April 2014

STEAM TRAP WITH INCORPORATED STRAINER (MODEL ST8000SS)

OPERATION, INSTALLATION AND MAINTENANCE INSTRUCTIONS

DO NOT THROW AWAY AFTER INSTALLATION
SAVE AND DISPLAY PROMINENTLY WHERE THIS EQUIPMENT IS USED

WARNING

HIGH PRESSURE AND HOT LIQUID SPRAYS CAN CAUSE SERIOUS BODILY INJURY.

CAUTION: DESIGNED FOR SATURATED STEAM ONLY. IMPROPER USE, INSTALLATION OR MAINTENANCE CAN RESULT IN SERIOUS INJURY.

INSTALLATION AND MAINTENANCE SHOULD ONLY BE DONE BY A QUALIFIED PROFESSIONAL. SUPERKLEAN IS NOT LIABLE FOR ANY INJURY THAT IS A RESULT OF IMPROPER USE, INSTALLATION OR MAINTENANCE.

WHY ARE STEAM TRAPS REQUIRED?

For any steam system to operate properly a method must be used to remove the condensate, air and other non-condensable gases such as carbon dioxide from the steam.

CONDENSATE:
When steam releases its heat energy in a heat exchanger making hot water, from a radiator heating a room, from a steam pipe transferring steam or from any process application, the steam reverts back to water. This water, technically referred to as condensate, must be separated from the steam and removed from the system or the system would back up with water. The removal of condensate from steam is considered the primary function of the steam trap.

AIR:
Air exists in all steam pipes prior to system start-up when the system is cold. This air must be bled out of the piping system so that the steam can enter and eventually reach the designated process applications. If the air is not removed, the steam will effectively be blocked from entering the steam pipes by the residual air. In addition to blocking the steam, air acts as an insulator to heat transfer. Even after the system is filled with steam, small amounts of air can re-enter the system thru various paths such as boiler water make-up systems and vacuum breakers.

NON-CONDENSABLE GASES:
Gases other than air such as carbon dioxide exist inside steam systems. These non-condensable gases must also be separated from the steam and removed from the system for all processes to operate properly. In addition to inhibiting steam flow and proper heat transfer, carbon dioxide can be very corrosive to components in the system.

THERMODYNAMIC STEAM TRAPS

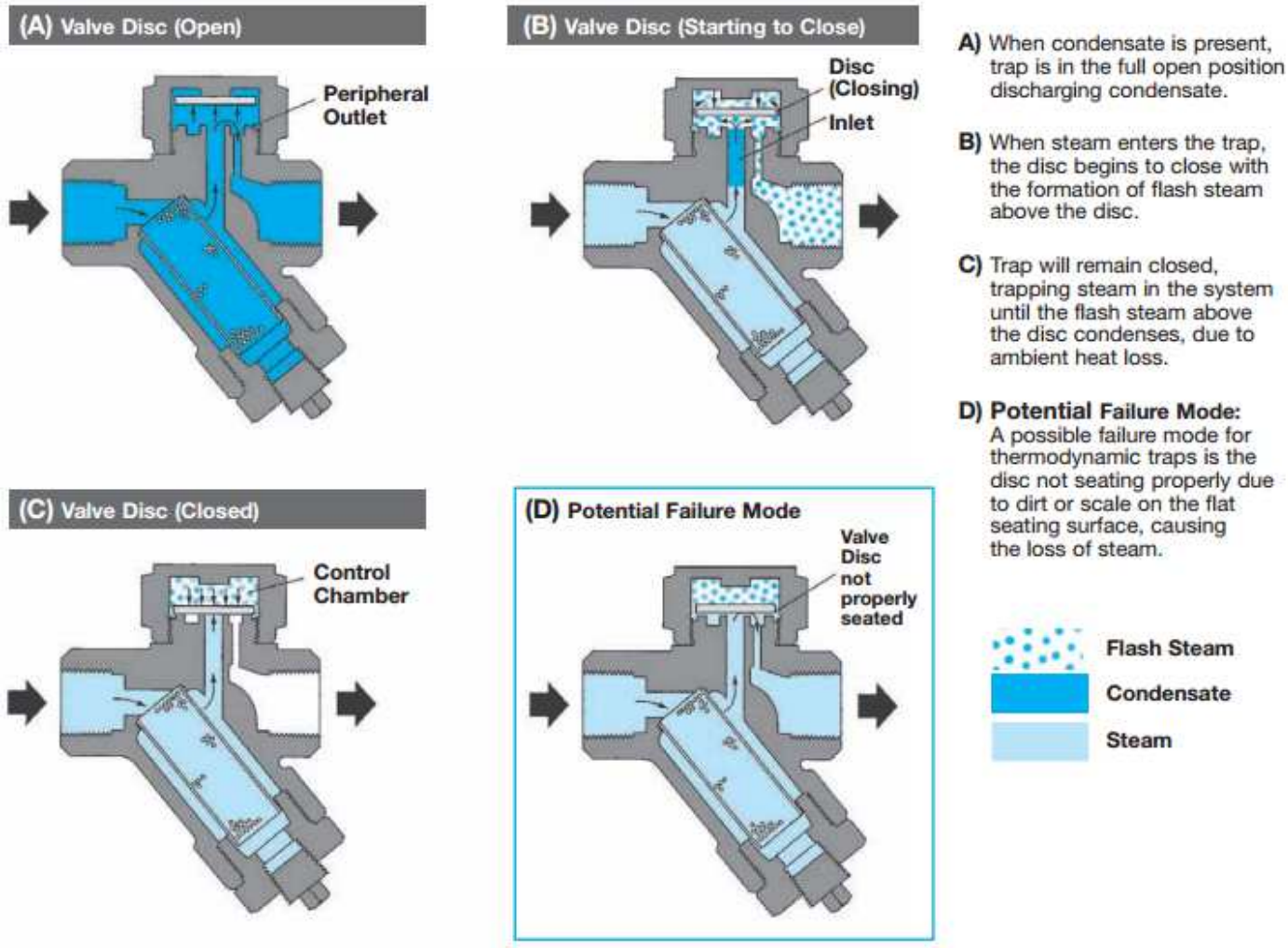
Thermodynamic steam traps operate in a cyclic on/off process using the thermodynamic properties of flash steam as it flows through the trap. Thermodynamic traps use only one moving part, the valve disc, which allows condensate to escape when present and closes tightly upon the arrival of steam. These traps have an inherently rugged design and are commonly used as drip traps on steam mains and supply lines. Their solid construction and single moving part

make them resistant to water hammer and are freeze proof when installed vertically. Thermodynamic traps will only discharge small amounts of air and therefore are typically not used in process applications.

OPERATION:

As inlet pressure to the trap increases, the disc lifts off the seat and allows the unwanted condensate to escape through the peripheral outlet surrounding the inlet (Figure 1A). As hot condensate reaches the disc chamber, it creates flash steam in the chamber (Figure 1B). This flash steam travels at high velocity from the inlet to the outlets, creating a low pressure area under the disc. Some of the flash steam bypasses the disc and enters the top of the chamber, creating a buildup of pressure above the disc. This differential pressure causes the disc to close against the seat, trapping the steam (Figure 1C). The flash steam above the disc is the only force opposing the pressure from the inlet condensate, keeping the valve closed. As heat transfer takes place in the upper chamber, the flash steam condenses and the pressure above the disc reduces. When the pressure above the disc falls to a point that is less than the pressure of the incoming condensate, the disc will lift again and repeat the cycle (Figure 1A). Cycle time is dependent on steam temperature, and more importantly, ambient temperature outside the trap. Since the amount of time the valve is closed is primarily dependent on the heat transfer from the flash steam to the ambient environment, frequent cycling of the valve can occur in cold or wet environments. Applying an insulating cap over the cover of the trap will reduce the cycle rate.

Figure 1:



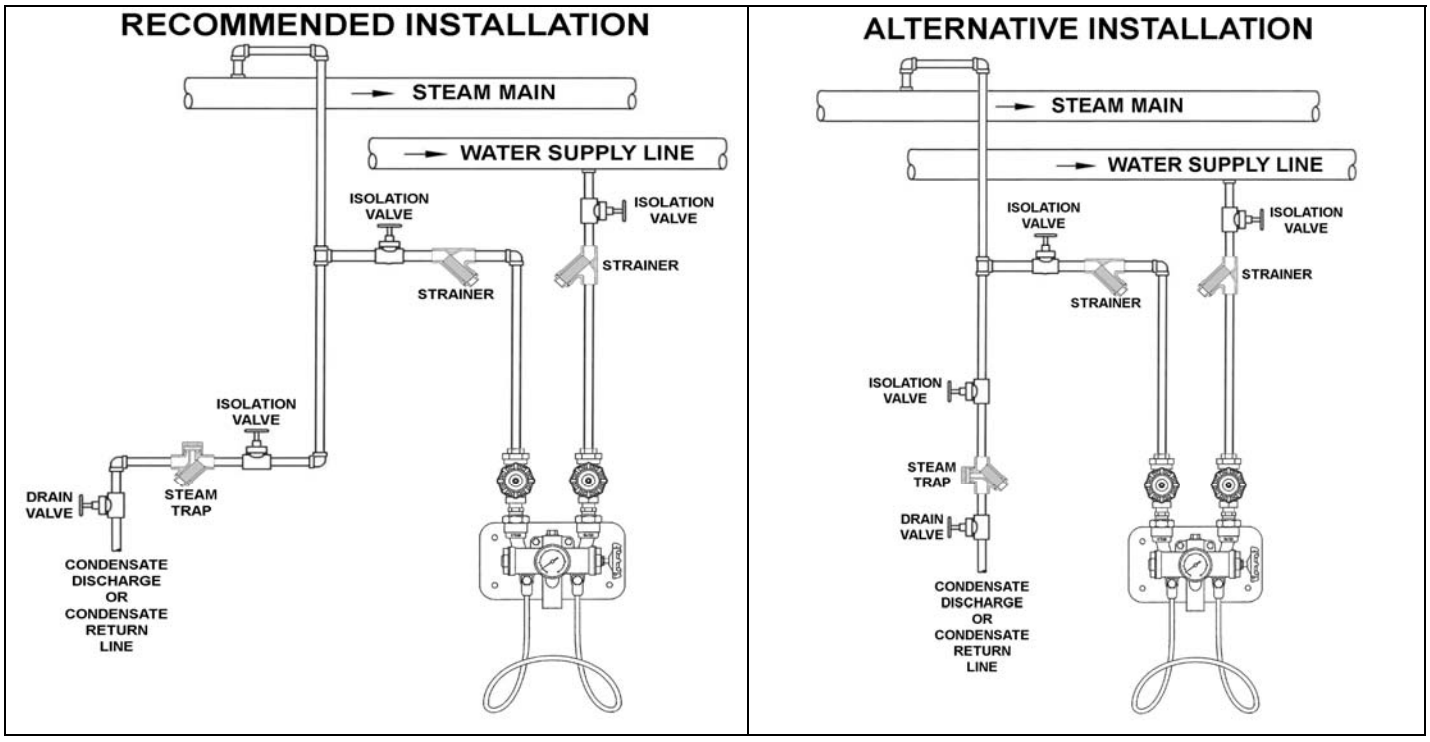
SuperKlean Washdown Products

INSTALLATION:

1. Check materials, pressure and temperature and their maximum values. If the maximum operating limit of the product is lower than that of the system in which it is being fitted, ensure that a safety device is included in the system to prevent over pressurization.
2. Determine the correct installation situation and the direction of fluid flow.
3. Remove protective covers from all connections and inspect inlet to confirm free of debris, where appropriate, before installation on steam or other high temperature applications.
4. Install a suitable isolation valve to allow for safe maintenance and trap replacement.
5. The trap should preferably be installed in the horizontal plane as close as possible to equipment being drained, with a drain valve following it. Strainer (20 mesh) is not required as steam trap incorporates strainer in its current design. Piping to and from the trap should be at least equal to or one size larger than trap connection. Do not weld pipe connection to trap. For freeze resistant installations, all drains must be pitched toward the trap for gravity flow. Trap must be installed vertically, discharging downward. Discharge piping must be self-draining.
6. Consideration should be given to a suitable method for testing the correct operation of the trap. This may be a sight glass system. Sight glasses must be positioned a minimum of 3 feet (1 meter) downstream of trap. Where the trap discharges into a closed return system, a non-return valve should be fitted downstream to prevent return flow.
7. Always open isolation valves slowly until normal operating conditions are achieved - this will avoid system shocks.
8. Check for leaks and correct operation.

Note: If the trap is to discharge to atmosphere, ensure it is to a safe place. The discharging fluid may be at a temperature of 212°F (100°C).

TYPICAL STEAM TRAP & STRAINER INSTALLATION WITH DURAMIX 8000 STEAM & COLD WATER MIXERS



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MAINTENANCE:

Note: Before actioning any maintenance program observe safety information.

General information:

1. Before undertaking any maintenance on the trap it must be isolated from both the supply line and return line and be allowed to cool to room temperature.
2. Maintenance should be done without disturbing the piping connections.
3. The trap should be disassembled periodically for inspection and cleaning of the disc and seat.
4. When reassembling, make sure that the joint faces are clean.
5. Maintenance can be completed with the trap in the pipeline, once the safety procedures have been observed.
6. It is recommended that new gaskets and spares are used whenever maintenance is undertaken.
7. Ensure that the correct tools and necessary protective equipment are used at all times.
8. When maintenance is complete open isolation valves slowly and check for leaks.

How to service:

1. Unscrew the cap using a suitable open-end wrench or socket. Do not use Stillson wrench or a wrench of similar type which may cause distortion of the cap.
2. If the seating faces on the body are only slightly worn, they can be refaced by lapping on a flat surface, such as a surface plate. A figure-of-eight motion and a little grinding compound gives the best results. If the wear is too great to be rectified by simple lapping, the seating faces on the body must be ground flat and then lapped. The disc should always be replaced with a new one. The total amount of metal removed in this way should not exceed 0.010” (0.25 mm).
3. When reassembling, the disc is normally placed in position with the grooved side in contact with the body seating face.
4. Screw on the cap with reasonable torque so as to allow new gasket to seal.
5. When service is complete open isolation valves slowly and check for leaks.

How to clean or replace the strainer:

1. Unscrew the strainer cap using a suitable open-end wrench.
2. Withdraw the screen and clean. If damaged, replace with a new one.
3. To reassemble, insert the screen into the strainer cap, then screw the strainer cap into place. Care should be taken to ensure that the new gasket and gasket faces are clean.
4. Tighten to reasonable torque so as to allow gasket to seal.
5. When maintenance is complete open isolation valves slowly and check for leaks.