

# HST Horizontal Surge Tanks

## With Gold Pump Package

The deaerator surge tank shall be a Bryan Model \_\_\_\_\_ horizontal transfer type boiler feed system, with a tank size of \_\_\_\_\_ (60 to 1,000) gallons design to operate at \_\_\_\_\_ PSI boiler relief valve setting with a total boiler capacity of \_\_\_\_\_ lbs/Hr or \_\_\_\_\_ boiler HP.

### **SURGE TANK:**

- A. The surge tank capacity rating shall exceed the capacity of the steam system it is servicing. The surge tank shall be of atmospheric design and be able to accept all condensate returns from the entire steam system including gravity returns, pumped returns, and high pressure returns from steam traps if necessary. All returns to the surge tank shall be identified and discussed with the manufacturer to accommodate the system. The surge tank shall be provided with a pump sized for the full capacity and a back-up or standby pump also sized for the full capacity. The pumps will run continuous feeding the deaerator through the modulating feedwater valve supplied with the deaerator. The surge tank shall be provided with a lining suitable for this service to protect the carbon steel vessel from corrosion or made of stainless steel. Access to the inside of the tank shall be made available through a minimum 12x16 manhole. Other connections and openings shall be added as required to accommodate the steam system and to provide trim items for a complete packaged system.
- B. The surge tank is to be fully trimmed by the manufacturer including the following items:
1. **Low Level Control:** An external float type control is to be supplied to monitor a low level condition. A low level shall ring an alarm bell and light a red light on the control panel notifying the operator. The control shall also shut off the pumps protecting them from harm.
  2. **High Level Control:** An external float type control is to be supplied to monitor a high level condition. A high level shall ring an alarm bell and light a red light on the control panel notifying the operator. The high level control shall be activated before the water reaches the overflow level.
  3. **Make-Up Water Assembly:** A water level controller and make-up water valve is to be supplied to monitor the level of water in the surge tank and add make-up water when necessary for continued operation.

4. **Misc. Gauges:** A temperature gauge shall be supplied and installed by the manufacturer. The gauge shall be sized suitable for the operation and design range of the surge tank. A gauge glass shall be supplied and installed to indicate the water level in the tank. The gauge glass shall be protected from objects by metal protectors and have shut off valves on both ends.
  5. **Alarm Package:** The alarm package shall consist of a Nema 12 enclosure with alarm bell, alarm silencing switch, and high and low level red lights to indicate by sound and visually a high and low level alarm condition.
- C. The surge tank shall be supplied from the manufacture with a pump package which shall include the following:
1. **Stand:** The stand shall be structurally sound and designed for the weight of the unit. The stand height shall be governed by the net positive suction head required by the transfer pumps and the boiler feed pumps if the suction piping is connected.
  2. **Pump(s):** Pump size shall be based on full capacity of the system with one pump used as a full capacity standby. Two pumps are required. The pump shall be a vertical multistage pump (Armstrong VMS, Goulds SSV, Grundfos CR, or similar) with stainless steel impellers and a minimum of 250F seals. The pump motors shall be 3-phase, TEFC motors.
  3. **Pump Mounting and Piping:** The pump(s) shall be mounted to the base. The pump suction piping shall include a vortex breaker, gate valve, strainer, and flexible connector for each pump. The pump header shall also have provisions to be tied into the deaerator pump suction header. Pump discharge piping shall include a liquid filled pressure gauge with shut-off valve and pump throttling valve. Suction and discharge piping shall be sized based on a maximum velocity of 4 ft/sec of rated flow. All suction and discharge components will be factory installed. Piping may be taken apart at the unions or flanges for shipment.

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4. Pump Electrical Components: The pump shall be supplied with a TEFC motor. Each pump shall have a thru-the-door (3-phase) pump disconnect switch and 3-phase protection by Class LPJ fusing or similar fuse. The pump shall also be protected from the following: undervoltage, overvoltage, motor overload, ground fault, and phase to ground short. Each pump will have its own variable frequency drive with pressure transducer and pressure controller. The VFD will modulate the pump's output based on a 4-20 mA signal from the transducer. A pressure controller with display shall be provided for ease of start-up and setting the pump discharge to a desired pressure. The circuit for each pump shall also be provided with the following digital displays: Frequency (Hertz), Current (Amps), and Voltage (Volts). An on/off switch and pilot light shall also be provided for each pump. All pump electrical components shall be wired and factory checked before shipment. A fused control circuit transformer shall also be provided to reduce the 3-phase supplied power to 120/1/60 for the control circuit. The complete surge tank system will have single point electrical connection located in a UL listed Nema 12 control panel. Liquid tight conduit shall be used between the panel and external electrical items mounted on the surge tank system package.

### SAMPLE SPECIFICATION

#### BRYAN SURGE TANK & DEAERATOR SYSTEM

Furnish and install a surge tank and deaerator system. The surge tank shall collect the condensate return from the system and have the capability of adding make-up water when required. The surge tank will then pump the water to the deaerator in a continuous fashion through a modulating feedwater valve that is controlled by a level controller on the deaerator. Both tanks shall have a minimum 10 minutes storage capacity to their respective overflows. The deaerator and surge tank shall be separate tanks in order to keep the steam system running when the deaerator needs inspection by local and state authorities (since being an ASME vessel) or for maintenance giving back-up and another alternative to keeping the steam system online. Under these extreme emergencies the boiler feed pumps can draw water from the surge tank by piping the suction connection from the surge tank to the suction side of the boiler feed pumps. Provisions for this piping shall be made available from the manufacture by supplying connections in the headers of the deaerator suction piping and the surge tank suction piping. Connection of these suction headers shall be done in the field. Combination deaerator/surge tank in one tank with recycling is not acceptable and provides no back-up or alternatives during tank inspection or maintenance. Deaerator and surge tank will be provided by same manufacture to coordinate pump suction connections and over-all compatibility.