Flexible Graphite Packing System for Rising Stem Valves – Design Requirements

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

> Substantive changes in this 2011 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 edition.

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

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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 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.

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FLEXIBLE GRAPHITE PACKING SYSTEM FOR RISING STEM VALVES – DESIGN REQUIREMENTS

1. SCOPE [1]

1.1 This Standard Practice establishes material and dimensional requirements for valve packing, packing chamber, packing gland, packing washer, bonnet, and the stem, as they relate to the total packing assembly.

1.2 This Standard Practice applies to standard, special, and limited Class 150 through Class 4500 (including intermediate classes) ASME B16.34 type gate, globe, and angle valves designed with rotating/rising and non-rotating/rising 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 This Standard Practice does not apply to valves that include a lantern ring as part of its packing system nor to bonnetless valves with split glands.

2. DEFINITIONS

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

2.2 See Figure 5 for definitions of symbols used in this Standard Practice.

3. PACKING ASSEMBLY

3.1 The packing shall be composed of center and end rings or a cylinder of flexible graphite and end rings. A flexible graphite packing assembly that is constructed with a braided carbon or braided graphite or metal-mesh that reinforces the flexible graphite may not require end rings.

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).

The end rings shall serve as wipers and anti-extrusion devices to keep the flexible graphite in the packing chamber during operation, including stroking, of the valve. Individual center rings may contain up to two (2) splits per ring to facilitate valve packing installation. Braided end rings shall contain a maximum of one (1) split per ring and molded end rings shall contain a maximum of two (2) splits per ring. The end ring properties shall be designed to deter the extrusion and/or erosion of the center flexible graphite rings during valve operation.

Packing assemblies of flexible graphite without end rings may be used; however, the diametrical clearance specified in Table 1 and Table 2 shall be reduced to a maximum of 50% of that required for higher than Class 300 valves. The packing shall also be qualified to the requirements of MSS SP-121.

3.2 The packing assembly shall contain a dispersed passive corrosion-inhibitor, a dispersed embedded active corrosion-inhibitor, or a suitable combination of inhibitors, to minimize stem pitting caused by the galvanic corrosion phenomenon set up in a wet valve packing-chamber. Inhibitors in end rings are optional, unless otherwise specified by the purchaser.

3.3 The pre-installed density and dimensions of the flexible graphite packing shall be at the valve manufacturer's option. The final adjusted density and dimensions of the packing assembly shall be capable of sealing with no visible leakage when the valve is tested at a pressure equal to the valve's 100 °F pressure rating at ambient conditions. The as-shipped remaining packing and packing gland adjustment (packing gland tight) shall be greater than 10% of the minimum depth of the packing chamber listed in Table 1 and Table 2.