

**SECTION 15559: STEEL WATER TUBE BOILERS
RECOMMENDED SPECIFICATIONS FOR PARKER INDIRECT FIRED HOT WATER BOILERS
GAS OR PREMIX LOW NO_x FIRED**

PART I: GENERAL

1.01 PROCUREMENT SPECIFICATION FOR BOILER

1.02 DIVISION 16: ELECTRICAL

1.03 REFERENCES

- A. ANSI Z21.13: Gas-Fired Low-Pressure Steam and Hot Water Boilers
- B. ASME SEC I: Boiler & Pressure Vessel Codes, Rules for Construction of Power Boilers
- C. ASME SEC IV: Boiler and Pressure Vessel Codes, Rules for Construction of Heating Boilers
- D. ASME SEC VIII: Boilers and Pressure Vessel Codes, Rules for Construction of Pressure Vessels
- E. CSA: Directory of Certified Appliances and Accessories
- F. Intertek Testing Laboratories (ETL)
- G. NFPA 54 (AGA Z223.1): National Fuel Gas Code
- H. NFPA 58: Storage and Handling of Liquefied Petroleum Gases
- I. NFPA 70: National Electrical Code
- J. UL 795: Gas and Oil Equipment Directory
- K. Title VIII: California Code of Regulations
- L. Underwriters' Laboratories, Inc. (UL) Listed Products, UL Standard 795, for Commercial Industrial Gas Heating Equipment

1.04 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum twenty years experience.

1.05 REGULATORY REQUIREMENTS

- A. Conform to applicable code for internal wiring of factory wired equipment.
- B. Units: ETL or UL Certified as a Complete Gas Fired Boiler Assemblies.
- C. Gas Train shall comply with UL Standard 795 & ASME CSD-1. FM Approved, or IRI Approved Gas Trains are an option.
- D. Conform to ASME Section I & IV for boiler construction.
- E. Comply with local Air Quality Management District requirements. Local jurisdiction is _____.
- F. Units under 2MM BTU input shall be pre certified to SCAQMD Rule 1146.2

1.06 DELIVERY, STORAGE, RIGGING, MOVING, AND PROTECTION

- A. Transport, handle, store, and protect products to point of delivery and receiving (by contractor).
- B. Coordinate shipping dates and off-loading requirements with installing contractor prior to shipment.
- C. Protect boilers and accessories before, during, and after installation from damage to casing (or any other related components) by leaving factory shipping packaging in place until immediately prior to final acceptance.

1.07 WARRANTY

- A. Manufacturer's Warranty: Provide non-prorated warranty for not less than 20-years against damage caused by thermal shock at all normal operating conditions.
- B. Provide a 5-year prorated warranty from the date of start-up (period starts automatically 3 months from ship date if start up not performed prior to this date) from ship date against defects in workmanship and materials on the pressure vessel.
- C. Provide a minimum 1-year Parts Warranty from date of start-up, or 15-months from ship date.

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Page 2.**PART 2: EQUIPMENT****2.01 BOILERS****A. MANUFACTURER**

1. Parker Boiler Co., Model WH-_____ Indirect Fired Hot Water Boiler.

B. MANUFACTURED UNITS

1. The boiler shall be of flexible bent steel, water tube design, incorporating a built-in flange-mounted finned copper heat exchanger. The heater shall be fired with _____ fuel(s) , _____ BTUH input rating, _____ BTUH output rating, and shall be furnished complete and assembled, factory fired and tested with controls and trim, mounted and wired. Minimum heating surface of _____ square feet.
2. Indirect heating is accomplished by circulating low temperature (or secondary) water through the copper tube Heat Exchanger, which is mounted internally and immersed in the primary boiler water. The primary boiler water is contained in a naturally circulating closed system Bent Steel Tube Bundle and is heated in the furnace area. It rises to the upper header where the heat transfer into the secondary water occurs,, external downcomers allow natural circulation to be complete. The colder secondary water does not come into contact with the high furnace temperatures or into contact with the flue gas at all.
3. Electrical Characteristics as shown on drawings.

C. CODES & STANDARDS

1. The heater shall be manufactured in accordance with the ASME Section I & IV Code, and registered with The National Board of Boiler and Pressure Vessel Inspectors, for a minimum pressure of 125 PSI MAWP.. Relief valve to be furnished for _____ PSI pressure and operating controls for 180°F maximum temperature, or 190°F maximum temperature. Furnish with "H" Stamp Section IV.

All controls trim shall be in compliance with UL Standards. The standard atmospheric natural gas fired hot water boiler shall be furnished as an Underwriters' Laboratories, Inc. Listed Gas Fired Boiler Assembly and displays this symbol on the nameplate. Canadian, Propane, Outdoor and Low NOx Models shall be C-ETL or ETL Listed Industrial and Commercial Gas Fired Packaged Boilers, certified to Can1-3.1 and UL795. The unit shall also be UL Listed for potable water service.

D. CONSTRUCTION

1. The boiler shall be of bent water tube design with carbon steel tubes of minimum wall thickness 0.12" (11GA) 1-5/16" O.D. welded to top and bottom headers with high tensive weld metal. End of Headers to have accessible inspection openings. Tubing shall be staggered to provide a minimum of 8-pass self-baffled heating surface and designed with down-comers to provide internal self-circulation. The tubes shall be of the bent design to permit free expansion and contraction. The boiler shall be mounted on a steel frame and enclosed in a heavy steel cabinet with controls mounted.
2. The heat exchanger shall be flanged mounted into the upper header of the heater for easy removal for inspection and cleaning. The heat exchanger shall consist of integral finned copper tubes immersed in water and not exposed to combustion gases, brass tube sheet and bonnet. It shall be designed to effect maximum heat transfer from the primary boiler water surrounding it to the water circulating within it during operation.
3. The cabinet shall consist of an inner and outer liner of minimum 16-gauge steel insulated with a high-temperature thermal fiber insulation minimum 1-1/2" thick. A minimum of one (1) inspection door shall be provided on the cabinet for accessibility to the burners and tubes. The cabinet shall be finished in an attractive baked enamel heat resistant finish for long-life protection.

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4. The boiler shall be furnished complete with controls and trim to provide safe, efficient operation. standard trim items furnished with the boiler shall include electronic flame safety with electric ignition, draft hood or barometric damper, safety relief valve, temperature and pressure gauge, operating temperature control, manual reset high-limit temperature control LCD display heat exchanger water operating control (built for field mounting) $\pm 1^{\circ}\text{F}$ - 1 - 35°F differential, and Warrick Probe type manual reset low water cutoff with test and reset buttons. The boiler shall be furnished with an enclosed boiler control panel with hinged door, boiler controls and main burner switch, and fuse for over-current protection. The Parker-Lite Sequence Indicator System with indicating lights shall be provided on boilers over 2.5 million BTUH and all power burners.

2.02 CONTROLS & TRIM (Choose one (1) burner type ONLY):**A. ALL BOILERS**

1. All controls and trim shall be in compliance with UL Standard 795. The gas manifold shall include dual electric gas valves, gas pressure regulator, a main shut off valve and a leak test cock above 400,000 BTU. On boilers over 2.5 million BTUH provide primary motorized gas valve in addition to standard type and high and low manual reset gas pressure switches.

Standard trim items furnished with the boiler shall include electronic flame safety with electric ignition, draft hood or barometric damper, safety valve(s), sight glass with drain, pressure gauge, column drain valve try cock, main blowoff valve(s) (and header blowoff valves on boilers 70 HP and larger).

B. ATMOSPHERIC BOILERS

The burner shall be multiple cast iron atmospheric up-shot, self-aspiring burners with fixed orifice requiring no air adjustment. Type of firing shall be on-off, two-stage or modulating. Burner shall be for standard natural gas, 950 to 1150 BTU content and rated at 4" W.C. pressure at burner.

C. LOW NO_x BURNERS FOR _____ PPM NO_x (Specify If Required & Verify w/ Local APCD)

The boiler shall incorporate a fan assisted combustion system with a burner bed of multiple Metal Fiber Burners. These burners shall be linked to a single fan through a gas air premix manifold. The premix burners shall provide a high degree of NO_x level repeatability once system is adjusted. No filters shall be required.

The burners shall be capable of generating Low NO_x without generating significant CO emissions. NO_x emissions are guaranteed less than ____ PPM at 3% O₂ with CO emissions guaranteed less than ____ PPM @ 3% O₂.

The burners shall consist of a Metal Fiber hot face made from a iron chromium alloy. The Metal Fiber shall be backed by a layer of stainless steel. The Metal Fiber Burners shall provide a high degree of resistance to mechanical and thermal shock, fast cool down and corrosion resistance. Maximum pressure drop through burner at normal firing rates shall be 1.25" W.C.

On boilers equipped with modulation or two stage firing and units over 970,000 BTUH, a blower mixer which distributes a ratio controlled gas air mixture to the burners shall be utilized. Blower construction shall be non-sparking with totally enclosed motor. The gas air ratio shall be controlled through the throttling range by a characterizable fuel valve supplied as part of the blower mixer.

On boilers 970,000 BTUH input and below which are on/off fired provide single inlet blower. Housing shall be die cast aluminum with forward curve wheel. Gas shall be injected downstream of the blower. Air proving switch, blower starter and heat roll out switch shall be provided. Programming flame safeguard with interrupted pilot shall be provided.

The primary side shall include a 125 PSI ASME Steel Expansion Tank provided to accommodate primary side expansion.

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Designer Note: Delete items below which are not applicable for your project and/or add additional special trim as desired (consult factory).

F. FACTORY TRIM OPTIONS AVAILABLE

1. California Code Trim
2. Parker Lite Sequence Indicator System (std. 2.5 MM BTU & above)
3. All-Limit Alarm 4" Bell
4. All-Limit Alarm Terminals (dry contacts)
5. Anchor Clips, 4 mounted and drilled
6. Remote start-stop relay (24 VAC in from EMCS)
7. Factory Mutual Gas Train (FM Trim)
8. IRI Gas Train (meets & exceeds FM Trim)
9. Inlet flow switch to automatically prevent burner operation when low flow through boiler
10. Weather protective cover/outdoor trim for installation on non-combustible base
11. Non-combustible base shield
12. LPG firing (ETL Listed)
13. Draft Hood or Barometric Damper (specify Vertical or Horizontal Mounting Position when using barometric damper)
14. Less Heat Exchanger for Closed System Heating
15. Stainless Steel Exchanger, Bonnet and Tube Sheet for Secondary Storage Tank, side all stainless steel water
16. Low Temperature Service (swim pool or heat pump service)

NOTE:

Additional required equipment for an operable hot water system is required. See Sections _____ for pumps(s), expansion tank, air separators, pot feeders, and other accessories.

2.03 PERFORMANCE

Performance rating shall be in accordance with UL Testing and Rating Standard.

2.04 VENTING

Boilers equipped with draft hoods are suitable for UL Listed Type "B" Vent System. Units with Barometric Damper require UL Listed Chimney. Venting materials by installing contractor.

PART 3: EXECUTION

3.01 MANUFACTURER'S OR MANUFACTURER'S REP FIELD SERVICES

- A. The manufacturer or manufacturer's rep shall provide factory-trained technicians to properly start-up the equipment for maximum performance. Boiler shall be started and tested throughout entire firing range. Systems shall be tested in the presence of the designated owner's representative to demonstrate the system operation. Provide start-up report to the owner.
- B. Instruct operating personnel in operation and maintenance of units.