

**Hurst Boiler & Welding Co., Inc.**

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**SERIES VIX STEAM BOILER SAMPLE SPECIFICATIONS (30-125 HP, 30-300 Psi)  
VERTICAL FIRETUBE BOILERS**

**1.0 Boiler Characteristics**

- 1.1 The boiler shall be Hurst Boiler & Welding Co., Inc., Series VIX  hp designed for  psig. The boiler operating pressure shall be .
- 1.2 The boiler shall have a maximum output of  Btu/hr, or  horsepower when fired with oil, natural or propane gas, 1,000 Btu/cu. ft. Electrical power available shall be  volt  cycle  phase.

**2.0 Pressure Vessel Construction**

- 2.1 The two pass vertical firetube boiler is to have the burner mounted in the center of the boiler at approximately mid height so as to provide for easy access for servicing. Mounting of burners at the bottom of the boiler or from the top of the boiler is not acceptable. Adequate hand holes must not be exposed to the fireside of the boiler. Boiler will make use of XID type boiler tubes with enhanced heating surfaces. The use of "pipes" or straight tubes is not acceptable.
- 2.2 Fireside heat exchange areas must be accessible from the top and bottom of the boiler. Removable access plates are to be provided with brass nuts. The flow of flue gasses shall not include swirlers, turbulators, or other add on devices. The use of flame retainers or baffles in the combustion chamber is not acceptable.
- 2.3 The boiler furnace crown shall be water-cooled and not less than 3/8" thick. The boiler shell shall not be less than 5/16" thick. Boiler tubesheet shall be 1/2" or thicker. The burner shall fire into the water-cooled furnace and shall not pass under the bottom mud ring of the boiler. A boiler blowdown connection shall be provided in the bottom of the boiler. The steam chamber shall cover the entire top of the boiler with convection rods for dry steam delivery.

- 2.4 Unit(s) shall be provided with minimum 2" thick mineral wool insulation. The boiler shall be lagged with 22-gauge thick carbon steel jacket. The boiler jacket shall feature a bottom side primer of polyurethane resin base coat of .2 mil. dry finish thickness and a final coat of .4 mil. dry thickness of valspar. The top side (exterior) of the jacket shall feature a primer of .3 mil. Dry finish thickness and a final coat of .8 mil. dry finish thickness of valspar polyurethane resin base paint. The application of the paint is to be automated roller type and is to be oven dried. The exterior finish of the boiler jacket shall have a limited warranty by the manufacturer for five (5) years from the date of manufacture for chalking, fade, peeling, or blistering.
- 2.5 The entire boiler base frame and other components shall be factory painted before shipment, using a hard-finish enamel coating.

### **3.0 Steam Boiler Trim**

#### **3.1 Water Column**

A water column shall be located on the right hand side of the boiler complete with gauge glass set, and water column blowdown valve. Provide a gauge glass protector.

#### **3.2 Low Water Cutoff**

The low water cutoff shall be included and wired into the burner control circuit to prevent burner operation if the boiler water level falls below a safe operating level. Use a Warrick probe type water level control with automatic reset device.

#### **3.3 Auxiliary Low Water Cutoff**

Auxiliary low water cutoff shall be included, and wired to the burner control circuit. A manual reset device shall be used on this control. Use a Warrick conductance type control.

#### **3.4 Safety Valves**

Safety valves of a type and size to comply with ASME Code requirements shall be shipped loose. Provide a drip pan elbow for each valve for installation by the installing contractor.

#### **3.5 Steam Pressure Controls**

The steam pressure control to regulate burner operation shall be mounted near the water column. Controls shall be a high limit (manual reset), operating limit (auto reset), and firing rate control. Provide auto low fire hold aquastat with high pressure well.

#### **3.6 Boiler Valves**

3.6.1 Provide a ¾" stainless steel chemical feed quill with a built in check valve, factory mounted on boiler.

3.6.2 Provide a 316 stainless steel water sample cooler, factory mounted on boiler.

3.6.3 Provide factory mounted feedwater stop and check valves. The stop valve shall be a ball type and the check valve is to be wafer type with spring.

3.6.4 Provide factory mounted and piped bottom blowdown assembly including one (1) quick opening and one (1) slow opening blowdown valves, all piped to a common blowdown header discharge at the rear of the boiler.

3.6.5 Provide a top mounted surface blowdown assembly including a factory supplied and mounted skimmer tube, and an automatic surface blowdown controller which opens and closes an electric valve based on intermittent operator selected intervals measuring the conductivity of the boiler water.

3.6.6 A factory supplied main steam valve shall include an O S & Y gate valve. It shall be factory hydro tested with the boiler and included on the ASME P6 data report.

#### **4.0 Burner**

4.1 The combination burner shall be of the forced draft annular port flame retention type suitable for burning natural or manufactured gas pressure atomizing type for burning No. 2 oil. The burner shall burn the specified quantity of fuel without objectionable vibrations, noise, or pulsation with no CO in the products of combustion. (The burner shall meet < \_\_\_\_\_ ppm Nox while firing on natural gas utilizing flue gas recirculation technology). The burner shall be factory installed and wired, shall bear the listing mark of Underwriters Laboratories, Inc. evidencing compliance with requirements of UL-796 for gas burners and UL 296 for oil burners. The entire boiler and burner unit shall be factory fire tested prior to shipment with a copy of the fire test being supplied to the owner.

#### **4.2 Burner Design**

A burner fan shall furnish all combustion air, which shall be an integral part of the burner. The burner fan and motor shall be mounted below the horizontal centerline of the boiler for ease of maintenance and inspection. The burner air control louver shall be of the low-pressure drop, inlet type to allow visual checking of the louver settings, and ease of cleaning or adjustment. The burner shall have an air flow safety switch to prove combustion flow. The burner shall have an interrupted gas-electric ignition system with a 6,000-volt ignition transformer. An observation port shall be provided in the burner to provide observation of both the pilot and main flame.

#### **4.3 Gas Pilot**

The gas pilot shall be the premix type with automatic electric ignition, complete with electronic flame scanner to monitor the pilot so the primary fuel valve cannot open until pilot flame has been established. The gas pilot train is to consist of shut-off cock, pressure regulator, and automatic gas valve.

#### **4.4 Gas Train**

The main gas train shall be mounted on the boiler and shall include the following: A manually operated gas cock at the inlet to the train, a gas pressure reducing regulator, a motorized automatic gas valve, a second automatic gas valve, and a manually operated leak test cock

located down stream from the automatic gas valve. The gas train shall include high and low gas pressure switches to monitor the gas pressure.

## **5.0 Fuel Oil System**

### **5.1 Oil Pump**

The oil pump set shall consist of an oil pump with a capacity of twice the firing rate of the boiler, and motor mounted on a base. The oil pump assembly shall also have the following: oil pressure relief valve, suction strainer, vacuum and pressure gauge, and motor starter. The oil pump assembly shall ship loose for field installation.

### **5.2 Oil Piping**

The oil burner piping shall include automatic oil safety valve, oil metering valve, fuel filter, and all necessary piping, and linkages for full modulation operation, all mounted and piped on the unit. Pressure gauge shall be provided to indicate oil pressure and air atomizing pressure. The unit shall have a low air pressure switch interlocked to prevent burner operation in the event of air pressure failure.

### **5.3 Control Panel**

The factory pre-wired control panel should be mounted on the burner proper or on the side of the boiler to allow for ease of maintenance and troubleshooting. The control panel shall contain the following items: Electronic flame safeguard, control circuit transformer, motor starter, control circuit fuse, numbered terminal strips, and indicating lamps for major functions. The control panel shall include a manual-automatic selector switch and a damper motor positioning switch to permit automatic firing in accordance with load demand or manual control of the firing rate at any desired point between low fire and maximum rate. Changeover from one fuel to the other shall be accomplished by flipping a switch. No burner adjustment or linkage change shall be necessary when going from one fuel to the alternate fuel. The electronic flame safeguard shall be complete with all necessary accessories and devices to control ignition and starting and stopping of the burner, to provide pre-combustion purge and post-combustion purge, and to shut down the burner on failure of ignition, pilot, or main flame by the electronic scanner.

### **5.4 Codes and Standards**

The boiler shall be inspected by an authorized inspector and be registered with the National Board of Boiler and Pressure Vessel Inspectors. The package boiler shall carry an Underwriters Laboratory label "B." The boiler-burner unit shall meet the requirements of  (U.L. or F.M. or GE Global)

## **6.0 Efficiency Guarantee**

6.1 The boiler must be guaranteed to operate at a minimum efficiency of  percent at 100 percent of rating when burning natural gas and  efficiency at 100% firing rate when burning oil

## 7.0 **Warranty**

7.1 All equipment is to be guaranteed against defects in materials and/or workmanship for a period of 12 months from date of shipment.

## 8.0 **Execution**

### 8.1 Tests

The packaged boiler must receive factory tests to check the construction, controls, and operation of the unit. The purchaser, if desired may witness all tests.

### 8.2 Start-up Service

After boiler installation is completed; the manufacturer shall provide the services of a field representative for starting the unit and training the operator at no additional costs. A factory approved and authorized start-up report shall be submitted to the customer/user at the time of start-up.