

MSS SP-61-2009

Pressure Testing of Valves

Standard Practice
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FOREWORD

This Standard Practice for Pressure Testing of Valves was originally adopted in 1961. It was developed for the purpose of providing a uniform means of testing valves commonly used in the "full open" and "full closed" type of service. It is not intended for use with control valves. Refer to standards ISA-S75.19 and ANSI/FCI 70-2 for Control Valves.

TABLE OF CONTENTS

<u>SECTION</u>		<u>PAGE</u>
1	SCOPE	1
2	DEFINITIONS	1
3	GENERAL REQUIREMENTS	1
4	SHELL LEAKAGE TESTS	2
5	SEAT CLOSURE TESTS	2
TABLE		
1	Shell Leakage Test Duration	2
2	Alternate Gas Test	2
3	Seat Closure Test Duration	3
4	Units of Leakage per NPS/DN	3
ANNEX		
A	Referenced Standards and Applicable Dates	4

PRESSURE TESTING OF VALVES

1. SCOPE

This Standard Practice establishes requirements and acceptance criteria for shell and seat closure pressure testing of valves.

2. DEFINITIONS

2.1 *Production Pressure Test*

Pressure tests which include closure member and shell leakage tests shall be performed on production units manufactured for sale. Production pressure tests verify the pressure containing capability of production units.

2.2 *Shell Leakage Test*

An internal pressure test of the pressure containing envelope to demonstrate pressure containing capability of the external pressure boundary.

2.3 *Seat and Closure Member Test*

An internal pressure test of flow regulating elements (seats, seals, and closure member such as gate, disc, ball, or plug) to demonstrate static performance within allowable leakage tolerances.

2.4 *No Visible Leakage*

2.4.1 The term "no visible leakage" applied to a hydrostatic test liquid is defined as a leak rate that will produce: no visible weeping or formation of drops at the test pressure and for the duration of the test.

2.4.2 The term "no visible leakage" applied to air or gas testing is defined as a leak rate that will produce no visible formation of bubbles in a water immersion test or after application of leak detection fluid at the test pressure and for the duration of the test.

2.4.3 For automatic leak detection methods, this definition shall be considered equivalent to a leak rate no greater than 4.1×10^{-5} in³/sec⁽¹⁾ (6.7×10^{-4} ml/sec) with a pressure differential of 80 to 100 psi (5.5 to 6.9 bar) for application to valves of NPS 8 (DN 200) and smaller.

3. GENERAL REQUIREMENTS

3.1 The manufacturer shall be responsible for the performance of tests specified herein.

3.2 Fluid for shell and seat closure tests shall be air, inert gas, or liquid, such as water (which may contain a corrosion inhibitor), kerosene, or other fluid with viscosity not greater than that of water. Temperature of the test fluid shall not exceed 125°F (52°C).

3.3 Valves shall be substantially relieved of air or gas when tested with liquid.

3.4 Seat closure tests for NPS 4 (DN 100) and larger valves shall be conducted after an acceptable shell test. Seat closure tests for smaller valves may be conducted before or after the shell test at the manufacturer's option. However, when valves conform to ASME B16.34, the requirements of paragraph 7.2 of ASME B 16.34 shall apply.

3.5 Valves shall be shell tested prior to painting. Corrosion protection treatment such as phosphatizing and linings may be applied prior to shell testing. If pressure tests in the presence of purchaser's representative are specified, valves that were painted following successful pressure testing may be retested without removal of paint.

3.6 Valve test fixture loads applied to valve ends shall be limited to those required to effectively seal the valve ends.

3.7 Leakage detection devices, e.g., pressure decay devices, may be used for detecting leakage provided that they perform at the pressures specified in Sections 4 and 5. The valve manufacturer shall be able to demonstrate that, when these devices are used, the test results are equivalent to the requirements of this Standard Practice.

Note:

(1) This leakage rate is based on the measured leakage of nitrogen gas from a needle valve with a 0.167" OD. x 0.091" I.D. tube submerged in water to a depth of 1". The tube end was cut square and smooth with no chamfers or butts and the tube axis was parallel to the surface of the water. Leakage was adjusted to a level equal to 40 bubbles in 10 minutes at 90 psi. The 40 bubbles equaled 1.6 ml or, 1 bubble = 0.04 SCC. Using these data, a leak rate equivalent to 1 bubble every minute is found to be 4.1×10^{-5} in³/sec (6.7×10^{-4} ml/sec).