Valves for Cryogenic Service Including Requirements for Body/Bonnet Extensions

Standard Practice
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This MSS Standard Practice was developed under the consensus of the MSS Technical Committee 114 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 B.)

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

Non-toleranced dimensions in this Standard Practice are nominal, and, unless otherwise specified, shall be considered “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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1. SCOPE

1.1 This Standard Practice covers requirements for design, dimensions, material, fabrication, non-destructive examination and pressure testing of stainless steel and other alloy cryogenic service valves with body/bonnet extensions. This Standard Practice applies to cryogenic gate, globe, butterfly and ball valves and may be used in conjunction with other valve-specific standards including the following identified in this Standard Practice as a parent standard:

ASME B16.34, Valves-Flanged, Threaded, and Welded End
API 600, Steel Gate Valves-Flanged and Buttwelding Ends
API 602, Compact Steel Gate Valves, Flanged Threaded, Welding and Extended Body Ends
API 603, Corrosion Resistant Bolted Bonnet Gate Valves-Flanged and Butt-Welding Ends
API 608, Metal Ball Valves-Flanged, Threaded and Welding End
API 609, Butterfly Valves: Double Flanged, Lug and Wafer Type
API 6D/ISO 14313, Petroleum and Natural Gas Industries Pipeline Transportation Systems-Pipeline Valves

1.2 The requirements in this Standard Practice are not intended to supersede or replace requirements of a parent valve standard.

1.3 This Standard Practice includes additional requirements specifically related to valves having body/bonnet extensions essential for cryogenic applications.

2. DEFINITIONS

2.1 ***General*** Definitions given in MSS SP 96 apply to this Standard Practice.

2.2 ***Cryogenics*** The science of materials at extremely low temperatures.

2.3 ***Cryogenic Fluid*** A gas that can be changed to a liquid by removal of heat by refrigeration methods to a temperature less than -100^0F (-73^0C).

2.4 ***Cryogenic Temperature*** For this Standard Practice a temperature range of -150^0F (-100^0C) to -425^0F (-255^0C) is cryogenic.

2.5 ***Cold Box*** An enclosure that insulates a set of equipment from the environment without the need for insulation of the individual components inside the cold box.

2.6 ***Cold Box Extension*** A valve body/bonnet extension section that removes the operating mechanism of the valve outside the cold box and is required to be longer than a non-cold box extension.

2.7 ***Non-Cold Box Extension*** A body/bonnet extension that is used for valves that are normally individually insulated.

2.8 ***Parent Valve Standard*** Endorses the ASME B16.34 construction requirements but has additional construction detail requirements exceeding or not addressed by ASME B16.34.

2.9 ***Gas Column*** That portion of body/bonnet extension that allows for the formation of an insulating column of vapor.

3. MATERIALS

3.1 Materials in contact with cryogenic fluid or exposed to cryogenic temperatures shall be suitable for use at the minimum temperature specified by the purchase order. ASME B31.3, Table A1 lists mechanical properties for materials at temperatures as low as -425^0F (-255^0C).

3.2 Body, bonnet, body/bonnet extension, and pressure retaining bolting shall be of materials listed in ASME B 16.34, Table 1 and also listed in ASME B31.3, Table A1 for the cryogenic valve design temperature. The body/bonnet extension shall be constructed of the same ASME B16.34 Table 1 group material as the valve body group material or a similar ASME B16.34 group material with the same cryogenic material compatibility as the valve body.

3.3 Internal wetted parts shall be made of material that is suitable for the specified cryogenic service temperature and has corrosion resistance at least equal to the valve body.