Flexible Graphite Packing Sealing for Rising Stem Valves

Standard Practice
Developed and Approved by the
Manufacturers Standardization Society of the
Valve and Fittings Industry, Inc.
127 Park Street, NE
Vienna, Virginia 22180-4602
Phone: (703) 281-6613
Fax: (703) 281-6671
E-mail: standards@msshq.org

www.msshq.org

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 resulting efforts of competent and experienced volunteers to provide an effective, clear, and non-exclusive standard that will benefit the industry as a whole. This MSS Standard Practice describes minimal requirements and 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 to this Standard Practice is established only by reference in other documents such as a code, specification, sales contract, or public law, as applicable. MSS has no power, nor does it undertake, to enforce or certify compliance with this document. Any certification or other statement of compliance with the requirements of this Standard Practice shall not be attributable to MSS and is solely the responsibility of the certifier or maker of the statement.

"Unless indicated otherwise within this MSS Standard Practice, other standards documents referenced to herein are identified by the date of issue that was applicable to this Standard Practice at the date of approval of this MSS Standard Practice (see Annex A). This Standard Practice shall remain silent on the validity of those other standards of prior or subsequent dates of issue even though applicable provisions may not have changed."

By publication of this Standard Practice, no position is taken with respect to the validity of any potential claim(s) or of any patent rights in connection therewith. MSS shall not be held responsible for identifying any patent rights. Users are expressly advised that determination of patent rights and the risk of infringement of such rights are entirely their responsibility.

In this Standard Practice, all text, notes, annexes, tables, figures, and references are construed to be essential to the understanding of the message of the standard, and are considered normative unless indicated as "supplemental". All appendices, if included, that appear in this document are construed as "supplemental". Note that supplemental information does not include mandatory requirements.

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.

This Standard Practice has been substantially revised from the previous 2011 edition. It is suggested that if the user is interested in knowing what changes have been made, that direct page by page comparison should be made of this document and that of the previous edition.

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

Originally Published: March 1997
Current Edition Approved: April 2017
Current Edition Published: May 2017

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 the manufacture and procurement of packing systems with design features for rising-stem valves that utilize flexible graphite packing. However, this does not preclude the use of these system features for other types of packing systems since this Standard Practice represents the consensus input from a broad spectrum of industry applications.

This Standard Practice shall not be construed to be effective for all pressures and types of services expected of ASME B16.34 valves. Special service applications, such as low fugitive emissions control or toxic fluid, may require additional or different design measures that are outside the scope of this Standard Practice.

This 2017 edition includes a complete rewrite for valve stem packing from the previous general packing requirements updating to the current low emissions packing requirements. The definitions, packing types, materials and ring configuration types are now inclusive within this Standard Practice. In addition, valve stems, stuffing boxes, packing glands, lubrication of gland bolting, and paint free areas are detailed. Leakage performance is added to meet the current industry-driven requirements by U.S. Environmental Protection Agency actions and other international standards. The packing set height was updated. A new table for allowable clearance between the stem and stuffing box has also been added, with figures showing packing, stuffing box, and gland specific requirements. Additional revisions include various editorial and formatting corrections, and updating of the organizations and external references in Annex A.

TABLE OF CONTENTS

This Page Intentionally Left Blank

Manufacturers Standardization Society of the Valve and Fittings Industry

FLEXIBLE GRAPHITE PACKING SEALING FOR RISING STEM VALVES

1. SCOPE[1]

1.1 This Standard Practice is applicable to valves that use flexible graphite packing stem sealing to achieve reduced or low emissions.

1.2 This Standard Practice encompasses dimensions and tolerances applicable to ASME B16.34 gate and globe valves designed with rising non-rotating and rising rotating stems.

1.3 This Standard Practice applies to valves in which a flexible graphite packing assembly is used as the primary stem-sealing system.

1.4 Valves that include a lantern ring as part of its packing system, and bonnetless valves with split glands, are outside the scope of this Standard Practice.

2. DEFINITIONS

2.1 ***Flexible Graphite*** Specially processed mineral graphite used as a sealing material. Can be supplied in various shapes and densities.

2.2 ***Low Emissions*** Reduced emissions limits of VOC emissions that are required to meet industry performance standards.

2.3 ***Skive Cut*** A type of diagonal cut (skive), usually at a 45° angle, that is designed to improve packing life, minimize stem packing leakage, and allow for field replacement.

2.4 ***VOC's*** Volatile Organic Compounds

2.5 ***Wiper Rings/Anti-Extrusion Rings*** Die-formed and/or braided packing rings placed at the top and bottom of a packing set, specifically to help prevent extrusion and keep debris from contaminating the sealing ring.

2.6 See MSS SP-96 for additional definitions of terms used in this Standard Practice.

3. PACKING TYPES

3.1 ***General*** The packing types described in Section 3.2 through 3.4 below are for use in valves which are designed with a means of adjustment to the packing at any given time. They are intended for service in applications where low emissions performance is required (see Section 7) and stuffing box temperatures are up to 398 °C (750 °F).

3.2 ***Type A (Carbon or Graphite Wiper/Anti-Extrusion Rings)*** These rings have a carbon assay of 98% minimum and include a corrosion inhibitor applied at the time of manufacture. Typically used as a top and bottom ring in conjunction with a Type B (see Section 3.3) or C (see Section 3.4) material. Note that this can include high density die-formed graphite rings.

3.3 ***Type B (Expanded Graphite Die-Formed Rings)*** These rings have a carbon content of 98% or better. Typically used as a sealing ring with a Type A ring (see Section 3.2) at the top and bottom of the installed set. Typical minimum density of Type B rings is 1442 kg/m^2 (90 lbs/ft^3).

3.4 ***Type C (Braided Graphite Yarn Packing)*** This material may be constructed with a reinforcement material, such as a wire filament or other fiber/yarn, to improve extrusion resistance.

NOTE: (1) This Standard Practice is not intended to apply to valves developed for and predominantly used in instrument piping systems (see MSS SP-99 and MSS SP-105).