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

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**Welded steel gas cylinders
(English Translation)**

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1 Scope

This document stipulates the basic parameters, technical requirements, test methods, inspection rules, as well as marking, packaging, transportation and storage, etc. of welded steel gas cylinders (hereinafter referred to as the steel cylinders).

This document is applicable to refillable low-pressure liquefied gas cylinders and cylinders filled with acetylene gas with porous packing that are used under normal ambient temperatures of $-40\text{ }^{\circ}\text{C} \sim 60\text{ }^{\circ}\text{C}$, with a withstand pressure test pressure of no more than 12 MPa (gauge pressure) and a nominal volume of 0.5 L $\sim$ 1,000 L.

This document also applies to fire-fighting gas cylinders filled with low-pressure liquefied gas for fire-fighting and its mixture with compressed gas.

2 Normative References

The following documents are indispensable to the application of this document. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 228.1 Metallic Materials - Tensile Testing - Part 1. Method of Test at Room Temperature

GB/T 229 Metallic Materials - Charpy Pendulum Impact Test Method

GB/T 232 Metallic Materials - Bend Testing Method

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

GB/T 7144 Colored Cylinder Mark for Gases

GB/T 8335 Special Threads for Gas Cylinders

GB/T 9251 Methods for Hydrostatic Test of Gas Cylinders

GB/T 9252 Method for Pressure Cycling Test of Gas Cylinders

GB/T 12137 Method for Leakage Test of Gas Cylinders

GB/T 13005 Terminology of Gas Cylinders

GB/T 14193 Rules for Filling of Liquefied Gas Cylinders working pressure shall be appropriately increased;

d) The saturated vapor pressure value of low-pressure liquefied gas at 60 °C shall comply with the provisions of GB/T 14193 or the corresponding standards on gas.

4.2.2 Withstand pressure test pressure

For the steel cylinders filled with liquefied gas or a mixture of liquefied gas and compressed gas, the withstand pressure test pressure shall not be less than 1.5 times the nominal working pressure. For the steel cylinders filled with acetylene gas, the withstand pressure test pressure shall be 5.2 MPa.

5.1 General Provisions for Materials

5.1.1

The material used to manufacture the main cylinder body shall be killed steel smelted in an electric furnace or converter, and it shall have satisfying forming and welding properties.

5.1.2

Generally speaking, the main cylinder body shall be made of the same designation of material.

5.1.3

All components welded to the main cylinder body shall be made of materials that are compatible with the welding properties of the material of the main cylinder body. Specifically speaking, the carbon content of materials used for valve seats and plug seats shall be less than

0.25%.

5.1.4

The welding materials used shall comply with the provisions of NB/T 47018. The tensile strength of the longitudinal and circumferential welded joints shall not be lower than the lower limit of the specified tensile strength of the base material.

5.1.5

The materials (including welding materials) shall comply with the corresponding technical standards, and valid quality certification documents shall be provided.

5.2 Chemical Composition

The chemical composition (smelting analysis) of the material of the main cylinder body shall comply with the provisions of Table 2. For steel containing trace alloying elements, the content shall comply with the provisions of Table 3.

of the accessories and their connection with the main cylinder body shall prevent fluid accumulation.

5.8.2 The base shall ensure the stability of the steel cylinders when they are upright and have holes for drainage and ventilation.

5.8.3 For the steel cylinders with a water volume greater than 150 L, lifting accessories or lifting holes shall be considered.

5.8.4 The selected cylinder valve shall satisfy the requirements of the medium in the cylinder.

The thread of the cylinder valve shall match the thread of the valve seat and shall comply with the provisions of GB/T 8335, GB/T 15383 and relevant standards. The length of the taper thread of the valve seat and plug seat shall not be less than the minimum length specified in the relevant standards on threads. The valve seat and plug seat of fire-fighting gas cylinders may adopt straight threads. The effective screwing length of straight threads is not less than 6 pitches, and the shear stress safety factor under the withstand pressure test pressure is at least 10.

5.8.5 Generally speaking, the steel cylinders shall be equipped with fixed caps or shields to prevent gas leakage caused by damage to the valves during storage and transportation.

5.8.6 The sealing materials used for the steel cylinders and their accessories shall be compatible with the medium in the cylinders.

5.8.7 When a safety discharge device is installed on the steel cylinders, its material shall be compatible with the medium in the cylinders and shall not affect the quality of the filling medium.

5.8.8 The safety discharge devices of liquefied propylene and propane cylinders shall comply with the requirements of Appendix A.

5.9 Batch Grouping

The manufacturer of the steel cylinders shall organize production in batches.

For the steel cylinders with a nominal volume less than or equal to 150 L, a batch shall consist of no more than 502 PCS; for the steel cylinders with a nominal volume greater than 150 L, a batch shall consist of no more than 50 PCS.

5.10 Welding Procedure Qualification

5.10.1

Before the production of the steel cylinders, or when the material of the main cylinder body, the welding materials and welding process need to be changed, the manufacturer of the steel cylinders shall conduct welding procedure qualification.

5.10.2

The production, properties test and result evaluation of test pieces for the welding procedure qualification shall be carried out in accordance with GB/T 33209. The welds for welding procedure qualification shall be able to represent the butt welds of the longitudinal and circumferential welds of the steel cylinders, the fillet welds or overlap welds connecting the convex pressure-bearing head and the cylinder body, the pressure-bearing fillet welds between the valve seat, plug seat and the main cylinder body, as well as the non-pressure-bearing fillet welds between the base, shields, etc. and the main cylinder body.

5.10.3

The welding procedure qualification documents shall be approved by the technical director of the cylinder manufacturer.

5.11 General Provisions for Welding

5.11.1

The welding of the steel cylinders shall be undertaken by welders holding a valid

"Special Equipment Welding Operation Certificate". The welding personnel of each weld can be tracked through welding records or seals. For the steel cylinders with a nominal wall thickness of the main cylinder body $S_n \geq 6$ mm, the welder's steel seal can be marked at an appropriate position near the welded seam.

5.11.2

The welding of welds of the main cylinder body shall adopt mechanized welding or automatic welding method, and rigorously comply with the qualified welding process.