
Steam System Best Practices

Document No. 3

Steam Trap Leak Rates

Q: Does a New Steam Trap Leak Steam? A: Yes!

Q: What is the leak rate?

When purchasing a new steam trap, request documentation describing the steam leak rate per the specification of ASME 39.1. A very important item that must be reviewed when purchasing steam traps is the steam leak rate. The steam leak rates will vary depending on the manufacturer and design of the steam trap.

A. New Steam Trap Leaks Steam

It may be surprising to hear that a new steam trap will leak steam but indeed, every steam component has an associated leak rate. Leak rates can be as specific as 1 oz per 100 years. The fact to understand is that all new steam devices leak a certain percentage of steam even when newly installed into a steam system. The most important factor is identifying the percentage or quantity of steam leakage.

Leak testing standards for steam traps began in the early 1980's by ANSI/ASME.

The ASME Code PTC 39.1 is described by ASME as follows:

“This Code covers devices used in removing condensate and non-condensable gases from steam systems. It covers devices used for intermittent or continuous removal of fluids such as steam traps, orifices and valves. The purpose of this Code is to specify and define the practice of conducting tests of condensate removal devices to determine: (a) Condensate discharge capacity, for specified conditions of saturated and sub cooled condensate and back pressure. (b) Steam loss, under specified conditions.”

Why Should We Care?

Take for example, a steam trap that is offered to industry today and has a tested leak rate of 9.5 kg of steam per hour. With steam costs averaging Bht 318.5 per thousand kg today, this steam

trap could cost the plant a large quantity of energy dollars. Steam costs are ever increasing. Therefore, the method we choose to purchase steam traps must take on a new economic factor which may not have been considered even four (4) years ago.

Let's look at an example:

$9.5 \text{ (kg per hour leak rate)} \times 24 \text{ hours} = 228 \text{ kg of steam leaking per day}$

$228 \text{ kg} \times 365 \text{ (days a year operation)} = 83,220 \text{ kg of steam leaking per day}$

$83,220 \text{ divide by } 1000 = 83.22 \text{ (kg of steam leaking per thousand)}$

$83.22 \times \text{Bht } 318.5 \text{ (average cost of } 454.5 \text{ kg of steam)} = \text{Bht } 26,505.57 \text{ a year}$

This is the cost of the leak rate designed into the trap. Assume a facility employs 20 steam traps with this particular leak rate.

$20 \text{ traps} \times \text{Bht } 26,505.57 \text{ (cost of leak rate per trap)} = \text{Bht } 530,111.4$

The resultant yearly energy loss is calculated to be Bht 530,111.4

In today's energy pricing, this is an unacceptable economic loss and steam leakage rate.

What Can We Do?

When purchasing steam traps, specify the amount of steam leakage as outlined in ASME PTC 39.1. Steam system component consumers can insist on specific designs and products that will make our steam systems more efficient.

In some instances, a higher initial price for a product will be offset by the lower costs associated with implementation of a more efficient design. This price difference may be recovered in less than 12 months.

Evaluation of Steam Traps to be Purchased

When purchasing steam traps, review the performance of the new steam traps that are being considered for installation into the steam system. If a new steam trap has a substantial steam leak rate, the steam trap will decrease in performance over a very short period of time.

Best Practices

1. Steam leak rates must be an additional factor to be considered when choosing steam traps.
2. Require steam leak rates per ASME PTC 39.1 on each steam trap design and manufacturer that is currently being purchased or under consideration.