MSS SP-61-2003

Pressure Testing of Steel Valves

Standard Practice
Developed and Approved by the
Manufacturers Standardization Society of the
Valve and Fittings Industry, Inc.
127 Park Street, NE
Vienna, Virginia 22180
(703) 281-6613

MSS

This **MSS** Standard Practice was developed under the consensus of the **MSS** Technical Committee **114** and the **MSS** Coordinating Committee. The content of this Standard Practice is the result of the efforts of competent and concerned volunteers to provide an effective, clear, and non-exclusive specification that will benefit the industry **as** a whole. This **MSS** Standard Practice is intended as a basis for common practice by the manufacturer, the user, and the general public. The existence of an **MSS** Standard Practice does not **in** itself preclude the manufacture, sale, or use of products not conforming to the Standard Practice. Mandatory conformance is established only by reference in **a** code, specification, sales contract, or public law, as applicable.

Unless otherwise specifically noted in this **MSS** SP, any standard referred to herein is identified **by** the date of **issue** that was applicable to the referenced standard(s) at the date of issue of this **MSS** SP. (See Annex **A.)**

In this Standard Practice all notes, annexes, tables, and figures are construed to be essential to the understanding of the message of the standard, and are considered part of the text unless noted as "supplemental". **All** appendices appearing in this document are construed as "supplemental". "Supplemental" information does not include mandatory requirements.

U.S. customary units **in** this SP are the standard; the metric units are **for** reference only.

Non-toleranced dimensions **in this Standard** Practice are nominal, and, unless otherwise specified, shall **be** considered "for **reference only".**

Originally Approved February, **1961**

FOREWORD

This Standard Practice for Pressure Testing of Steel Valves was originally adopted in **1941.** It was developed for **the** purpose of providing a uniform means of testing steel 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

SECTION **PAGE**

PRESSURE TESTING OF STEEL VALVES

1. SCOPE

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

2. DEFINITIONS

2.1 *Production Pressure Test*
Pressure tests which include closure member and shell tests performed on production units manufactured for sale. Production pressure tests verify the pressure containing capability of production units.

2.2 *Shell 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 withii 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 then **4.1** x **10^{-5} in^3/sec**[1] **(6.7 x 10^{-4}** ml/sec) with a pressure differential of **80** to **100** psi (**5.5** to **6.9** bar) for application to valves of **8 NPS** (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 B16.34** 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 paragraphs **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.**

(1) **This leakage rate is based on the measured leakage of nitrogen gas from a needle valve with a 0.167" O.D. 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 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. The 40 bobbles 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 x 10^{-5} in^3/sec (6.7 x 10^{-4} ml/sec).**