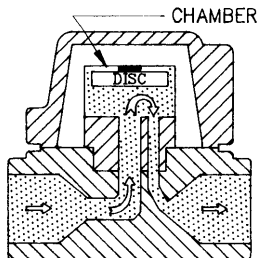


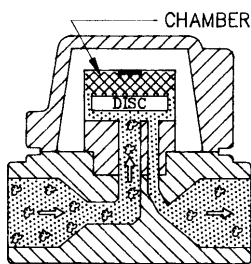
# THERMODYNAMIC STEAM TRAPS

Essentially, a thermodynamic steam trap is a time cycle device which responds to imbalances of pressure applied to a valving device, usually a disc.



**FIGURE 9**

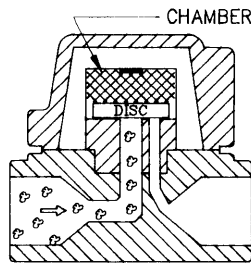
**Figure 9:** Pressure caused by air or condensate lifts the disc permitting flow through the trap.



**FIGURE 10**

**Figure 10:** When steam arrives at the inlet port, blowby at a high velocity creates low pressure under the disc. Some of the flashing condensate is

blown past the disc into the upper chamber, forcing the disc downward.

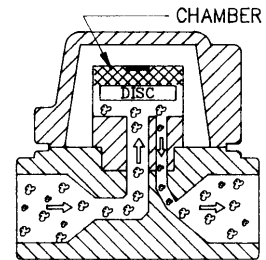


**FIGURE 11**

**Figure 11:** Further flow is stopped when sufficient pressure is trapped in the chamber above the disc. During operation, a decrease in chamber pressure permits inlet pressure to lift the disc and open the trap (**Figure 9**).

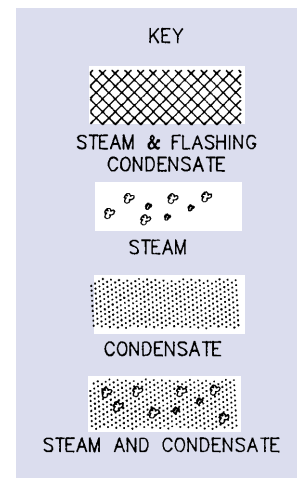
The decrease in the chamber pressure should only be caused by the presence of cooler condensate. Due to the design of most thermodynamic traps, especially in cold or wet conditions, the chamber may be prematurely cooled causing improper or frequent cycling as well as steam loss and increased wear. Advanced TD designs have a steam jacket which surrounds the chamber and prevents ambient conditions affecting the operation of the disc.

This type of trap is also subject to water binding. If water pressure is trapped above disc, trap will fail closed.



**FIGURE 12**

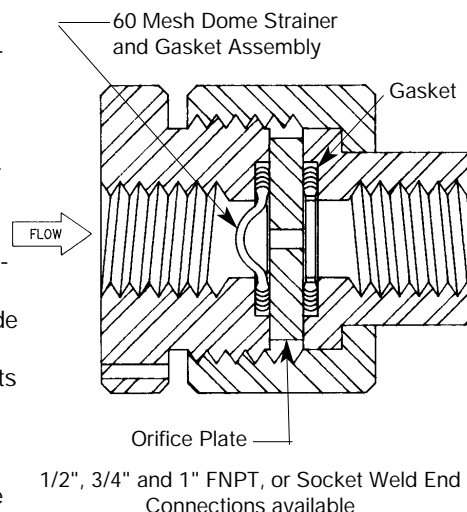
**Figure 12:** Trap is easily affected by dirt and/or other foreign matter which will cause trap to fail open.



# ORIFICE STEAM TRAPS

Orifice type traps are engineered continuous flow devices. Orifice traps discharge air, condensate and all other non-condensable gases with minimal live steam loss.

The fixed orifice size is calculated, for a given application, to discharge the condensate load at maximum thermal efficiency. Approximately 10 to 25 percent of discharging hot condensate flashes to steam at the downstream side of the orifice, at a constant pressure drop. This flashing effect further restricts the flow of saturated steam. In actual conditions, a minimum percentage of steam, by weight, is discharged with condensate, since the specific volume



of steam is relatively large compared to that of the condensate.

The velocity through the orifice is highly turbulent. The initial calculated steam loss can be expected to remain relatively constant over the expected trap life of 10 plus years.

The major factor for energy efficient performance is based on initial orifice sizing for the application. Properly sized, thermal efficiencies of 98 percent plus can be attained.

While Orifice Traps can be applied at all pressures, they are ideally suited for use on saturated or superheated steam 250 PSIG or greater.