



FTS Flextube Fired Steam Boiler – Sample Specifications

1. General

- 1.1. The (high or low) pressure steam boiler required shall be Precision Boilers model FTS – forced draft, (natural gas, propane, oil, natural gas/oil, or propane/oil) fired Flextube Steam Boiler.
 - 1.1.a. The boiler shall be rated at ___ MBH input. Boiler shall be designed for a maximum allowable working pressure of ___ psi and shall operate at ___ psi. Boiler shall be designed for ___V / ___ ph / ___ hz electrical supply with single point power connection.
 - 1.1.b. Complete package shall be UL Listed and shall bare the Underwriters Laboratories Label.
 - 1.1.c. Complete design shall be fully ASME compliant.
 - 1.1.d. Choose one of the below options:
 - 1.1.d.1. Boiler shall be completely factory assembled and tested, with controls and trim as specified.
 - 1.1.d.2. Boiler shall be designed to be completely field erected and tested. Boilers will be “knocked down” and packaged for field assembly. Each unit shall be field inspected by a third party Authorized Inspector and stamped in accordance with the ASME Code as well as National Board Registered. Each factory packaged boiler includes inner casing, insulation, outer casing, and trim. All code welding is to be completed in the factory prior to shipment of packaged components.

2. Pressure Vessel Construction

- 2.1. Complete assembly shall be constructed and stamped in accordance with ASME Section IV “H” stamp (15psi) or Section I “S” stamp (150 psi) for steam boilers and shall be registered with the National Board.
 - 2.1.a. Factory assembled boilers shall be submitted to hydrostatic testing witnessed by third party authorized inspector prior to shipment.
 - 2.1.b. Field erected boilers require hydrostatic testing to be witnessed in the field by third party authorized inspector after vessel assembly.
- 2.2. Vessel shall consist of upper and lower drums, flexible water tubes, and (2) downcomers.
 - 2.2.a. Upper and lower drums shall be fabricated from carbon steel of sufficient thickness and equipped with inspection openings as required by ASME code for ease of inspection and cleaning. Flexible water tubes shall be fabricated from 1 ½” diameter Carbon Steel tubes and be easily removed and/or replaced without welding/cutting to drums.
 - 2.2.b. Boiler tubes must utilize a 5-pass serpentine tube configuration as to insure an even flow of gases through the heat transfer area of the boiler as well as equal water flow. An upper plenum plate diverts the flue gases to burner end to facilitate flue gas recirculation if required.
 - 2.2.b.1. FTS series 1 – 3: Boiler tube’s serpentine tube configuration is to create a tangential water wall on the top, bottom, and one side of the combustion chamber. All tubes are to be removable for maintenance purposes from a single side of the boiler via removable inner and outer panels.
 - 2.2.b.2. FTS series 4 – 6: Boiler tube’s serpentine tube configuration is to create a tangential water wall on the top, bottom, and both sides of the combustion chamber. Tube removal access for maintenance purposes is required of both sides of the boiler via removable inner and outer panels.



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- 2.2.c. Boiler vessel must include (2) downcomers sufficiently sized to provide positive natural internal circulation of boiler water.

3. Combustion Chamber & Boiler Casing

- 3.1. The inner casing shall house 2 inches of ceramic fiber insulation between tangential tubes and 16 gauge steel inner casing. Once completely assembled, the inner casing shall provide an air tight seal, containing the combustion gases until they exit the flue vent.
- 3.2. There shall be an additional 2 inches of fiberglass/durable ceramic fiber insulation between inner casing and 16 gauge outer boiler cabinet panels.

4. Steam Boiler Piping Connections & Trim

- 4.1. Operating pressure control
- 4.2. Automatic reset high pressure limit
- 4.3. Manual reset high pressure safety limit
- 4.4. Dial type pressure gauge
- 4.5. Float type combination Level Control/LWCO
 - 4.5.a. Should be mounted in a water column adjacent to a water sight gauge glass assembly with protective rods and blowdown/drain valve
- 4.6. Auxiliary probe type low water cut off
- 4.7. ASME rated steam pressure relief valve(s)
- 4.8. Surface blowoff provision
- 4.9. Bottom Blowdown valves – (1) quick opening and (1) slow opening.
- 4.10. Burner mount shall be of the flanged type for easy removal during times of maintenance.
- 4.11. Boiler shall include a flame observation port in the rear of the vessel as well as in the burner assembly on the front of the vessel.

5. Burner and Controls

- 5.1. Provide forced-draft burner to burn (natural gas) (#2 oil) (natural gas/#2 oil) (propane) (propane/#2 oil) with (off-on)(low-high-low)(full modulation) firing rate control. Burner shall be equipped to fire at a maximum input of ____ BTU/hr at an elevation of ____ ft.
- 5.2. Blower motor shall be 3450 rpm design with motor starters (units over ¾ HP).
- 5.3. Burner controls shall conform to [UL795 (natural gas fired), UL726 (oil fired), and/or UL2096 (Low Nox natural gas fired)], CSD-1, (FM), (IRI) requirements.
- 5.4. For burners with electrical supplies other than 120V/1ph, the burner shall be equipped with a control circuit transformer.



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6. Packaging

6.1. Specify Factory Assembled or Field Erected

6.1.a. Factory Assembled Boiler

- 6.1.a.1. Boiler shall be completely factory assembled and mounted on a structural steel support frame. Lifting lugs are to be an integral part of the support frame to facilitate lifting and rigging.
- 6.1.a.2. All specified components will be factory mounted, piped, and wired.
- 6.1.a.3. Boiler shall be insulated with durable ceramic fiber and fiberglass insulating materials such that the outside surface temperature will not exceed 130°F during continuous operation at maximum firing rate.
- 6.1.a.4. Boiler is to be housed in a rectangular outer casing of 16 gauge steel and coated with a durable high temperature rated enamel finish.

6.1.b. Field Erected Boiler

- 6.1.b.1. Boiler shall be shipped factory disassembled and packaged for field assembly. All components will be labeled and packaged in a way which they have the ability to fit through a standard doorway.
- 6.1.b.2. No code welding shall be required in the field for final assembly.
- 6.1.b.3. Inner and outer casing pieces will be shipped with insulation and refractory factory installed for protection and to facilitate speedy assembly.

7. Quality

- 7.1. Boiler shall be manufactured by Precision Boilers in strict accordance with ASME Boiler and Pressure Vessel Code and ISO 9001 Quality System. Boiler shall meet all UL and CSD-1 requirements.

8. Warranty

8.1. Standard Boiler Warranty

- 8.1.a. Precision Boilers, standard warranty covers the burner & burner controls, (when the burner is purchased with the package) boiler controls and trim for a period of twelve(12) months from start-up or eighteen (18) months from the ship date or notice to ship, whichever comes first, when installed in accordance with Precision Boilers Operation/Service Manual.
- 8.1.b. This warranty covers controls, motors, gauges, valves, factory installed piping and wiring, which, from our inspection, are attributed to defects in workmanship or failure. This warranty does not cover damage or failures that are attributed, by our inspection, to improper water treatment, improper service wiring, or shipping damage. Precision Boilers does not warranty expendable items such as lamps, fuses, gaskets, etc.
- 8.1.c. Precision Boilers liability hereunder is limited to furnishing a replacement component or parts thereof, as deemed necessary by our inspection. Precision Boilers is not



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responsible for shipping, handling, installation and other costs associated with the removal and disposition of the component part. Any defective component shall be returned to Precision Boilers with prepaid shipping, for warranty evaluation. In no event shall Precision Boilers be responsible for any incidental, consequential or other damages, including, without limitation, any damages, resulting from loss of use of the boiler.

8.2. Thermal Shock Warranty

- 8.2.a.** In addition to the standard warranty, Precision Boilers warrants the pressure vessel of this boiler for a period of twenty-five (25) years from the date of shipment when installed in accordance with Precision Boilers' installation documentation and operated in accordance with Precision Boilers' Operation/Service Manual.
- 8.2.b.** This warranty covers leaks in drums, headers, tubes and downcomers (not including failed gaskets) which, from our inspection, are attributed to unequal or rapid expansion, typically referred to as "thermal shock", or stress cracking. This warranty does not cover damages or failures that are attributed, through 3rd party inspection, to corrosion, operation at low water level, accumulation of scale, sludge or dirt in the boiler, or other improper service, operation or neglect.
- 8.2.c.** Precision Boilers' liability hereunder is limited to furnishing a replacement pressure vessel or component thereof, as deemed necessary by Precision Boilers. Precision Boilers is not responsible for shipping, handling, installation, and other costs, including all costs associated with the removal and disposition of the old pressure vessel or component parts. In no event shall Precision Boilers be responsible for any incidental, consequential or other damages, including, without limitation, any damages resulting from loss of use of boiler.