



HAMMOND VALVE
BETTER AT EVERY TURN

Milwaukee Valve Company
Engineering Department

16550 West Stratton Drive
New Berlin, WI 53151
Phone (262) 432-2702 Fax (262) 432-2703
www.hammondvalve.com

TECHNICAL BULLETIN

Valve Seat Leakage Standards
and Related

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This technical bulletin discusses some issues related to valve leakage and the specifications that control or define acceptable leakage for a new valve tested at the factory. It also touches on common language and how that relates to these specifications.

While the particular spec or standard to which a valve is made controls first (and some of these are discussed later), there are leakage specifications and standards that apply across valves types and are commonly used in the industry. The three most commonly used for valve leakage are:

- API (American Petroleum Institute) 598 – this document covers valves of all types, metal and soft seated, and is the industrial valve seat leakage baseline.
- FCI (Fluid Controls Institute) 70-2 (also called ANSI/FCI 70-2) – this document is specifically for control valves, and in general allows higher leakage as a result.
- MSS (Manufacturer’s Standardization Society) SP-61 – this document is similar to API 598 in that it applies to metal and soft seated valves. For soft seated valves, it converges with API 598, while for metal seated valves it may allow a little more leakage than API 598 would.

In general, specifications such as API 598 or MSS SP-61 that govern leakage for soft seated valves call for ‘0’ bubbles of air or ‘0’ drops of water under the specified test conditions over the minimum test time period. These valves are therefore sometimes referred to as ‘zero leakage’ valves. In reality, there really is no such thing as ‘zero’ leakage, since microscopic amounts of material may indeed cross the seat or packing boundaries, especially if helium or hydrogen or other small molecule gases are used. Another common term for soft seated valves is ‘bubble tight’.

Less frequently, the leakage performance for soft seated valves is referred to as Class VI, which is the tightest leakage under FCI 70-2, and generally applies to resilient seated control valves (as opposed to metal seated control valves or soft seated shut off valves). In fact, FCI 70-2 Class VI allows some small number of bubbles per minute, increasing with valve size, during the test, whereas API 598 and MSS SP-61 do not.

Metal seated valves, on the other hand, usually (not always) have some level of acceptable leakage when tested, defined first as some acceptable amount of liquid, under test conditions and over the time period of the test. Gas is an alternate test media for metal seated valves, as liquid can be easier to measure, especially for larger valves.

This bulletin is intended to provide our customers with the latest information regarding our valve products and services. The information is based on our experience as a supplier, and on the best data available at the time of publication. All users of this information are reminded that ultimate responsibility for the final selection of valve configuration, materials, and options remains the end user’s. Hammond Valve does not warranty valves for specific applications. In all cases, our standard warranty applies. This information is subject to change without notice; for updated information and/or additional support, contact Hammond Valve, engineering at 262-432-2702, or via email at info@hammondvalve.com.



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Most industrial valves, such as our high performance butterfly valve, flanged ball valves, cast steel valves, etc. are tested in accordance with American Petroleum Institute (API) 598. As previously stated, resilient seated valves tested to this standard are allowed '0' leakage of air or water under the specified test pressures and hold times.

Hammond Valve performs the API 598 high pressure closure test on our HPBV, which is 110% of the rated pressure, held to the minimum times in that standard, i.e. valve size $\leq 2''$, time = 15 seconds, valves from 2 1/2'' to 6'', time = 60 seconds, valves from 8'' and up, time = 120 seconds. For our ball valves, we typically test to low pressure closure, which is 60-100 psig, for the same hold times.

Our iron valves are tested to the standards to which they are made, for example MSS SP-70 for iron gate valves, MSS SP-71 for iron swing checks, MSS SP-85 for Iron globe valves. MSS SP-80 applies for bronze gate, globe and check valves.

If you have any questions regarding the particular leakage of the valves on your job, please contact Hammond Valve for support.