

Waterhammer – What is this awful noise?

Waterhammer in a steam system is a serious concern. It can lead to failure and rupture of piping and valves, and in some cases, cause serious injury to associates from contact with steam and condensate.

There are several ways waterhammer can occur.

1. The first way occurs when condensate, accumulated in steam distribution piping, is slammed with high-velocity steam.
2. The second way occurs in a condensate return line and heat exchange equipment. Condensate can flash into steam by going from a smaller pipe size to a larger pipe size. This allows the pressure of the condensate to drop and “flash” back into steam, thus creating a pressure pulse, thus creating waterhammer.
3. A third way is in temperature controlled application where condensate has to lift to a return line or return to a pressurized vessel. **A general rule of thumb for lifting condensate is: one pound of pressure will lift condensate 2.3 feet.** Condensate will back up if this rule is not met.

Waterhammer in a steam system always needs immediate attention and repair. It is a symptom of a problem somewhere in the steam system. This could be due to poor design of the steam and condensate piping, the use of the wrong type of trap, a steam trap that is “blowing by” or a combination of these items.

The correct application of the various traps offered is imperative. Steam traps serve three important functions.

1. Prevent steam from escaping from the system before heat is used.
2. Remove condensate from the system.
3. Venting noncondensable gases.

Poor steam trap selection can result in waterhammer, ineffective process heat transfer and cause corrosion in the piping system. If a steam trap continues to fail after being repaired or replaced on an established system system due to waterhammer, it is probably the fault of the system layout rather than the trap.

Another general rule of thumb when laying out a steam piping system is that the steam main line should be drained at regular intervals of 100-150 feet with adequately sized drains.

In summary, the next time you experience waterhammer, it may not always be that the trap is bad. It may be a system design issue that needs to be studied.

Brett Easterling
Sales Steam and Compressed Air Products
I&M Industrials, Inc. (<http://www.iandminindustrials.com>)