

## CHECK VALVES

### Check The Flow And Double-Check The Location

Depending on the application, check valves can get a bad rap. Blame can include problems such as water hammer, vibration, reverse flow, leakage, or component wear and damage – all of which are harmful to downstream systems. However, the real cause of these problems usually stems from poor sizing and selecting of the check valve for the application.

Most check valves are selected on line size and the desire for the largest  $C_v$  available. Swing checks require a **minimum rate of flow** for the valve to function. If the flow is not sufficient to hold the disc in a full open and stable position, the disc and associated internal parts will be in a constant state of motion (wobble). Insufficient flow results in premature wear, noisy operation, and vibration.

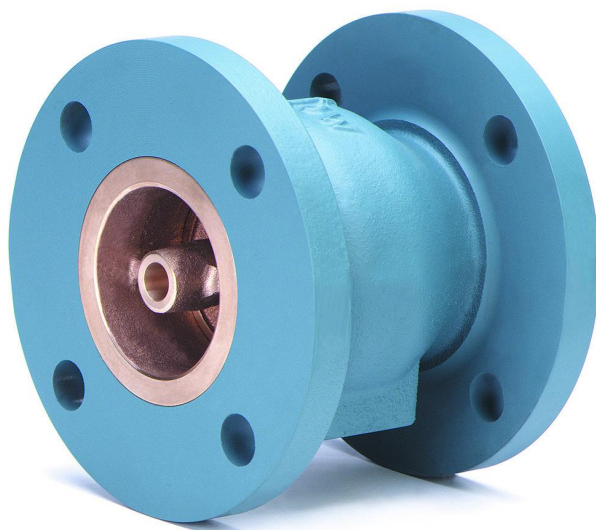


The solution to this problem is selecting a line size that produces sufficient flow. A general rule of thumb for water systems is to maintain a minimum of 7.5 ft/sec flow rate. If the system struggles to maintain that flow rate, it is sometimes recommended that the line size be reduced.

In piping systems containing other types of fluids, the flow requirements vary with the specific gravity of the media. The following formula can be used to approximate the minimum flow rates.

$$\text{Flow}_{\min} \text{ (ft/sec)} = 60 \sqrt{V}$$

$V$  = specific volume of fluid (ft<sup>3</sup>/lb.)



Silent check valves such as the Milwaukee Valve 1400 (Wafer) and #1800 (Globe) have slightly different flow requirements. Spring-loaded silent check valves are designed to provide a cracking pressure of 0.5 psi and to fully open at a 4 ft/sec flow velocity.

All check valves should be installed in a location that has smooth and laminar flow conditions. The following general rules exist for check valve installations:

- 1) Downstream of a reciprocating pump or other turbulence-inducing device (elbow, tee, etc.):
  - **Swing Type:** Locate the valve a minimum of 10-12 diameters downstream of the device.
  - **Silent Type:** Locate the valve a minimum of 4-5 diameters downstream of the device.
- 2) Pipe fittings, elbows, reductions, etc. downstream of the valve:
  - **Swing Type:** Locate the elbow a minimum of 5-7 diameters downstream of the valve.
  - **Silent Type:** Locate the elbow a minimum of 2-3 diameters downstream of the valve.



Milwaukee Valve offers a full line of brass, bronze, cast steel, iron and lead-free UltraPure check valves. For more information, visit our website at [www.MilwaukeeValve.com](http://www.MilwaukeeValve.com). For questions or assistance on specific check valve applications, contact your Milwaukee Valve sales representative or regional manager.



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