

MSS SP-121-2006

Qualification Testing Methods for Stem Packing for Rising Stem Steel Valves

Standard Practice
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This MSS Standard Practice was developed under the consensus of the MSS Technical Committee 308 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.)

U.S. customary units in the Standard Practice are the standard; the metric units are for reference only.

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.

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FOREWORD

This Standard Practice was developed by a cooperative effort of representatives of valve and packing manufacturers. This Standard Practice is intended primarily to be an aid for verification of the performance of valve stem packing materials and material combinations at selected pressure and temperature conditions. It is based on packing systems to be used in rising stem steel valves that generally use flexible graphite packing systems in accordance with MSS SP-120.

While MSS SP-120 addresses only flexible graphite packing systems, it does not preclude use of specified system design features for other types of packing systems. This Standard Practice references MSS SP-120 design features and packing systems qualified in accordance with this Standard Practice and may be considered by manufacturers and users for application in rising stem steel valves that otherwise comply with MSS SP-120.

This Standard Practice shall not be construed to be effective in qualifying packings for all types of services expected of ASME B16.34 or equivalent valves. Special service applications such as low fugitive emissions control or toxic fluid may require additional or different qualification testing or leakage measurement methods that are outside the scope of this Standard Practice.

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QUALIFICATION TESTING METHODS FOR STEM PACKING FOR RISING STEM STEEL VALVES

1. SCOPE

1.1 This Standard Practice provides procedures and guidelines for testing and evaluation of valve stem packing materials and material combinations. This testing provides qualification by verifying the adequacy of specific packing material combinations for service within defined limits of size, pressure, temperature, and cyclic duty. Such specific combinations generally represent products of individual manufacturers, although generic qualification of raw materials may be demonstrable in certain cases.

1.2 It is intended that this Standard Practice apply to qualification of stem packings for Class 150 through 4500 ASME B16.34 or equivalent steel or special alloy valves (including intermediate classes and Standard, Special, and Limited Class ratings) with rotating/rising and non-rotating/rising stems, as traditionally used in globe and gate valves. Other valve stem types (e.g. quarter-turn) may involve additional considerations not within the scope of this Standard Practice.

1.2.1 The requirements herein apply to qualification of traditional compression packings. Rod seal elements such as "O" rings, "V" rings, and similar proprietary seals are not within the scope.

1.2.2 Stem packings may be prequalified by experience or by test programs conducted prior to publication of this Standard Practice if a qualification report is prepared based on documented evidence.

1.3 This Standard Practice is intended to provide experimental qualification of packing materials and materials combinations for service with water, steam, and other common liquids, vapors, and gases. Some of the procedures identified in detail use water and steam as test fluids, but air or nitrogen may also be used with appropriate modifications in testing and data acquisition methods.

General Note: More chemically aggressive line fluids may damage packings and degrade sealing performance. Packings qualified in accordance with this Standard Practice may not be satisfactory for applications with such fluids.

1.4 Environmental pollution regulations (e.g. fugitive emissions) or limitations on leakage of hazardous or toxic fluids may require additional or different qualification tests that are outside the scope of this Standard Practice.

1.5 This Standard Practice is not intended to apply to packings for valves developed for and predominantly used in instrument piping systems.

2. DEFINITIONS

2.1 See MSS SP-96 for definitions of common terms used in this Standard Practice.

2.2 **Detectable Leakage** For the purposes of this Standard Practice, detectable leakage of a packing assembly is defined as follows:

2.2.1 *Standard criteria*

(1) Visible leakage of liquid water which results in breaking away of droplets to form a dripping action or a steady stream

(2) Leakage of saturated or superheated steam that is visible as condensed vapor or detectable as condensation in a cold trap, on a mirror, or with a similar device

(3) Leakage of air or nitrogen sufficient to produce continuous bubbling in a liquid leak detector solution applied in the packing gland area

2.2.2 **Alternate criteria** At the discretion of the test sponsor, more conservative (lower) allowable leakage rate criteria may be selected. If this is done, leakage shall be measured quantitatively (e.g., in ml/hr as liquid or condensed vapor or as an air or nitrogen volume at standard atmospheric conditions). The alternate "detectable leakage" definition and the method of measurement shall be described in the Qualification Report.