

# **APACHE**

## **SPECIFICATION SHEET**

The following sample specifications are provided by Superior Boiler Works to assist you in providing your customer with the specific needs for that application. The sample specification is normally used as the base template for the boiler specification.

### **MODEL: APACHE 40 - 1500 HP**

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**APACHE** 2-Pass Steam Boiler, 40-1500HP, Section IV (0-15 PSI) and Section I (over 15 PSI)

The size and location of all connections, steam-disengaging area, furnace volume and steam storage volume can be found on Superior Boiler Works Form CAT8SB. (Issued 1-1-99)

Contact your local insurance carrier and State Boiler Inspector for the current insurance and code requirements.

### **1.0 Specification Overview**

- 1.1** The boiler shall be a 2-pass Apache dryback boiler manufactured by Superior Boiler Works. Model No. . The boiler shall not have less than five square feet of A.S.M.E. heating surface, measured on the fireside, per rated boiler horsepower.
- 1.2** The boiler is to be mounted on a structural steel base with a forced draft burner and burner controls. The boiler is to be designed, constructed and tested in accordance with the latest edition and addenda of the A.S.M.E. Boiler and Pressure Vessel Code and shall be registered with the National Board of Boiler and Pressure Vessel Inspectors.

**1.3** The boiler shall be designed for \_\_\_\_\_ PSI steam with an operating pressure of \_\_\_\_\_ in accordance with the latest edition and addenda of Section (I) or (IV), of the A.S.M.E. Boiler and Pressure Vessel Code.

**1.4** The steam boiler shall be completely pre-assembled and firetested at the factory to check construction, controls and combustion characteristics of the unit.

**1.5** Boilers smaller than 300 HP are to be constructed to meet the requirements of CSD-1; boilers 300 HP and larger are to comply with the requirements of NFPA8501. Boilers are to be built and equipped in conformance with the applicable UL standard.

## **2.0** **Structural Specification**

**2.1** The steam boiler is to be designed to produce a steam quality of 99% at all firing rates.

**2.2** The furnace is to be located in the bottom third of the boiler to provide for maximum heat transfer while being in contact with the coolest boiler water.

**2.3** All Section I boilers with 400 or more square feet of fireside heating surface are to have a furnace of the Morrison corrugated design and shall have a furnace volume of not less than \_\_\_\_\_ cubic feet.

**2.4** All tubes are to have a minimum wall thickness of .105" and have an OD of 2-1/2". The tubes on a Section I boiler are to be attached to the tubesheets by flare rolling and then beading the tubes to the tubesheet. The tubes on a Section IV boiler are to be attached by flare rolling.

**2.5** Turbulators shall be factory installed in all tubes to enhance the convective heat transfer coefficient.

**2.6** The boiler tubesheets on Section I boilers Model 8-750 and larger are to be a minimum of 3/4" thick.

- 2.7** The boiler shall be mounted on a heavy structural steel base with extended runners on the front to provide burner support and protection.
- 2.8** The rear saddles are to be slotted to provide for movement when the boiler expands from a cold to a hot condition.
- 2.9** All heating surfaces must be fully accessible for inspection and cleaning without disturbing the burner equipment. All boilers with 400 or more square feet of heating surface are to have a 15" diameter rear access plug in the rear door. The plug is to be gasketed and supplied with handles for ease of removal. The plug is also to be equipped with a Pyrex observation port and shutter assembly for the observation of the burner flame. The shutter assembly is to have a 1/2" tapping for the field connection of a manometer.
- 2.10** The rear turnaround area, tubesheets, and refractory are to be fully accessible when the rear door is opened. The rear turnaround area is to house the refractory blocks and bridge. The blocks and bridge are to be manufactured from a high quality castable insulating refractory equal to Plibrico LWI24. The rear door refractory is to be poured from the same material as the refractory blocks and is to be "one piece construction" with no baffles. The refractory is to be held in place with anchors welded to the rear door.
- 2.11** The rear door is to be supported by an extra heavy-duty davited hinge that is capable of supporting the door when it is being opened or shut. The hinge is to be positioned so that the rear door will open to the (right) (left) when viewed from the burner end.
- 2.12** The front doors are to be insulated with a 1" thick ceramic fiber blanket. The insulating blanket is to have a K-factor of .44 and is to be coated with a hardener to prevent erosion from the flue gases. Front doors on all boilers with 400 square feet or more in heating surface are to be of the davited design.
- 2.13** All doors are to be held in place by lugs that are secured by replaceable brass nuts. The doors are to be sealed with a gas tight, non-proprietary ceramic fiber rope with a minimum density of 20 lbs. per cubic feet. And a continuous use limit of 1800 °F.

**2.14** All necessary handholes and man holes shall be provided in accordance with the A.S.M.E. Code. Provide two additional handholes to improve the ease of waterside inspection and cleaning located in the front tubesheet near the bottom of the boiler on either side of the furnace.

**2.15** The front and rear tubesheets must be fully accessible for inspections or cleaning when the doors are opened (two in the front and one in the rear). Opening of the doors shall not be impeded by any fuel lines, linkage or electrical connections.

**2.16** The boiler shell is to be insulated with two inch thick, eight pounds per cubic foot density mineral wool with a K-factor of .27. The insulation is to be held in place by bands and then covered with a 22 gauge phosphate coated galvanized steel jacket. All opening in the jacket are to have trim rings.

**2.17** The entire boiler is to be painted with a high temperature, 400 F minimum, silicone based enamel. The front and rear doors are to be sand blasted before painting and the jacket is to be primed with a vinyl wash primer before painting.

### **3.0** **Connections**

**3.1** The boiler is to have \_\_\_\_\_ bottom blowdown connections.

**3.2** Section IV boilers are to be supplied with one factory piped and installed slow opening blowdown valve per boiler blowdown connection, and one slow opening valve per boiler blowdown connection, and one slow opening valve per boiler. The piping is to be documented on the Manufacturer's Data Report.

**3.3** The boiler is to be equipped with two lifting eyes.

**3.4** Two (size) feedwater connections on the horizontal center line shall be provided, one on each side of the boiler. Each connection shall be furnished with an internal baffle.

**3.5** One set of feedwater valves (one gate valve and one check valve) the same size as the boiler feedwater connection is to be factory piped and installed on

one of the feedwater connections. The piping is to be documented on the Manufacturer's Data Report Form.

- 3.6** A (size) flue gas connection shall be located at the rear of the boiler on the top centerline. The stack shall be designed for easy attachment of the exhaust flue by allowing for a slip connection. The flue gas connection will be designed to support a minimum of 2,000 lbs. dead weight. The stack shall have a 1/2" connection for a stack thermometer.
- 3.7** A one-inch surface blowdown connection complete with a dip tube shall be provided.
- 3.8** One set of surface blowdown valves (a gate type shutoff valve and a calibrated flow control valve) are to be factory piped and installed on the boiler. The piping is to be documented on the Manufacturer's Data Report.
- 3.9** The steam connection will be a (size) class (300# Section I) (150# Section IV).
- 3.10** Boilers with 500 square feet or more of fireside heating surface are to be supplied with a low fire hold connection located on the bottom third of the shell.
- 4.0** **Boiler Trim**
- 4.1** A float type primary low water cut-off and pump control shall be provided with gage glass, ball check gage glass valves, try-cocks and a ball type water column blowdown valve.
- 4.2** A probe type secondary low water cut-off shall be provided.
- 4.3** A high limit control with manual reset shall be provided in addition to the operating control.
- 4.4** A firing rate controller if the burner is low-hi-low or modulating shall be provided.

**4.5** Relief valves set at a minimum of 17% higher than the operating pressure of the boiler, but no higher than the boiler design pressure shall be provided.

**4.6** A pressure gauge with an inspector's test cock shall be provided.

## **5.0** **Factory Firetest**

**5.1** The factory firetest shall be a complete functional test conducted at 10 PSIG (Section IV) or 100 PSIG (Section I) and at a minimum, is to consist of filling the boiler with water and operating the burner throughout its complete range of operation. Additionally, all of the components wired into the boiler safety control circuit are to be tested by simulating a failure condition. A copy of the firetest report is to be included in the manual.

**5.2** Upon completion of the factory firetest, the boiler shall be cooled and hydrostatically tested and the boiler external piping documented. The unit shall be ready for installation and final connection of water, steam, fuel, blowdown, electrical and flue.