

Flashtanks

Purpose

Advise customers to inspect flashtanks and associated piping installed in once-through boiler bypass systems.

Background

Flashtanks are installed in once-through (UP) boiler bypass systems for use during start-ups, shutdowns and low load operation. Some systems use flashtanks to vent steam during boiler trips for overpressure relief as well. A once-through boiler, by design, requires that a minimum feedwater flow be maintained in the furnace circuits at all times while the unit is being fired to prevent overheating. During start-ups, fluid from the boiler convection pass enclosure and primary superheater is directed to the flashtank, where the steam and water is separated and distributed. Flashtank drains are used for deaeration and feedwater heating. The steam is used to warm, roll and load the turbine. The excess water is dumped to the condenser.

As load is increased, less and less of the flow is diverted to the flashtank until all flow from the furnace, the convection pass, and the superheater goes directly to the turbine. Thus the flashtank is backed out of the system as load is increased.

Problem

Flashtanks and bypass piping can experience high temperature gradients, especially when flow is suddenly diverted into this system, which can occur during the over-pressure relief mode of operation. Sudden operation of the boiler bypass or flashtank steam and drain valves can impose both mechanical and thermal stresses on the flashtank and pip-

ing. These stresses can cause fatigue damage, especially to the flashtank internals. As any damage is cumulative, older units, units that are cycled, and units that experience frequent shutdowns and trips are most prone to experience these problems.

Recommendation

Operating and maintenance procedures should be reviewed to include the following items:

Operational Procedures—Make sure that the flashtank and bypass piping is kept at a warm standby condition at all times when the boiler is in operation. The minimum recommended flashtank pressure should be maintained (refer to your unit Operating Instructions).

Maintenance Procedures—Thorough visual inspections should be done annually for the following:

1. **Flashtank Lubrite Expansion Pads**
Check for improper expansion or any interference problems (see Figure 1).
2. **Flashtank Internals/Steam Separating Equipment**
Check for signs of corrosion, erosion or cracking. Check all bolts and acorn nuts to assure they are tight. Loose acorn nuts and bolts should be tightened and tack welded. Check the perforated plate for tightness and ensure it is not damaged (see Figure 2).
3. **Overpressure Relief Valve**
Check the opening speed of the valve to make sure it is as specified.
4. **External Piping Hangers and Supports**
Inspect external piping hangers and supports for:
 - Cracks in pipe hangers and welds.
 - Cracks in pipe saddles and welds.
 - Cracks in shock and sway suppressors and welds.
 - Proper hot and cold positions on constant load hangers.

After 15 years of operation, the flashtank should be inspected for the following:

1. **Flashtank Inlet Nozzles**
Check for corrosion, erosion and cracks. Magnetic particle or liquid dye penetrant method should be used, particularly in the weld regions.
2. **Flashtank Welds**
Examine all accessible internal longitudinal and circumferential welds for degradation, such as

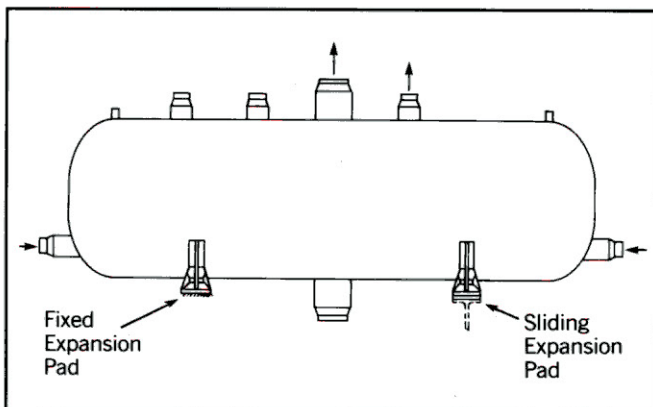


Figure 1 Typical flashtank.

chemical attack. Magnetic particle or liquid dye penetrant methods should be used in the weld regions. Replication is also recommended to evaluate the degree of damage that may have occurred.

3. External Piping Hangers and Supports

Inspect external piping hangers and supports. Liquid dye penetrant inspection methods are recommended for hanger and saddle welds.

4. Piping

Inspect welds, especially if problems are encountered with hangers and supports. Magnetic particle dye penetrant is recommended for hangers and supports. Ultrasonic shear wave testing and replication is recommended for pipe welds.

5. Flashtank Manhole Openings

Check for cracks around opening and at the seat (see Figure 3). Magnetic particle dye penetrant test is recommended.

Any problems found in these areas should be corrected to ensure unit reliability. More extensive inspections should be done per above recommendations. Future inspections should be three to five years thereafter, based on the last inspection results.

Support

Please contact your local Babcock & Wilcox Field Service Engineering Office if you have any questions, require more information, or require assistance in doing this inspection.

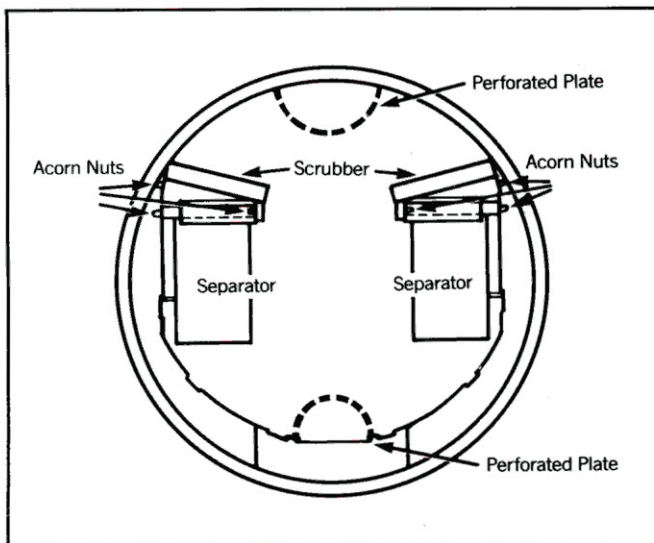


Figure 2 Typical steam separating equipment.

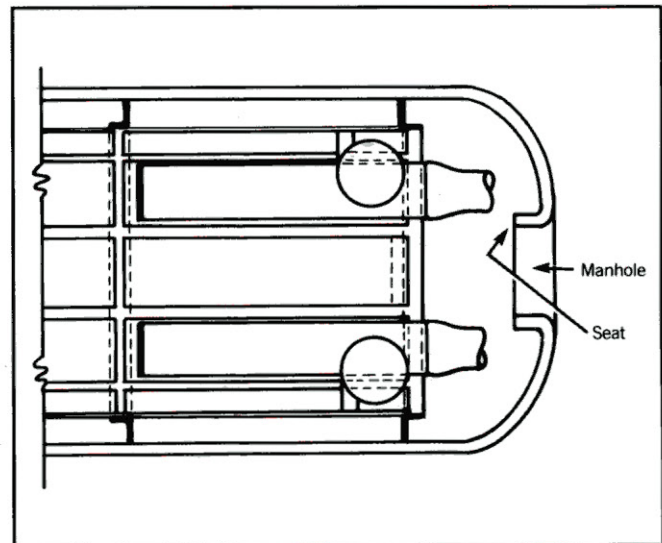


Figure 3 Typical flashtank manhole.

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