

Recommended Specifications

Furnish and install one (1) Lockwood Model _____ ST two-stage, spray tray deaerator with internal vent condenser and integral storage section. The deaerator shall be rated at _____ pounds per hour (outlet capacity including condensed steam). The deaerator shall be guaranteed to:

1. Heat the feedwater to the saturation temperature corresponding to the steam pressure within the heater.
2. Reduce feedwater oxygen content to 0.005 cc/liter as determined by the Heat Exchange Institute method, Winkler method, or any modifications outlined by the ASTM.
3. Reduce the free carbon dioxide in the feedwater to zero as determined by the APHA method.
4. Operate with minimum noise at all flow rates from 3 percent to 100 percent of outlet capacity.

The deaerator shall be constructed of SA-516 grade 70 carbon steel plate with minimum thickness of 1/4", designed for _____ PSIG pressure in accordance with the latest revision of ASME Code, and shall be so stamped. The deaerator shall incorporate T-316 stainless steel spray valve(s) with 303 stainless steel spline(s) mounted within the tray compartment. The internal direct contact vent condenser, fabricated of stainless steel, shall consist of a separate compartment for concentrating the non-condensable gases before they are released to atmosphere. The final stage of deaeration shall be accomplished by using a tray system designed to heat the water with the entering steam to saturation temperature. The trays shall be constructed of grade T-304 stainless steel, with 0.050 inches minimum thickness. The trays shall be interchangeable and designed to incorporate a capillary action for the water cascading to each lower tray. The internal parts of the deaerating heater, including the tray enclosure, baffles, vent connection, and vent collecting hood, shall be constructed of 12 gauge, T-304 stainless steel. All trays are to be fabricated using TIG welding process. One piece formed and riveted trays shall not be permitted. Flow of steam shall be such that the steam entering the heater first contacts the hottest water which is leaving the last row of trays, and then proceeds upward through the tray stack in a true counter-current fashion. Deaerator shall provide _____ cubic feet of storage (_____ gallons) measured to the overflow level. This storage shall be equivalent to _____ minutes of the rated outlet capacity. Deaerator shall be operable from _____ PSIG.

The entire assembly shall be factory pre-assembled and shall consist of the following components:

1. One (1) _____ pound/hour horizontal deaerator with the following accessories:
 - a. One (1) - sentinel relief valve.
 - b. One (1) - vent valve.
 - c. One (1) - water level gauge glass assembly with shut-off cocks and protective rods to cover the full water level travel.
 - d. One (1) - vacuum breaker.
 - e. Two (2) - stainless steel dial thermometers with separable sockets.
 - f. One (1) - pressure gauge with syphon pipe and cock.
 - g. One (1) - (mechanical) (pneumatic) (electrical) make-up water valve with controller, strainer and by-pass assembly.
 - h. One (1) - self contained overflow trap.
 - i. One (1) - pressure reducing valve and strainer for steam supply to deaerator.
 - j. Adequately sized atmospheric back pressure relief valve(s).
 - k. One (1) - high water alarm switch.
 - l. One (1) - low water alarm switch.

All above components shall be piped with the exceptions of the steam supply valve, inlet steam strainer, and back pressure relief valve(s). Piped assemblies may be removed to facilitate shipping.

2. Heavy structural steel support stand for elevating deaerator above pumps to avoid pump cavitation. Deaerator may be removed from support stand to facilitate shipping.
3. _____ boiler feed pumps (turbine type for intermittent service) (centrifugal type for intermittent/continuous service), each mounted on heavy support base integral with tank support stand, driven by _____ HP, _____ RPM, _____ V, _____ phase, 60 Hz (open, drip-proof) (totally enclosed, fan cooled), ball bearing motor. Each pump shall be sized to deliver not less than _____ GPM of 230°F water against a total discharge pressure of _____ PSIG.
4. Interconnecting piping between deaerator storage vessel and boiler feed pumps, to include shut-off valves and strainers.
5. NEMA 12 control cabinet complete with motor starters, (disconnect switches) (fuse blocks) (circuit breakers), control transformer, alarm relays, alarm silencer button, alarm horn, lights, etc. Wiring to be in accordance with the National Electric Code.

The deaerator shall be selected based upon the following condition:

1. _____ PSIG make-up water supply.
2. _____ PSIG saturated steam supply.
3. _____ PSIG maximum boiler design pressure.
4. Make-up water to deaerator to be approximately _____ % of total inlet flow at _____ °F.
5. Low pressure condensate to deaerator shall be approximately _____ % of total inlet flow at _____ °F.
6. High pressure condensate to deaerator shall be approximately _____ % of total inlet flow at _____ °F.

Any deviations from, or exceptions to, the above specifications must be clearly stated in the bid. Otherwise, bidder will be expected to furnish equipment exactly as specified herewith. All components shall be furnished by one manufacturer for single responsibility. The equipment shall be guaranteed to be free from defects in material and workmanship for a period of fifteen (15) months after shipment or twelve (12) months from date of installation, whichever period shall first expire.

The specifications contained in the bulletin were effective at the time of publishing. Lockwood Products, Inc. reserves the right to discontinue products at any time or to change specifications or design without incurring any obligation.

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