



Diagnosing and Preventing Steam Trap Failures

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Owners and operators of industrial, commercial, and institutional facilities understand the high costs associated with steam trap failure. The often-overlooked steam trap is a mechanical valve that opens, closes, or automatically modulates steam. Despite the basic nature of the steam trap, they demand proper and consistent maintenance. When closely monitored, a failing or failed steam trap can be either repaired or replaced before they cost the user precious time and money. To maintain a high-level of steam trap performance, there are a few critical tasks you must complete.



Type of Steam Traps

To build a successful maintenance plan you must first understand the equipment you are working with. When it comes to steam traps, there are four major types in use today. These include:

- **Mechanical Traps** – Often referred to as Float Traps or Bucket Traps, Mechanical Traps feature a float that is raised or lowered relative to the condensate levels. An attached mechanical linkage opens and closes the valve.
- **Temperature Traps** – As temperatures rise and all, contractions cause this trap to move off or onto a seat. One of the benefits of these traps is their ability to cool steam before release by withholding condensation.
- **Thermodynamic Traps** – These strong but simple traps work by reacting to the velocity of the flow of compressible and incompressible fluids. The valves of thermodynamic traps open due to static pressure. Once steam begins to condense, the pressure is reduced and the trap opens for it to flow out.
- **Venturi Nozzle Traps** – Unlike other traps that operate on relatively basic principles, these traps are much more complicated. These innovative traps utilize the physics of two-phase flow for removing condensate from steam systems. The steam and condensate move through the Venturi nozzle via a series of staged steps. These traps require design engineers to properly size and fit for specific steam systems.

Why Do Traps Fail?

There are many causes of steam trap failure. Though each situation is unique, there are typical reasons for steam trap failure; these include wear, blockage, or improper selection during the design phase. Both wear and blockage failures are due to regular operation; however, you can attribute excessive wear or blockage to upstream issues. Let's take a closer look at each of these reasons for failure.

- **Wear** – As with any piece of equipment, no matter the quality, time and usage will lead to wear. Failures due to wear are naturally occurring during the normal operation of a steam system. The key in stopping wear-related failure is predicting life-span. Accomplishing this task takes a combination of actions including referring to the OEMs service life projections and using and documenting personal experience.

- **Blockage** – It is obvious that no steam trap will function if the flow of steam is blocked. Breakage or failures of a steam trap due to a blockage typically take place when debris is carried by the condensate and clogs the trap. A blockage can also impede condensate flow for example when condensate flashes, blocks an opening or perhaps a strainer screen.



- **Improper Selection** – Though steam traps are a small part of an overall steam system, they must never be overlooked. Improperly selection of even one trap can lead to a system wide failure.

The biggest problem is when your steam trap does not meet the system’s requirements for proper drainage.

Drainage vs. Leakage Failures

So, which of these failures is the most critical to ongoing maintenance and can cause the most downtime and expense? It is first important to know the difference between drainage failures and leakage failures.

- **Drainage Failures** - Drainage failures happen when the trap is unable to remove condensate form the system. Most experts agree that drainage failures cause the most damage. Traps that are unable to drain properly will simply cease to operate. Steam and condensate will build up leading to possible full system failure. Drainage failures are often caused by blockage or improper selection. If you see any level of drainage failure, you must act immediately to fix the problem through repair or replacement.
- **Leakage Failures** – Traps facing leakage problems may still remove condensate, but will leak steam. While the overall system may continue to operate, leakage failures will instantly raise costs and lower efficiency. Any of the major failure types can easily cause leakage failures.
- **Preventing Failures**
Understanding the basic construction, operation, and reasons for failure are important. However, the challenge is finding a way to prevent these costly failures in the first place.
- **Regular Maintenance** – As with any component, consistent and thorough maintenance is the key to avoiding, or at the very least minimizing, failure. Create a strict maintenance schedule and adhere to it without fail. It is always more cost-effective to maintain steam traps than having to replace them. Just remember that if a steam trap fails, it will often lead to other, much more costly, failures throughout your system.

- **Steam Trap Repair Kit** – Once you have a maintenance plan in place, you need the right tools to carry out any critical repairs. This is where a state-of-the-art repair kit is critical. Knowing which type of steam traps you are working with and maintaining and having a trap repair kit on hand will lower overall emergency repair costs and limit down time if a trap fails.

When it comes to guaranteeing steam trap longevity, the most important word to remember is vigilance. By mastering the intricacies of the steam trap, you can always stay one step ahead of damaging and costly failures. As soon as you detect any issue, no matter how small or large, you must be prepared to immediately replace or repair a trap in order to prevent larger problems developing.

As the experts in steam traps, BoilerSupplies.com is always ready to help you find ways to maximize your steam trap efficiency. To find out even more about operating, testing, and installation of steam traps, you can purchase our exhaustive 97-page

Trap-Pro Guide

(http://boilersupplies.com/Steam_Trap_Pro_Guide.htm?__hstc=223308676.99aac3b2fe0845c72ab0ee54886edc4.1407648556789.1412543926685.1412550412803.4&__hssc=223308676.3.1412550412803&__hsfp=2428905166)

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