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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 33146-2016

Valves for liquefied dimethyl ether cylinders

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(English Translation)

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1 Scope

This Standard specifies the terms and definitions, model compilation, structural type and basic dimensions, technical requirements, detection and test methods, inspection rules, marking, packaging, storage and transportation of liquefied dimethyl ether cylinder valves (hereinafter referred to as valves).

This Standard applies to valves on liquefied dimethyl ether cylinders with an ambient

temperature of $-40\text{ }^{\circ}\text{C} \sim +60\text{ }^{\circ}\text{C}$, a nominal working pressure of 1.6 MPa, a nominal volume of no more than 150 L, and a medium that complies with the provision of GB 25035.

This Standard does not apply to liquefied dimethyl ether cylinder valves for vehicles.

NOTE: The pressure in this Standard refers to the gauge pressure.

2 Normative Reference

The following documents are essential to the application of this Document. For the dated documents, only the versions with the dates indicated are applicable to this Document; for the undated documents, only the latest version (including all the amendments) is applicable to this

Document.

GB/T 197 General purpose metric screw threads - Tolerances

GB/T 228.1 Metallic materials - Tensile testing - Part 1. Method of test at room temperature

GB/T 1184 Geometrical tolerancing - Geometrical tolerance for features without individual tolerance indications

GB/T 1804 General Tolerances - Tolerances for Linear and Angular Dimensions without Individual Tolerance Indications

GB/T 3934 Specification of gauges for general purpose screw threads

GB/T 4423 Copper and copper alloy cold-drawn rod and bar

GB/T 5121.1 Methods for chemical analysis of copper - The electrolytic method for the determination of copper content

GB/T 5121.3 Methods for chemical analysis of copper and copper alloys - Part 3.

a) Aging resistance

Non-metallic seals shall be placed in air at a temperature of $100\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ for 72 h without cracks or obvious aging.

b) Low temperature resistance

Non-metallic seals shall be placed in air at a temperature of $-40\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ for 24 h without cracks or other damage.

c) Medium compatibility

After non-metallic seals are immersed in liquefied dimethyl ether solution at a temperature of $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ for 168 h, the volume expansion rate is no more than 15% or the shrinkage rate is no more than 1%, and the mass loss rate is no more than 10%.

6.2 Process requirements

6.2.1

The valve body shall be forged. The valve body surface shall be free of cracks, wrinkles, inclusions, incomplete filling and other defects that may damage the valve performance. The valve body surface shall be shot peened; and the size and depth of the surface pits shall be uniform.

6.2.2

Unspecified size tolerance specified shall be processed according to the Level-m precision in the GB/T 1804-2000 standard.

6.2.3

Unspecified geometric tolerance shall be processed according to the Level-k precision in the GB/T 1184-2000 standard.

6.2.4

The actual mass of valves of the same model, specification and trademark after assembly shall not deviate from the design mass of the valve by more than 5%.

6.3.1 Opening and closing performance

Under the nominal working pressure, the opening and closing torque of the valve shall not exceed 5 N·m; and there shall be no jamming when the valve is opened or closed in the full stroke.

6.3.2 Air tightness

Under the following conditions and states, the valve leakage shall not exceed 15 cm³/h, or no bubbles shall be generated when immersed in water for 1 min if tested by immersion method.

- a) Under nominal working pressure, closed and any open state;
- b) Under 0.05 MPa pressure, any open state.

6.4 Minimum design service life

The valve shall ensure safe use of at least one cylinder inspection cycle.

7.1.1 Test environment

Except for special requirements, the tests of this Standard are carried out at room temperature of 15 °C ~30 °C, and the test room is kept shockproof, moisture-proof, corrosion-proof and ventilated.

7.1.2 Test medium

Except for the pressure test medium which is clean tap water, other test media are pure dry air or nitrogen.

7.1.3 Test pressure gauge

The accuracy of the test pressure gauge shall be no lower than Class-1.6, and the range of the pressure gauge shall be 1.5 times to 2 times the test pressure.

7.2 Mechanical properties test and chemical composition analysis method of valve body

metallic material

The tensile test specimen and test method of valve body metallic material shall be in accordance with GB/T 228.1; and the chemical composition analysis method shall be in accordance with

GB/T 5121.1, GB/T5121.3 and GB/T5121.9.

NOTE: When not in arbitration, the chemical composition analysis method of metal can also be selected from electrolysis, atomic absorption, volumetric and spectroscopic methods.

7.3.1 Aging resistance test

Place three non-metallic seals in a test device at a temperature of $100\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ for 72 h. Then take them out and visually observe their changes. The results shall comply with the provisions of 6.1.2.1.

7.3.2 Low temperature resistance test

Place three non-metallic seals in a test device at a temperature of $-40\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ for 24 h. Then take it out and visually inspect its changes (if the seal is an O-ring, it shall be placed on a steel mandrel with a diameter 1.2 times the inner diameter of the O-ring). The result shall comply

The inlet thread of the valve is inspected by a gauge that complies with GB/T 8336 and shall comply with the provisions of 5.3.

The outlet thread of the valve is inspected by a gauge that complies with GB/T 3934 and shall comply with the provisions of 5.4.

7.6 Mass inspection

Put the assembled valve on a balance with a sensitivity of no more than 1 g and an error of no more than one thousandth; and weigh it, which shall comply with the provisions of 6.2.4.