DFT Valves

Non-Slam Check Valves vs. Swing Check Valves





© 2017 DFT Valves

Non-Slam Check Valves vs. Swing Check Valves

Check valves, which allow fluid to flow in one direction but prevent it from flowing in the other, are available in a wide range of styles. The variety most appropriate for your project will depend on the application at hand and the specific properties it requires in a valve.

In this eBook, we'll discuss two of the most common varieties of check valves, non-slam check valves and swing check valves, while comparing their unique uses and benefits.

Key Differences Between Non-Slam and Swing Check Valves

Some styles of check valves are specifically designed to allow their disc, or flapper, to slam shut in certain conditions, such as the reversal of fluid flow. This sudden shutting, or slamming, creates a wave of pressure in the liquid that reverberates throughout the system and, depending on the precise application, can ultimately lead to reduced process efficiency, valve damage, gasketed joint leaks and other issues. This inevitable — but controllable — phenomenon is commonly referred to as water hammer.



Non-slam check valves are designed specifically for use in these situations. As their name implies, these valves close without slamming, meaning no excess pressure spikes are created. The disc of a non-slam check valve has an internal spring opposing the opening fluid flow pressure. When the flow of a media is strong enough, the spring compresses and the valve opens; the disc is smoothly pushed back toward the seating surface in the valve by the spring as the flow decreases and stops, but before flow direction reverses.

Often called flapper style check valves, swing check valves are a more traditional variety. The disc of a swing check valve is secured to the body of the valve by a trunnion and hinge arm, without the aid of a spring. Unlike a non-slam check valve, which opens and closes at rates comparable to the pressure of the fluid flow, a swing check valve opens and closes more suddenly, relying on the installation orientation, gravity, and reversing flow to close the valve.





Applications

Both non-slam check valves and swing check valves are suitable for use in a wide range of applications. Generally, though, non-slam check valves are ideal for vertical runs of piping, or complex applications that require constant and controllable pressure levels. Alternatively, swing valves are often used in very large-volume applications, horizontal pipe runs, and those applications in which varying pressures and flow rates are not a concern.

Due to the precise pressures required, non-slam check valves are commonly specified in various oil and gas, refining, and power industry processes.

These valves can be found in the following applications:

- Gas and liquid pipelines
- Gas export facilities
- Water and steam systems
- Cooling towers

Gas storage caverns

Product tank farms

Water treatment

- Mine dewatering
- Cryogenic applications

Non-slam check valves are also used in similar applications throughout the chemical processing industry, steam condensate systems, and in the power generation industry.

Swing valves, because of their less controlled opening and closing mechanics, are used in less sensitive applications. They are most commonly employed in large-scale pipeline applications, such as liquid, gas, and steam, generally only in horizontal configurations. In particular, they're often used in natural gas applications, as natural gas processing generally does not require as stringent pressure control as the oil and refining industry or in sewage and water treatment systems.







Pros and Cons of Non-Slam and Swing Check Valves

Depending on the application, both non-slam check valves and swing check valves present unique advantages and disadvantages.

Non-Slam Check Valves



One of the primary advantages of non-slam check valves is their ability to effectively prevent water hammer, and, therefore, eliminate resultant pressure swings, vibrations, and damage. Non-slam valves have a short stroke, which facilitates soft closing quickly in the event of rapidly reduced flow to prevent water hammer.

Because they feature only one moving part, the disc itself, non-slam check valves experience minimal wear over time. In many designs, the spring is also fully protected from the process flow. Together, these factors help to greatly extend the service lives of non-slam check valves over more traditional valves. Non-slam check valves' extended lifespan and reduced maintenance requirements ultimately allow for greatly reduced operational costs, which mean a lower cost of ownership over the full life cycle of the part.

Non-slam check valves' main disadvantage is that they cannot be used where line cleaning maintenance requires line "pigging."

Swing Check Valves



The primary benefit of swing check valves is their ability to allow a full, unobstructed flow — which is particularly important in piping systems that may require line cleaning. Swing check valves are also ideal for use in low cost systems with manual valves, such as gate valves in common use.

Disadvantages include a high rate of wear due to the rotation about the hinge pin and the requirement for full and precise alignment of the disc and seat upon closing. The limitations of this design restrict their use in pulsating systems with intentionally cyclic pressures, as the constant pulsating action of the valve leads to premature wear.



Learn More

Though both non-slam check valves and swing check valves offer versatility in today's varied industrial landscape, non-slam check valves are increasingly supplanting standard swing valves in many situations.

This is largely due to the commonality of the water hammer phenomenon, which may arise to some degree in any liquid control system. As these systems become more complex and rely on increased process automation, water hammer becomes a more serious issue. Non-slam check valves are proven to be very effective at mitigating this risk.

DFT® Inc. offers a wide range of reliable check valves specially designed to accommodate diverse applications across every industry. To learn more about your options for preventing water hammer with non-slam check valves, check out DFT® Inc.'s comprehensive <u>check valve literature library</u>. For more information and examples of return on investment (ROI) of DFT reliable check valves, read our <u>case studies</u> highlighting the use and long service life of DFT check valves.



TO DISCUSS YOUR NEEDS >> with one of our value experts,

reach out to your DFT valve representative today.

