Bellows Seals for Globe and Gate Valves

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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TABLE OF CONTENTS

BELLOWS SEALS FOR GLOBE AND GATE VALVES

1. SCOPE [1]

1.1 This Standard Practice covers requirements for design, materials, fabrication, installation, qualification, examination, testing, and shipment of metal bellows and/or bellows assemblies to be installed in manual and automated on-off globe and gate valves.

1.2 This Standard Practice is applicable to metal bellows used in conjunction with steel globe and gate valves which otherwise satisfy the requirements of standards such as API 600, API 602, ASME B16.34, and API 603. Such standards are referred to herein as the "parent" valve specifications.

1.3 This Standard Practice does not apply to non-metallic bellows or bellows made of low melting point materials such as brass, phosphor-bronze, or similar materials.

1.4 Except where specifically noted in the text of this Standard Practice, the requirements here are not intended to supersede or replace those requirements of the parent valve standard. This Standard Practice specifies additional requirements for those valves utilizing bellows seals.

1.5 It is the responsibility of the bellows valve manufacturer to ensure compliance with this Standard Practice.

2. MARKING

2.1 Valves utilizing bellows seals shall have a corrosion-resistant metal identification plate securely attached, giving the following information:

a) Bellows seal as per MSS SP-117

b) Bellows Material: *(insert actual bellows material)*

Note: [1] This Standard Practice is not intended for valves developed for and predominantly used in instrument piping systems.

Note: If the parent valve elevated pressure-temperature rating is to be de-rated or service temperature limited due to bellows' design limitations, any bellows rated limitations to the parent valve pressure-temperature rating shall be marked as required by the parent valve specification.

3. DESIGN

3.1 *General*

3.1.1 The purpose of the bellows seal is to provide a metal barrier between the stem at its point of entry through the pressure boundary and the process fluid within the valve to eliminate stem leakage. The bellows seal is not intended to be a structural member of the valve nor is it considered to be the ultimate pressure containing mechanism of the valve. Thus, the bellows seal is to be designed in conjunction with and not as a substitute for the conventional pressure boundary components normally required. See Figure 1 for an example of a typical valve assembly with a bellows seal.

3.1.2 Because a conventional pressure boundary mechanism is available to act as the ultimate pressure containing mechanism, latitude is permitted in the design of bellows seals so long as they satisfy the performance and all other requirements of this Standard Practice.

3.1.3 Except as specifically noted herein, the rules governing the design of all other valve components found in the parent valve specifications apply.

3.2 *Pressure-Temperature Ratings*

3.2.1 The Pressure-Temperature ratings of ASME B16.34, or other parent specification, for the pressure class and body material of the valve, apply as well to the bellows seal. The bellows shall withstand the parent valve class full 100 °F rating. The valve manufacturer may choose to de-rate the bellows seal to some lower pressure rating at elevated