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U.S. Deaerator Company. For all your deaerator, boiler feed, condensate, and water heating equipment needs.

INSTALLATION AND OPERATING INSTRUCTIONS TRAY TYPE DEAERATORS AND DEAERATING HEATERS

Read the instructions through completely before starting the installation

INSTALLATION

RECEIVING SHIPMENT

Transportation facilities permitting, the deaerator will be shipped assembled except for external accessories. It will have been hydrostatically tested before shipment. Unload the shell carefully. The piping, valves and accessories are normally boxed separately and shipped individually.

LEVELING

The shell of the deaerator must be leveled to insure uniform water distribution and proper deaeration. Use the straight side of the dome for leveling. The deaerator should be bolted to a sufficiently strong floor.

PIPING AND FITTINGS

Water and steam lines should be brought to the deaerator and attached to the proper nozzle in such a manner that no strain is exerted which might pull the tank out of plumb; all piping must be supported independently. See Tray Installation Drawing for mounting of spray pipes.

Refer to the assembly drawings and attach the accessories to the connection provided.

TRAYS

There are two types of tray bundles to be installed. The heating trays consist of six tiers of water retaining pans and are to be mounted on the top leveling angles. The air separating trays contain six tiers of slotted trays and are installed on the bottom angles in the tray compartment. See Tray Installation Drawing.

TRAY INSTALLATION

1. After the deaerator has been installed and leveled, open the tray access and the deaerating compartment doors.

2. With a level and rod check and adjust the leveling angles in all directions to assure that the trays will be level after installation.

3. Install and level the heating trays on the top leveling angles to assure uniform distribution and spilling.

   CAUTION: Proper deaeration is dependent upon level tray stacks and placement of the air separating trays with all upper tray slots facing in the same direction.

4. Check the tray bundles with a level and if not, level remove them and readjust the leveling angles.

5. Install the bottom layer of air separating trays making sure that all of the bundles are placed so that all top tray slots slope downwardly in the same direction.

6. Install the remaining layers of air separating trays on top of the first layer making sure again that the top tray slots face in the same direction as the top tray slots of the first layer.

7. Close and bolt the deaerating compartment and tray access door.

8. If vent piping is used see Vent Piping Layout Drawing.

OPERATION

PRELIMINARY

During the start-up or shutting down of the deaerator the heat load placed on the deaerator should never exceed the heat load for which the deaerator was designed.

Before placing the unit into service for the first time or when it has been out of service for an extended period, carefully check the following:

1. The deaerator is level.

2. All pipe lines, tanks and other equipment are flushed out, made water tight and tested. Until lines are thoroughly clean it is well to protect pumps by placing screens in the suction connections.

3. Relief valves are in proper working condition. The relief valves should be lifted by hand while starting up to check operation.

4. Steam and water are available and valves in these lines and the deaerator outlet have been closed.

5. Ascertain that all isolating valves to the accessories are open.

STARTING UP

1. Open the vent valve on top of the deaerator.

2. Partially open the water inlet isolating valve to allow the deaerator storage section to fill slowly at a rate not exceeding 15% of the design flow rate.

   CAUTION: A float operated water inlet regulating valve is wide open until the storage section is filled to the operating level. The flow of the water must be throttled so that the design capacity of the deaerator is not exceeded, which may damage the spray pipes.

3. As the storage section fills, check the water level in the gauge glasses and make necessary adjustments to level alarms or controls as the water level reaches that control. If an overflow trap is supplied, allow the storage to overflow by holding open the inlet regulating valve and check the action of the overflow device for proper operation.

4. Close the water inlet isolating valve and drain the storage section of all old contaminated, non-deaerated water accumulated during testing.

5. With the vent valve remaining open and the water inlet valve closed, “crack” open the steam inlet valve and allow the deaerator to heat slowly to the operating temperature.

6. When the deaerator has reached operating temperature, open the steam inlet valve wide.

7. Again, partially open the water inlet isolating valve to allow the unit to fill to the working level maintaining at all times a plume of steam from the vent to assure heating of the inlet water.

8. When the storage section has been filled to the operating level, open the inlet water isolating valve wide. At this time the level operating controls will take over the operation of the inlet valve.

9. Open the valve in the pump suction line and start the pump.

10. Throttle the vent valve on the vent condenser until the steam emitted is reduced to a small plume one or two feet high.

11. If surges are experienced or expected during normal operation, it is advantageous to partially throttle the isolating valve in the makeup water line to even out the surge condition and assure the proper heating and deaeration of the makeup water.

12. It is a good practice to pump deaerated water to waste or to a source not needing completely deaerated water until the effluent water has reached the approximate saturation temperature of the operating steam.

NORMAL OPERATION

During normal operation the vent valve should be throttled so that there is always a plume of steam escaping. Excessive throttling will result in "air blanketing" during which the oxygen and carbon dioxide gases accumulated in the vent condenser cannot escape causing incomplete deaeration.

The temperature of the deaerated water should be maintained at the saturated temperature of the steam in the shell. A wide variation of steam and water temperature may be due to "air blanketing" resulting from an insufficient vent rate. The vent rate may be increased by opening the manually operated air vent valve on the vent condenser. To ascertain that a temperature variation is not due to faulty thermometers, reverse the position of the steam and water thermometers and again check the temperature.

Periodic inspection is advisable on operating controls, protective devices, overflow mechanism and the safety valve.

SECURING UNIT (Shut down)

1. Shut down boiler feed pump if the entire system is to be secured. If only the deaerator is to be secured, isolate the deaerator from the boiler feed line.

2. When the water demand has been removed from the deaerator the float controlling the inlet valve will rise and close the inlet valve.

3. When the water rises to the shut-off point, close off the steam supply.

MAINTENANCE

The U. S. Deaerator does not require frequent maintenance during normal operation. It is recommended that the interior be inspected for possible evidence of corrosion or incrustation during annual inspection periods.

During operation, gauge glasses and thermometers should be kept clean. Thermometers should occasionally be checked for accuracy. A quick check may be made by switching thermometers and noting any change in temperature.

Protective devices such as the overflow device and relief valve should occasionally be hand operated or tripped to check proper operation. Do not clean stainless steel parts with muriatic or hydrochloric acid.

REPAIR AND REPLACEMENT ORDERS

The handling of repair and replacement orders will be facilitated if the following instructions are carefully observed.

1. Give the manufacturer's shop order number as appears on the nameplate of the deaerator.
2. Give the number found on the title page of the instruction book.
3. Designate the part required by the number in the instruction book.
4. Specify the quantity of each part required.
5. Give complete shipping instruction.