

**SUGGESTED
SPECIFICATIONS**

PEERLESS[®]
PUREFIRE[®]

Peerless[®] PureFire[®] High Efficiency Stainless Steel Boilers: PF-850 & PF-1000

1. GENERAL

1.1. SECTION INCLUDES:

- A) Condensing Boilers
- B) Boiler Controls

1.2. REFERENCE STANDARDS:

- A) American Society of Mechanical Engineers
 - ASME Boiler & Pressure Vessel Code, Section IV – Rules for Construction of Heating Boilers
 - ASME CSD-1 – Controls and Safety Devices for Automatically Fired Boilers
- B) American National Standards Institute
 - ANSI Z21.13/CSA 4.9 – Standard for Gas-Fired Low Pressure Steam and Hot Water Boilers
- C) Air conditioning , Heating and Refrigeration Institute
 - BTS 2000 Testing Standard – Method to Determine Efficiency of Commercial Space Heating Boilers
- D) National Fire Protection Association
 - NFPA 54 – National Fuel Gas Code

1.3. SUBMITTALS:

- A) Product Submittal Sheet: Provide submittal data sheet which lists performance, features, standard equipment and optional equipment
- B) Capacities and Pressure Drop: Provide total water capacity, expected pressure drop, gas pressure range, maximum length of vent/air intake piping and shipping weight.
- C) Dimensional Drawings: Provide detailed dimensional drawings that show overall length, width and height along with locations of all water, exhaust, air inlet, gas inlet and condensate drain connections.
- D) Manufacturer's Instructions: Provide Installation, Operating and Maintenance Instructions, including detailed wiring diagrams showing all required electrical connections.
- E) Electrical Ratings: Provide electrical supply specifications including current draw of the appliance and maximum rated draw of circulating pumps.

1.4. Regulatory Requirements:

- A) Boiler pressure vessel to be designed, constructed and tested in accordance with Section IV of the ASME Boiler and Pressure Vessel Code entitled, "Rules for Construction of Heating Boilers".
- B) ETL Listed in the United States and Canada. Certified in accordance with ANSI Z21.13/CSA 4.9 by Intertek Testing Services NA Inc.
- C) Each boiler shall be listed in the AHRI Certification Directory and shall bear the AHRI Certified Logo.
- D) Designed to meet ASME CSD-1 requirements for Controls & Safety Devices without additional separate equipment.
- E) Tested by Gas Consultants, Inc. in accordance with Rule 1146.2 Administrative Certification Program for California's South Coast Air Quality Management District (SCAQMD) for NOx Compliance (14 ng/J or 20 PPM corrected to 3% O₂).

1.5. QUALITY ASSURANCE:

- A) Each boiler is supplied with a Manufacturer's Data Report for Watertube Boilers, Form H-3, which provides full traceability of all pressure vessel parts to their raw materials.
- B) Each boiler is factory tested by the manufacturer to assure proper operation of the heating system.
 - The factory testing includes testing of each burner individually and both burners together at low fire and high fire.
 - A factory test report showing the satisfactory results of all combustion and controls tests is supplied with each boiler.

1.6. WARRANTY:

- A) 10 year limited Heat Exchanger warranty.
- B) 1 year parts warranty
- C) 1 year labor warranty (registered providers)
- D) Available extended service plans

2. PRODUCTS

2.1. MANUFACTURERS:

- A) PB Heat, LLC, Manufacturers of Peerless Boilers
- B) Approved equal conforming to these specifications.

2.2. PERFORMANCE:

- A) Full Load Thermal Efficiency 96% minimum as tested in accordance with BTS-2000, Method to Determine Efficiency of Commercial Space Heating Boilers by AHRI.
- B) Fully Modulating boiler(s) with 10:1 input turndown ratio capability.

2.3. CONSTRUCTION:

- A) Fully assembled, packaged, watertube, condensing boiler design certified for zero clearance to combustible construction and approved for installation on combustible floors.
- B) Pressure vessel to be designed, constructed and tested in accordance with Section IV of the ASME Boiler and Pressure Vessel Code for a maximum allowable working pressure of 160 psig and a maximum temperature of 210°F.
- C) All heat exchanger surfaces must be constructed of high grade stainless steel to prevent corrosion due to acidic condensation.
- D) The heavy gauge jacket and support structure shall be factory designed to allow stacking of identical units up to two high.
- E) The boiler shall have removable jacket panels to allow access for cleaning, inspection and service.
- F) The heat exchanger shall be designed with dual combustion chambers to facilitate dual combustion systems.
- G) Leveling legs shall be provided to assure level installation of the boiler on uneven floors allowing for proper condensate drainage.
- H) The exhaust connection shall be 6" stainless steel with a factory supplied adapter to 6" PVC.
- I) The air inlet connection, if required, shall be suitable 6" diameter plastic or metal pipe.
- J) The water connections shall be 2" NPT supply (outlet) and return (inlet).
- K) The gas inlet connection shall be 1-1/4" NPT.
- L) Connection for the condensate drain shall to be a 3/4" hose barb fitting.
- M) Maximum dimensions : 46" high x 27" wide x 40" Long

2.4. COMBUSTION SYSTEM:

- A) A dual, tandem, fully modulating, combustion system shall be provided to provide a maximum boiler turndown ratio of 10:1.
- B) Pneumatic gas valves shall be used to provide a consistent fuel/air ratio throughout the modulation range. The valve is to be mounted on the inlet to the combustion air fan to provide a thorough fuel/air mixture.
- C) Combustion air fans shall be powered by an electronically commutated brushless DC motor controlled with a pulse width modulated input with a tachometer feedback to the control system.
- D) Combustion air fans shall have integral venturi mixers to maximize fuel input capability with minimum electrical energy input.
- E) Ported, cylindrical, premix burner heads with a metal mesh sleeves shall be used in each combustion chamber.
- F) Flame supervision on each burner shall be through both the flame sensor and the ignition electrode for reliable operation.
- G) Ignition of the main flame shall be achieved by a direct spark from a high energy ignition system.
- H) Each combustion system shall incorporate a "flapper" valve to prevent back flow of combustion gases through an inactive burner while the other burner is operating.

2.5. ELECTRICAL:

- A) Electrical control cabinet with removable terminal strips for easy connection of power supply wiring, circulating pumps, outdoor sensor and central heating and/or domestic hot water demand signal wires.
- B) Electrical knockouts on the rear jacket support panel for all required component connections.
- C) Two service switches for interrupting power to individual control circuits.

2.6. CONTROL:

- A) Dual integrated control systems to provide primary safety functions, temperature operating control and burner sequencing.
- B) Integrated manual reset high limit and low water cutoff inputs to meet CSD-1 requirements.
- C) Factory installed high and low gas pressure switches.
- D) Factory installed vent temperature limit switch.
- E) Plain English display interface to explain burner operation and current status of each burner
- F) Front pixel display shows status, current supply temperature, target temperature, modulation rate of each burner, outdoor temperature, boiler demand type.
- G) Easy access to status of all connected boilers through the master boiler pixel display.
- H) Dual temperature operation to allow one boiler reset temperature target and one setpoint target for domestic hot water input. Configurable for two fixed setpoints if required.
- I) Factory equipped to allow control and sequencing of up to 16 boilers.
- J) Factory equipped for connection to serial communication (Modbus) from building management systems.
- K) Factory equipped with alarm contacts for remote annunciation of fault conditions.
- L) Installer/Service Menu allows flame signal status, logging of flame signal during the last ignition sequence, fault history, service notification, presets for reset calculation parameters.
- M) Control features for efficient operation:
 - Warm Weather Shutdown
 - Anti-Cycling Logic
 - DHW Tank Warm Hold
 - Temperature Boost
- N) Central Heating Modes: Multiple central heating modes
- O) Domestic Hot Water Modes: Multiple domestic hot water modes

2.7. EXHAUST/AIR INLET:

- A) Boiler(s) shall be suitable for direct, positive pressure exhaust operation with outside or indoor air.
- B) Boiler(s) shall include a stainless steel drain tee (shipped loose) with condensate connection to the neutralization system.
- C) Boiler(s) shall be designed to allow a single vent connection from a standalone boiler and common venting from multiple boilers.
- D) Boiler(s) shall incorporate a vent temperature sensor with control logic to limit the boiler input to regulate vent temperature if a problem should occur.

2.8. CONDENSATE SYSTEM:

- A) Boiler(s) are to include built-in condensate trap with neutralization
- B) The condensate collector shall allow visual inspection of neutralizer charge.
- C) Boiler(s) shall incorporate a blocked condensate switch to prevent operation condensate to back up into the combustion area.

2.9. ADDITIONAL COMPONENTS (LOOSE):

- A) ASME Rated pressure relief valve rated for the full input of the boiler at 30 psig relief pressure.
- B) Hardware required to mount relief valve to supply connection
- C) Temperature/Pressure Gauge – 0-320°F & 0-75 psig, 2 ½" Diameter
- D) 6" Stainless steel boot tee with test port and condensate drain
- E) 6" Stainless steel to PVC Adapter
- F) Outdoor Sensor
- G) Hardware for stacking boilers