Pressure Testing of Valves

Standard Practice
Developed and Approved by the
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The U.S. customary units and SI (metric) units in this Standard Practice are regarded separately as the standard; each should be used independently of the other. Combining or converting values between the two systems may result in non-conformance with this Standard Practice.

> Substantive changes in this 2019 edition are "flagged" by parallel bars as shown on the margins of this paragraph. The specific detail of the change may be determined by comparing the material flagged with that in the previous 2013 edition.

Non-toleranced dimensions in the Standard Practice are nominal unless otherwise specified.

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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. For control valves, refer to standards ISA-75.19.01 and FCI 70-2, which may be more appropriate for control valve pressure testing.

With the identification of General Purpose, Special Service, and Severe Service Valves, an MSS Standard Practice has been recently introduced for supplementary high-pressure testing; namely, “Supplemental HP Gas Test Procedures for Valves”. MSS SP-61 continues to be offered as a means of testing for all valves, regardless of criticality.

CAUTION: Safety precautions must be taken when gas is used.

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Manufacturers Standardization Society of the Valve and Fittings Industry

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1. SCOPE

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

2. DEFINITIONS

2.1 *No Visible Leakage*

2.1.1 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 (1) at the test pressure area and (2) for the duration of the test.

2.1.2 The term "no visible leakage", as applied to air or gas testing, is defined as a leak rate(1) 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.

2.1.3 For automatic leak detection methods, this definition shall be considered equivalent to a leak rate no greater than 4.1×10^{-5} in^3/sec (6.7×10^{-4} ml/sec)(1) 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.

2.2 *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.

2.3 *Shell Leakage Test*

Internal pressure tests of the pressure containing envelope to demonstrate pressure containing capability of the external pressure boundary.

2.4 *Seat and Closure Member Test*

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

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.

NOTE: (1) This leakage rate is based on the measured leakage of nitrogen gas from a needle valve with a 0.167 in. (4.24 mm) O.D. x 0.091 in. (2.31 mm). I.D. tube submerged in water to a depth of 1 in. (25.4 mm). The tube end was cut square and smooth with no chamfers or burrs 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 (6.2 bar). The 40 bubbles equaled 1.6 ml or, 1 bubble = 0.04 SCC. Using this data, a leak rate equivalent to 1 bubble every minute is found to be 4.1×10^{-5} in^3/sec (6.7×10^{-4} ml/sec).