

TECHNICAL SPECIFICATION

VALVES IN SPECIAL SERVICE

MESC SPE 77/303

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MESC SPECIFICATION DOCUMENT



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PART I INTRODUCTION

1.1 SCOPE

This MESC SPE specifies requirements for valves in special service (see Part II).

This specification shall apply in addition to the applicable MESC Buying Description, purchase order or requisition sheet.

1.2 DISTRIBUTION, INTENDED USE AND REGULATORY CONSIDERATIONS

Unless otherwise authorised by Shell GSI, the distribution of this MESC SPE is confined to Shell companies and, where necessary, to Contractors and Manufacturers/Suppliers nominated by them.

This MESC SPE is intended for use in oil refineries, chemical plants, gas plants, exploration and production facilities and, where applicable, supply/distribution installations.

If national and/or local regulations exist in which some of the requirements may be more stringent than in this MESC SPE the Contractor shall determine by careful scrutiny which of the requirements are the more stringent and which combination of requirements will be acceptable with regards to safety, environmental, economic and legal aspects. In all cases the Contractor shall inform the Principal of any deviation from the requirements of this MESC SPE which is considered to be necessary in order to comply with national and/or local regulations. The Principal may then negotiate with the Authorities concerned, the objective being to obtain agreement to follow this MESC SPE as closely as possible.

1.3 DEFINITIONS

The Contractor is the party that carries out all or part of the design, engineering, procurement, construction, commissioning or management of a project, or operation or maintenance of a facility. The Principal may undertake all or part of the duties of the Contractor.

The Manufacturer/Supplier is the party that manufactures or supplies equipment and services to perform the duties specified by the Contractor.

The Principal is the party that initiates the project and ultimately pays for its design and construction. The Principal will generally specify the technical requirements. The Principal may also include an agent or consultant authorised to act for, and on behalf of, the Principal.

The word **shall** indicates a requirement.

The word **should** indicates a recommendation.

1.4 ABBREVIATIONS

EO	Ethylene-Oxide
HF	Hydrofluoric acid
OEM	Original Equipment Manufacturer
TGA	Thermogravimetric Analyzer

1.5 CHANGES SINCE PREVIOUS EDITION

The previous edition of this MESC SPE was dated February 2019. The change is to correct a typo in section 8 (space between “of” and “ISO 15156”).

1.6 COMMENTS ON THIS MESC SPE

Comments on this MESC SPE may be sent to the MESC SPE Administrator at MESC@shell.com.

PART II REQUIREMENTS

1. INTRODUCTION

Where any of the following services is specified, the applicable requirements specified in this MESC SPE shall apply:

- Steam.
- Hydrogen.
- Hydrofluoric acid (HF).
- Chlorine.
- Oxygen.
- Ethylene-Oxide (EO).
- Sour.
- Sodium hydroxide, potassium hydroxide (caustic soda) or amine.

2. STEAM

The following additional requirements shall apply, if steam service is specified:

- For metal seated rising stem valves in sizes $\geq$ DN 80 (NPS 3), the body seat(s) and back seat shall be integral or fully welded-in;
- For metal seated check valves in sizes $\geq$ DN 80 (NPS 3), the body seat shall be integral or fully welded-in.

3. HYDROGEN

The following additional requirement shall apply, if hydrogen service is specified:

- For metal seated rising stem valves in sizes $\geq$ DN 80 (NPS 3), the body seat(s) and back seat shall be integral or fully welded-in;
- For metal seated check valves in sizes $\geq$ DN 80 (NPS 3), the body seat shall be integral or fully welded-in.

4. HYDROFLUORIC ACID (HF)

The following additional requirements shall apply, if hydrofluoric acid (HF) service is specified:

- Where applicable, valves shall meet the applicable licensor specifications.
- Carbon steel forgings shall comply with supplementary requirement S62 of ASTM A 961.
- Carbon steel castings shall comply with supplementary requirement S16 of ASTM A 216.
- Carbon steel plate shall comply with supplementary requirement S54 of ASTM A 516.
- If a carbon steel gate valve is specified, the wedge guides for those valves in sizes $\geq$ DN 50 (NPS 2) shall be constructed from solid Alloy 400.
- Plug valves with a pressure balance hole and stagnant body cavities may only be used in carbon steel plug valves, if the body cavity is filled with a grease resistant to hydrofluoric acid.
- All flanges shall be painted with one coat of HF-detecting paint and shall not be insulated.

- Stem thread lubrication is prohibited.
- Valves shall be separately packaged in a clean and hermetically sealed plastic bag. If the bore of the valve permits, moisture absorbent sachets (e.g. silica gel) shall be placed inside the valve.
- For plug valves, the bottom flat portion (lower bowl area) of the body shall also be radiographed perpendicular to the flat portion along the center line of the stem including the other critical areas as specified in Fig. 14 of ASME B16.34.

5. CHLORINE

The following additional requirements shall apply, if chlorine service is specified:

- Valves shall be thoroughly cleaned, assembled, tested, inspected and packaged in accordance with the following:
 - Preliminary Cleaning

All component parts shall be cleaned so as to be visibly free of any defects, dirt, corrosion, scale, weld spatter, oil, grease, or any other particulate or hydrocarbon contamination.

Oil and grease shall be removed by steam cleaning or hot water wash with a mild detergent. Defects, scale, corrosion and weld spatter may be removed by e.g. abrasive blast cleaning, wire brush or grinding cleaning, or swab, spray, and dip cleaning, so long as there is no permanent damage to the fit, finish or functionality of the part. Carbon steel brushes and brushes that have been used on carbon steel parts shall not be used on stainless steel.

Preliminary cleaning of components may be accomplished during the normal manufacturing process and shall be visually examined for surface Irregularities in accordance with MSS-SP-55.
 - Secondary Cleaning

Benches and trolleys that are used for assembling and transporting products shall be covered with clean plastic sheets. Clean gloves shall be used for all parts handling. In addition, plastic covers shall be used to cover all clean parts during transportation.

Secondary cleaning for all wetted metallic parts that are not subject to oxidation shall be performed by means of a steam/hot water, in combination with a mild detergent.

Secondary cleaning for all wetted metallic parts that are subject to oxidation, e.g. rusting and scale shall be deoxidized and de-scaled in a phosphoric acid bath. Only metal parts of the same material will be allowed in the bath at the same time.

All parts, both rusting, non-rusting metallic and non-metallic, will then be thoroughly rinsed with an alcohol or hydrofluorocarbons, followed by dry, oil-free air blowing.
 - UV Visual Inspection

After all of the component parts have been cleaned and inspected, the finished product shall be assembled and pressure tested. After assembly and pressure testing, the final product shall be UV Visual inspected in darkness or subdued light, using an ultraviolet light radiating at wave lengths between 250 and 370 nm and an intensity of 800m W/cm² at the surface. If fluorescence shows up as a blotch, smear, smudge, or film, the entire component shall be re-cleaned.
 - Packaging