

SERIES 5B ATMOSPHERIC: GAS FIRED BOILER SUGGESTED SPECIFICATIONS

Note: To use as a project specification:

- A. Insert, in the blank spaces provided, the applicable model number, capacity, fuel, and electrical data.
- B. Delete the item in parentheses or marked "*" which are not applicable to the project requirements.
- C. Insert, where applicable, optional non-standard features desired.

1. GENERAL SPECIFICATION

Contractor shall furnish and install, where indicated on the drawings, _____ (quantity) Model 5_____ B, _____ (steam or water) boiler(s) having an I=B=R approved gross output of _____ MBH and a net rating of _____ MBH per boiler with an input of _____ MBH when fired with (natural or LP gas). Boiler(s) shall be constructed of cast iron sections manufactured in accordance with ASME requirements for low pressure boilers and each section shall be permanently marked with the ASME symbol and the maximum allowable working pressure.

2. BOILER EQUIPMENT SPECIFICATION

- 2.1 Boiler sections shall have pinlike projections on each center section, evenly spaced on the vertical flue surfaces to extract the greatest possible quantity of heat from the hot flue gases.
- 2.2 Boiler shall be equipped with stainless steel burners with air shutters which feature smooth ignition, positive flame extinction and high combustion efficiency.
- 2.3 Boiler sections shall be surface ground to ensure smooth positive mating surfaces.
- 2.4 Boiler sections shall be assembled with precision machined cast iron push nipples, pressed into a mating machined nipple port in the section eliminating the need for any material such as gaskets, etc. which would be subject to deterioration due to corrosion or oil based chemicals.
- 2.5 Boiler shall have individual clean out openings between sections covered with insulated steel flue cover plates on front and rear of boiler.
- 2.6 Boiler flue canopy(s) shall be constructed of heavy gauge aluminized steel.
- 2.7 A horizontal to vertical draught(s) shall be furnished for each boiler.
- 2.8 The boiler jacket shall be constructed of heavy gauge steel with 1" thick insulation and have a rust resistant baked enamel finish. The jacket shall be capable of being installed after system piping has been connected to the boiler section assembly. Jacket will have the capability of being removed for cleaning the boiler without disturbing the system piping.
- 2.9 All boiler sections shall be hydrostatically tested for 50 psi water working pressure in accordance with ASME Code, Section IV.
- 2.10 Boiler shall be manufactured of flake graphite/eutectic cell/ cast iron sections which shall have been subjected to a hydrostatic pressure test of 2-1/2 times MAWP at the factory before assembly and each section shall be marked, stamped or cast with the ASME Code symbol. After section assembly, the entire block of sections shall be hydrostatically tested at 1-1/2 times MAWP prior to shipment. Boiler shall be designed in accordance with the ASME Boiler and Pressure Vessel Code Section IV requirements.

(NOTE TO SPECIFIER: The Series 5 boiler is shipped as standard with sections unassembled, however, if the job conditions permit, we can factory assemble and water test up to 11 sections. Boiler sizes 12 thru 26 sections will be shipped in two (2) or more assembled and tested blocks.)

- * 2.10 Water trim shall include a 3½" round pressure-temperature gauge with separate scales for pressure and water temperature. In addition, an ASME approved safety relief valve shall be furnished, sized to exceed the gross output of the boiler, BTU/Hr. and shall be factory set to relieve pressure at (30)(50)psi.

- * 2.11 Steam trim shall include a 3½" round steam pressure gauge with a siphon device. A water level gauge glass shall be furnished with a needle drain valve in the lower connection. In addition, an ASME approved safety valve shall be furnished with side outlet porting set to relieve pressure at 15 psi. The safety valve shall be sized to exceed the gross output of the boiler.

(NOTE TO SPECIFIER: Tankless heaters for domestic water supply are available for the Series 5 water boilers only. Because of the wide variety of ratings (4½ to 12 GPM) dependent on boiler size, please refer to current Series 5 literature or trade price book for exact quantity, heater number ratings and control arrangements available. If a tankless heater is desired, we suggest the following paragraph be added.)

- 2.12 The boiler shall include _____ (insert (1) 6 thru 9 section or, (2) if desired, 10 thru 26 section) tankless heater(s) number AT-2, AT-3 or AT-4 with _____ GPM (continuous draw) 40°- 140°F rise with 200°F boiler water temperature.

3. BOILER CONTROLS

- 3.1 High limit control (a) or (b) below:
(a) shall be automatic reset type suitable for 115 volt 60 Hz.
(b) shall be manual reset type suitable for 115 volt 60 Hz.
- 3.2 A separate operating control shall be furnished in addition to high limit control and shall be suitable for 115 volt 60 Hz.
- 3.3 A low water cut-off shall be furnished and sized on the basis of boiler capacity and pressures involved. The low water cut-off shall be McDonnell & Miller No. (a) or (b) options below:
Options (a) for Water Boilers
No. 750P-MT, manual reset
No. 64, automatic reset
No. 63M, manual reset
Options (b) for Steam Boilers
No. 67BC-2, automatic reset
No. 64, automatic reset
No. 63M, manual reset
No. 47-2 feeder and cut-off combination, automatic reset, No. 47-2M (manual reset)
No. 51-2 feeder and cut-off combination, automatic reset, No. 51-2M (manual reset)
No. 150 pump control and cut-off, automatic reset, No. 150-M (manual reset)

4. GAS TRAINS AND IGNITION SYSTEMS

- * 4.1 **(insert for 6 thru 14 section boilers)** The boiler gas train shall be AGA certified and shall consist of (select option a, b, c, d, e, f, or g)
- * 4.1 **(insert for 15 thru 26 section boilers)** The boiler shall be furnished with two gas trains. Each gas train shall be AGA certified and shall consist of (select option a, b, c, d, e, f, or g)

Option (a)

(Standard on 5006 thru 5009 with EI ignition, N/A on other sizes)

a 24 volt redundant combination gas valve with 100% shut-off and 1/8" NPT pressure tapping.

Option (b)

(Standard on 5010 thru 5026 with EI ignition)

a manual shut-off valve, pilot gas filter, pilot shut-off cock, gas pressure regulator, and two diaphragm gas valves.

Option (c)

a manual shut-off valve, pilot gas filter, pilot shut-off cock, gas pressure regulator, solenoid gas valve, and motorized gas valve with low-high-off operation.

Option (d)

a manual shut-off valve, pilot gas filter, pilot shut-off cock, gas pressure regulator, solenoid gas valve, and motorized gas valve with low-high-low operation.

Option (e)

a manual shut-off valve, pilot gas filter, pilot shut-off cock, solenoid gas valve, and a two stage

combination diaphragm valve/regulator with low-high-low operation.

Option (f)

a manual shut-off valve, pilot gas filter, pilot shut-off cock, gas pressure regulator, solenoid gas valve, and motorized gas valve with full modulation operation.

Option (g)

a manual shut-off valve, pilot gas filter, pilot shut-off cock, gas pressure regulator, low and high gas pressure switches, two motorized gas valves with on-off operation, normally open vent valve and second manual shut-off valve.

- * 4.2 (Low-High-Low firing rate controller to be used with Option (d) and (e)). A hi-lo firing rate controller shall be furnished. The controller shall be of the SPST type switch with a range of **130 to 240°F to open on temperature rise** (water boiler); **2 psi to 14 psi to open on pressure rise** (steam boiler).
- * 4.2 **(insert for 6 thru 14 section boilers** - Modulating firing rate controller to be used with Option (f). A modulating firing rate controller shall be furnished. The controller shall be 3 wire - 24 volt type with a potentiometer resistance of 135 ohms.
- * 4.2 **(insert for 15 thru 26 section boilers** - Modulating firing rate controller to be used with Option (f). A dual modulating firing rate controller shall be furnished. The controller shall contain two 135 ohm potentiometers, 24 volt type each capable of controlling a motorized modulating gas valve. Both potentiometers to work in unison.
- 4.3 Boiler ignition system shall be (select option a, b, c, d, e, f, or g).

Option (a)

(Note: This ignition system must be used only with gas control train option (a or b) of the EI type system which shall provide:

(insert for 6 thru 14 section boilers) (1) electrically ignited intermittent gas pilot

(insert for 15 thru 26 section boilers) (2) electrically ignited intermittent gas pilots

and permits the main gas valves to open only when the pilot burner is proven to be lit. Should a loss of pilot flame occur, the main gas valve will close and the spark will recur within 0.8 seconds. If pilot fails to ignite within 90 seconds, control will attempt to relight after 5 minutes. System shall include:

(insert for 6 thru 14 section boilers): (1) electronic ignition module, (1) electronic pilot assembly and (1) pilot gas valve.

(insert for 15 thru 26 section boilers): (2) electronic ignition modules, (2) electronic pilot assemblies and (2) pilot gas valves.

Option (b)

of the EO type electronic control system which provides manual ignition, 100% shut-off, continuous pilot flame operation, electronic supervision of pilot, 0.8 second flame response time, 15 second safety switch timing and shall include:

(insert for 6 thru 14 section boilers): (1) Honeywell RA890-F protectorelay, (1) pilot assembly, (1) pilot safety switch.

(insert for 15 thru 26 section boilers): (2) Honeywell RA890-F protectorelay, (2) pilot assemblies, (2) pilot safety switches.

Option (c)

of the OP type electronic control system which provides manual ignition of electronic pilot assembly, 100% shut-off, continuous pilot flame operation, electronic supervision of pilot, 0.8 second flame response time, 15 second safety switch timing and shall include:

(insert for 6 thru 14 section boilers): (1) factory prewired electronic control panel including: Honeywell RA890-F protectorelay, main power on switch and light, gas valve on switch and light, flame failure light and terminal strip, (1) pilot assembly, (1) pilot safety switch.

(insert for 15 thru 26 section boilers): (2) factory prewired electronic control panels each including: Honeywell RA890-F protectorelay, main power on switch and light, gas valve on switch and light, flame failure light and terminal strip, (2) pilot assemblies, (2) pilot safety switches.

Option (d)

of the EE type electronic control system which provides electric ignition of electronic pilot, 100% shut-off, intermittent pilot flame operation, 0.8 second flame response time, 15 second safety switch timing and shall include:

(insert for 6 thru 14 section boilers): (1) Honeywell RA890-F protectorelay, (1) pilot assembly, (1) pilot gas valve, (1) ignition transformer.

(insert for 15 thru 26 section boilers): (2) Honeywell RA890-F protectorelays, (2) pilot assemblies (2) pilot gas valves, (2) ignition transformers.

Option (e)

of the EP type electronic control system which provides electric ignition, 100% shut-off, intermittent pilot flame operation, 0.8 second flame response time, 15 second safety switch timing and shall include:

(insert for 6 thru 14 section boilers): (1) factory prewired electronic control panel each including: Honeywell RA890-F protectorelay, main power on switch and light, gas valve on switch and light, flame failure light and terminal strip; (1) pilot assembly, (1) pilot gas valve, (1) ignition transformer.

(insert for 15 thru 26 section boilers): (2) factory prewired electronic control panels each including: Honeywell RA890-F protectorelay, main power on switch and light, gas valve on switch and light, flame failure light and terminal strip; (2) pilot assemblies, (2) pilot gas valves, (2) ignition transformers.

Option (f)

of the OP-IRI electronic control system which provides manual ignition, 100% shut-off, continuous pilot flame operation, electronic supervision of pilot, 0.8 second flame response time, 15 second safety switch timing and shall include:

(insert for 6 thru 14 section boilers): (1) factory prewired electronic control panel including: Honeywell RA890-F protectorelay, main power on switch and light, gas valve on switch and light, alarm light and bell to indicate flame failure, purge timer and alarm silencing switch; (1) pilot assembly, (1) pilot safety switch, (1) gas train shall be furnished as specified herein as option (g). Paragraph 4.1

(insert for 15 thru 26 section boilers): (2) factory prewired electronic control panels each including: Honeywell RA890-F protectorelay, main power on switch and light, gas valve on switch and light, alarm light and bell to indicate flame failure, purge timer and alarm silencing switch; (2) pilot assemblies, (2) pilot safety switches, (2) gas trains shall be furnished as specified herein as option (g). Paragraph 4.1

Option (g)

of the EP-IRI type electronic control system which provides electric ignition, 100% shut-off, intermittent pilot flame operation, 0.8 second flame response time, 15 second safety switch timing and shall include:

(insert for 6 thru 14 section boilers): (1) factory prewired electronic control panel including: Honeywell RA890-F protectorelay, main power on switch and light, gas valve on switch and light, alarm light and bell to indicate flame failure, purge timer and alarm silencing switch; (1) pilot assembly, (1) pilot safety switches, (1) gas trains shall be furnished as specified herein as option (g). Paragraph 4.1

(insert for 15 thru 26 section boilers): (2) factory prewired electronic control panels each including: Honeywell RA890-F protectorelay, main power on switch and light, gas valve on switch and light, alarm light and bell to indicate flame failure, purge timer and alarm silencing switch; (2) pilot assemblies, (2) pilot safety switches, (2) gas trains shall be furnished as specified herein as option (g). Paragraph 4.1

(NOTE TO SPECIFIER: If the electronic control system above and the gas train suitable for IRI are to be used and your client's insurance is covered by IRI insurance, you should obtain prior approval of the equipment to be furnished in order to avoid conflicts with the IRI inspector after the installation is completed. We suggest the following paragraph be added.)

- 4.4 Contractor shall be prepared upon request to submit three (3) copies of wiring diagram, sequence of operation and schematic of gas train proposed to meet IRI requirements. These drawings must be suitable for submittal to local IRI insurance inspector.

