

TECHNICAL SPECIFICATION

VALVES IN LOW TEMPERATURE AND CRYOGENIC SERVICES

MESC SPE 77/200

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MESC SPECIFICATION DOCUMENT



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PART I INTRODUCTION

1.1 SCOPE

This MESC SPE specifies requirements for valves with a minimum design temperature $\geq -196\text{ }^{\circ}\text{C}$ ($-321\text{ }^{\circ}\text{F}$) and $< -29\text{ }^{\circ}\text{C}$ ($-20\text{ }^{\circ}\text{F}$).

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

The design requirements for the extended bonnet and the production test requirements have been contained in Part II of this MESC SPE. Other requirements are contained in the relevant base standard and applicable MESC SPEs (e.g. requirements for body cavity relief and anti blowout design).

The requirements for valves not requiring an extended bonnet (i.e. non-operable valves), but with a minimum design temperature below $-29\text{ }^{\circ}\text{C}$ ($-20\text{ }^{\circ}\text{F}$) have not been contained in this MESC SPE. Non-operable valves with a minimum design temperature below $-29\text{ }^{\circ}\text{C}$ ($-20\text{ }^{\circ}\text{F}$) shall undergo production testing in accordance with the base standard and fugitive emission testing in accordance with MESC SPE 77/312.

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 CHANGES SINCE PREVIOUS EDITION

The previous edition of this MESC SPE was dated February 2019. The changes are to clarify the applicability of the requirements in this MESC SPE (check valves added),

to change the table 1 and table 2 extended bonnet lengths in line with ISO 28921 and to remove thermal lagging extension requirements from this MESC SPE. These requirements have been transferred to the new MESC SPE 77/213.

1.5 COMMENTS ON THIS MESC SPE

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

PART II VALVES IN LOW TEMPERATURE AND CRYOGENIC SERVICES

1. INTRODUCTION

The requirements specified in this part are applicable, in case “extended bonnet” and the designation of this MESC SPE are specified **and for check valves, in case the designation of this MESC SPE is specified**. These requirements shall apply in addition to the design and testing requirements specified in the base standard of the valve and specified MESC SPEs.

2. EXTENDED BONNET

2.1 DESIGN

Valves for temperatures below -50 °C (-58 °F):

These valves shall be supplied with extended bonnets, meeting the minimum vapour space requirements as specified in Table 1, unless MESC datasheet specifically states: “extended bonnet not required”. The length of the extension shall be sufficient to maintain the stem packing at a temperature high enough to permit operation within the normal temperature range of the packing material. The vapour space for rising stem valves is defined as the distance between the bottom of the packing box and the top of the lower bonnet bush. The vapour space for quarter turn valves is defined as the distance between the bottom of the packing box and the top of the lower stem bearing.

Valves shall be capable of operation with the valve stem within 45° from the vertical.

Gear operators, actuators and their mounting bracketry shall not be attached to any part of the valve that would result in Loss of Primary Containment (LOPC) if the attachment bolting is loosened or removed.

Valves for service temperatures down to -50 °C (-58 °F):

Valves for service temperatures down to -50 °C (-58 °F) for which an extended bonnet is specified shall be supplied with extended bonnets, meeting the minimum vapour space requirements as specified in Table 1 for the temperature range -50 °C (-58 °F) to -110 °C (-66 °F).

Table 1 – Minimum vapour space length (bonnet extension)

Minimum design temperature	DN (NPS)	Min	15 (½)	40 (1½)	80 (3)	150 (6)	250 (10)	350 (14)	450 (18)	700 (28)	900 (36)
		Max	25 (1)	50 (2)	100 (4)	200 (8)	300 (12)	400 (16)	600 (24)	800 (32)	1200 (48)
From -197 °C to -110 °C (From -321 °F to -166 °F)	Minimum vapour space length		200 (7.9)	250 (9.8)	300 (11.8)	350 (13.8)	400 (15.8)	450 (17.7)	500 (19.7)	550 (21.7)	600 (23.6)
From -110 °C to -50 °C (From -166 °F to -58 °F)		mm (in)	100 (3.9)	125 (4.9)	150 (5.9)	175 (6.9)	200 (7.9)	250 (9.8)	300 (11.8)	350 (13.8)	400 (15.8)