.
 - 2. Lifting lug on to of boiler.
 - 3. Minimum 1" drain valve.
 - 4. Tappings or flanges for supply and return connections
- G. Boiler Casing: The external surfaces shall be covered with a minimum of 1" mineral fiber insulation encased within an 18 gauge steel jacket.
- H. Secondary Flow Applications: For secondary flow applications a factory mounted and wired pump shall be sized so that at rated output, the temperature rise through the boiler is less than 50°F. Provide pump isolation valves for applications where glycol is used.

2.2 WATER BOILER TRIM

- A. Boiler to include the following factory mounted/wired:
 - 1. Theraltimeter gauge
 - 2. ASME relief valve
 - 3. Operating control
 - 4. High limit control (Manual Reset)
 - 5. Modulation Control

6. M&M #751-MT Probe type low water cut-off (Manual Reset)
7. Stack Damper: Flue stack damper (Manual type)

2.3 FORCED DRAFT BURNER

- A. Basis of Design Product: Subject to compliance with requirements, provide products as listed:
 1. Riello – Model: _____ with a minimum turndown of 5:1.
- B. Code Compliance: UL, CSD-1
- C. Burner must be factory mounted and wired including burner control panel.
- D. Light Package: Power On, Ignition On, Fuel On, Alarm, Call for Heat
- E. Quick Connect Wiring of Burner and Gas Train: Burner to include factory wired burner quick connect wiring. This provides quick and easy removal of the burner and gas train for applications when the burner may need to be shipped loose or removed for rigging purposes. The quick connect system greatly reduces the time required for the installing contractor to remount and make wiring connections.
- F. For AVR-G/M models packaged with Riello RS-M burner modulation is attained with a mechanical cam system.
- G. For AVR-G/E models packaged with Riello RS-E burners the burners are to include a Siemens LMV linkageless modulation system consisting of independent servo motors to manage the air-fuel ratio.
- H. Blower: Forward-curved centrifugal fan integral to burner, directly driven by motor.
- I. Gas Train: Control devices shall comply with requirements in ASME CSD-1 and UL. Gas train to include pilot shut-off valve, regulator, pilot solenoid valve, intermittent electric spark pilot ignition with 100 percent main valve and pilot safety shutoff with electronic ultra violet supervision of burner flame (flame rod not acceptable).
- J. Main Gas Train: Factory piped and wired (may be removed for shipment as a complete assembly for protection), main gas regulator, main gas safety shut off valve, secondary gas safety shut off valve, isolation valve(s) with test cock(s), high and low gas pressure switches.

2.4 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 EXAMINATION

- A. Before boiler installation, examine roughing-in for concrete equipment bases, anchor bolt sizes and locations, and piping and electrical connections to verify actual locations, sizes, and other conditions affecting boiler performance, maintenance, and operations.
 1. Boiler locations on drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections and consult mechanical engineering Project Manager for approval prior to proceeding.
- 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. Equipment Mounting: Install boilers on cast-in-place concrete equipment bases.
 1. Coordinate sizes and locations of concrete bases with actual equipment provided.
 2. Construct bases to withstand, without damage to equipment, seismic force as required by code.
 3. Construct concrete bases 4" high and extend base not less than 6" in all directions beyond the maximum dimensions of boiler unless otherwise indicated.
- B. Install gas-fired boilers according to NFPA-54.

- C. Install electrical devices furnished with boiler but not specified to be factory mounted.
- D. Refer to drawings for additional requirements.

3.3 START-UP SERVICE

- A. The mechanical contractor is required to engage a factory authorized service representative to perform start-up services and also provide owner's maintenance personnel training on the adjustment, operation and recommended maintenance of the boilers.

END OF SECTION 235239