



Materials System Specification

04-SAMSS-003

11 October 2010

Additional Requirements for Low Temperature Valves

Document Responsibility: Valves Standards Committee

Saudi Aramco DeskTop Standards

Table of Contents

1	Scope.....	2
2	Conflicts and Deviations.....	2
3	References.....	2
4	Design.....	3
5	Materials.....	4
6	Marking.....	4

Previous Issue: 25 October 2009 Next Planned Update: 11 October 2015

Revised paragraphs are indicated in the right margin

Primary contact: Shiha, Saad Mohammed on 966-3-8760163

Page 1 of 4

1 Scope

This specification, along with the purchase order, defines the minimum additional requirements for steel valves in services with minimum design temperatures in the range of -18°C to -45°C. All requirements as stated in the specifications attached to the purchase order remain fully applicable except as modified herein.

2 Conflicts and Deviations

- 2.1 Any conflicts between this specification and other applicable Saudi Aramco Materials System Specifications (SAMSSs), Engineering Standards (SAESs), Standard Drawings (SASDs), or industry standards, codes, and forms shall be resolved in writing by the Company or Buyer Representative through the Manager, Consulting Services Department of Saudi Aramco, Dhahran.
- 2.2 Direct all requests to deviate from this specification in writing to the Company or Buyer Representative, who shall follow internal company procedure [SAEP-302](#) and forward such requests to the Manager, Consulting Services Department of Saudi Aramco, Dhahran.

3 References

The selection of material and equipment, and the design, construction, maintenance, and repair of equipment and facilities covered by this specification shall comply with the latest edition of the references listed below, unless otherwise noted.

3.1 Saudi Aramco References

Saudi Aramco Engineering Procedure

[SAEP-302](#)

*Instructions for Obtaining a Waiver of a
Mandatory Saudi Aramco Engineering
Requirement*

3.2 Industry Codes and Standards

American Society of Mechanical Engineers

ASME B31.3

Chemical Plant and Petroleum Refinery Piping

American Society for Testing and Materials

ASTM A194

*Carbon and Alloy Steel Nuts for Bolts for High
Pressure and High-Temperature Service*

ASTM A203

Pressure Vessel Plates, Alloy Steel, Nickel

<i>ASTM A320</i>	<i>Alloy Steel Bolting Materials for Low-Temperature</i>
<i>ASTM A333</i>	<i>Seamless and Welded Steel Pipe for Low-Temperature Service</i>
<i>ASTM A350</i>	<i>Carbon and Low-Alloy Steel Forgings, Requiring Notch Toughness Testing for Piping Components</i>
<i>ASTM A352</i>	<i>Steel Castings, Ferritic and Martensitic for Pressure Containing Parts, Suitable for Low-Temperature Service</i>

National Association of Corrosion Engineers / International Standardization Organization

[*NACE MR0175/ISO 15156*](#) *Petroleum and Natural Gas Industries-Materials for use in H₂S-Containing Environments in Oil and Gas Production*

Commentary Note:

In case of conflict between this specification and the referenced documents, this specification shall take precedence.

4 Design

- 4.1 The vendor shall ensure that all valves that permit pressure to be trapped in the body cavity in any closure position are provided with means to prevent excessive pressure build-up due to thermal expansion of liquids.
- 4.2 Valves that are classified as "Double Block & Bleed", shall either (a) be of a self-relieving design, or (b) be provided with an external relief system that will relieve pressure to the upstream or downstream side. Option (b) shall be approved by the Chairman of the Valves Standards Committee.
- 4.3 Valves that are not classified as "Double Block & Bleed" e.g., flexible wedge, double disc, soft-seated wedge and split wedge gate valves, floating seat ball valves, and other similar valves, shall either (a) be of a self-relieving design, or (b) have a 3–5 mm hole drilled in the upstream side of the closure element to relieve cavity pressure; such valves shall have the flow direction clearly marked on the body.

5 Materials

- 5.1 All nonmetallic seats, seals and packing shall be suitable for continuous exposure to design service conditions. The selected materials shall retain adequate resilience after prolonged and cyclic loading.
- 5.2 For valve designs with stuffing box, the stem packing shall be a combination packing consisting of two (2) braided graphite filament 99% carbon end rings (JC-1625G or equal) and graphite intermediate rings (JC-237 or equal).
- 5.3 All bolting shall be ASTM A320, Grade L7. The corresponding nuts shall be ASTM A194, Grade 4.
- 5.4 The requirements of [NACE MR0175/ISO 15156](#) shall not apply unless specified.
- 5.5 All appurtenances such as plug, nipple, relief, drain, and vent valve shall be AISI Type 316L stainless steel.

Metallic materials shall comply with ASME B31.3 Section 323.

6 Marking

- 6.1 In addition to the normal marking requirements, the valves shall have a 25 mm wide orange stripe on both sides, parallel with the longitudinal axis of the valve. Flanged valves shall also have the flange rim painted orange.
- 6.2 Identification stamping on or adjacent to welds shall be avoided. When stamping is necessary, only low stress stamping is permitted.
- 6.3 In addition to other requirements in the purchase order, the valve shall be permanently marked with the minimum design temperature.

Revision Summary

11 October 2010

Revised the "Next Planned Update." Reaffirmed the contents of the document, and reissued with editorial revision to reflect the changes in committee members list.