MSS SP-143-2018

Live-Loaded Valve Stem Packing Systems

Standard Practice
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> Substantive changes in this 2018 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 2012 edition.

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

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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 in the design and application of live-loaded packing systems. This Standard Practice represents the consensus input from a broad spectrum of industry representatives.

This Standard Practice should not be construed to be effective for all pressures and types of services expected of ASME B16.34 valves.

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Manufacturers Standardization Society of the Valve and Fittings Industry

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LIVE-LOADED VALVE STEM PACKING SYSTEMS

1. SCOPE

This Standard Practice establishes the minimum requirements for the application, design and installation of live-loaded stem packing systems for valves designed in accordance with ASME B16.34, having rising and/or rotating stems. It applies to valves with flexible graphite, polytetrafluoroethylene (PTFE), expanded polytetrafluoroethylene (ePTFE), or other packing stem seal material, regardless of frequency of operation.

This Standard Practice does not apply to valves that include a lantern ring(s) as part of its packing system or to self-energized packing.

2. DEFINITIONS

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

2.2 The following terms and definitions are unique to this Standard Practice:

As-Shipped The condition of the assembled product when it leaves the manufacturers shipping dock.

Belleville Spring, Belleville Disc Spring, Disc Spring, Belleville Spring Washer or Conical Compression Washer A conical shaped disc that will deflect (flatten) at a given rate. The spring rate is usually very high, allowing the deflective spring to produce a very large compressive load while occupying a very small space. It can be dimensionally defined by its outside diameter (O.D.), inside diameter (I.D.), material thickness (t), overall height (H) and flat deflection (h) capability.

Cantilever Spring A flat spring supported at one end and fastened to its load at the other end.

Coil Spring A spring made by winding a wire around a cylinder or conical shape (volute spring) that has a near linear force/deflection curve.

Consolidation Reduction in overall height of packing as result of wear, thermal and pressure cycles, and time-dependent volumetric changes of packing while in-service.

Gland Plates Designed to act like cantilever springs, providing load characteristics across a narrow deflection range.

Live-loading System A system designed to provide a continuous compression sealing load on a valve's packing system and has a built-in deflection feature to maintain the packing sealing load to overcome negative packing volumetric changes (relaxation, consolidation, shrinkage or wear) that may occur during a valve's service life.

Packing "K" Factor A multiplier of the force on the bottom ring of packing that will insure the gland face force will produce a radial load on the packing stack below the top packing ring capable of sealing the packing system from leakage and eliminating any packing consolidation of the bottom rings of packing due to service pressure that could create a void in the packing at the bottom of the packing chamber.

Sleeve Tubular device that fits over either Belleville O.D. or I.D. packing gland bolting to prevent lateral movement for stack of Belleville disc springs having a larger I.D. than gland bolt, thickness less than gland bolt pitch, or to limit torque that can be applied to the disc spring stack.

Snap Over Spring deflection direction reversal if the ratio of the conical height of the spring washer, prior to compression to the thickness of the spring washer, approaches or exceeds two (2).

Wave and Nested Wave Springs Produced from flat spring stock in a washer style but waves are pressed in the washer perimeter, which provides a deflection mechanism. They can be series stacked or parallel stacked like disc springs to meet load and deflection requirements.