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**NATIONAL STANDARD OF THE
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GB/T 45439-2025

**Technical specification for the application of traceability
two-dimensional code on fuel gas cylinders and fuel gas
cylinder valves**

燃气气瓶和燃气瓶阀溯源二维码应用技术规范

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1 Scope

This document specifies the labelling requirements, the test methods and the inspection rules for the traceability two-dimensional code of fuel gas cylinders and fuel gas cylinder valves, together with the basic requirements for the traceability system.

This document applies to the traceability two-dimensional code label of fuel gas cylinders and fuel gas cylinder valves, and to the design, manufacture, construction, application, maintenance and management of the traceability systems for fuel gas cylinders and fuel gas cylinder valves.

2 Normative references

The contents of the following documents constitute indispensable provisions of this document through normative reference in the text. For dated references, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies to this document.

GB 5842-2023 Liquefied petroleum gas cylinders; GB/T 6739 Paints and varnishes - Determination of film hardness by pencil test; GB 7512 Valves for liquefied petroleum gas cylinders; GB/T 13005 Gas cylinder terminology; GB/T 18284 Quick response matrix code; GB/T 18347 Code 128 bar code; GB/T 21049 Han Xin code; GB/T 22240-2020 Information security technology - Guide for grading of classified protection of cybersecurity; GB/T 33146 Valves for liquefied dimethyl ether cylinders; GB/T 33147 Liquefied dimethyl ether

steel cylinders; GB/T 35208 Self-closing valves for liquefied petroleum gas cylinders; GB/T 36373.1 Information resource management for special equipment - Specification for data elements - Part 1: Gas cylinders; GB/T 43072 Implementation guide for building a gas cylinder traceability system; GB/T 43616 Gas cylinder informatization - Basic requirements; TSG 23 Safety technical regulation for gas cylinders.

3 Terms and definitions

The terms and definitions given in GB/T 13005 and GB/T 43616 and the following apply to this document.

Fuel gas cylinder: a gas cylinder holding liquefied petroleum gas, liquefied dimethyl ether or another domestic fuel gas.

Fuel gas cylinder valve: a cylinder valve fitted to a fuel gas cylinder and used to control the opening and closing of the medium.

Traceability label based on a two-dimensional code, also termed traceability label: an electronically readable mark on a cylinder or a cylinder valve that is based on a two-dimensional code.

Manufacturing traceability system: an information system set up by the manufacturer to provide the manufacturing record data of fuel gas cylinders and fuel gas cylinder valves to the filling and using units, the registration bodies and the periodic inspection units of the cylinders, and to the general public.

4 Requirements

Traceability label - service life. The traceability label shall conform to the provisions on electronic reading of GB 5842-2023, GB 7512, GB/T 33146, GB/T 33147, GB/T 35208 and TSG 23. It shall remain complete and legible and shall be readable by scanning with a mobile phone throughout the design service life of the fuel gas cylinder or fuel gas cylinder valve.

Traceability label - rule for the electronic number. The electronic number consists of 12 digits: the first three are the unit code of the manufacturer of the fuel gas cylinder or fuel gas cylinder valve, and the last nine are the numerical serial number that the manufacturer assigns to the product. Serial numbers shall not be repeated, so that the electronic number is unique. Note: the electronic number is not the same as the traceable unique manufacturing number of the cylinder or valve, but it is bound to that number in the traceability system, so that the item can be identified by scanning.

Traceability label - content of the label. The content of the traceability label of a fuel gas cylinder shall include the characters meaning "electronic reading", the two-dimensional code, a one-dimensional bar code (not mandatory) and the 12-digit electronic number, as

shown in the example of Figure 1. The traceability label of a fuel gas cylinder valve requires only the two-dimensional code, as shown in the example of Figure 2. In Figure 1 the reference numbers denote: 1, the electronic number; 2, the one-dimensional bar code; 3, the Chinese characters meaning "electronic reading"; 4, the two-dimensional code.

Traceability label - size of the two-dimensional code. The two-dimensional code in the traceability label of a fuel gas cylinder shall be not smaller than 11 mm by 11 mm. The two-dimensional code in the traceability label of a fuel gas cylinder valve shall be not smaller than 9 mm by 9 mm.

Traceability label - symbology. The one-dimensional bar code shall use Code 128 and shall conform to GB/T 18347. The two-dimensional code shall conform to GB/T 18284 or GB/T 21049 and shall be an open, general-purpose two-dimensional code symbology; the information the two-dimensional code carries shall be encoded in clear, unencrypted form.

Traceability label - encoding rule for the two-dimensional code. A web address data structure shall be used, composed of the network service address (URL), a wildcard defined by the user, and the electronic number. The network service address is the domain name of the traceability system registered by the manufacturer of the fuel gas cylinder or fuel gas cylinder valve.

Traceability label - application requirements. When a cylinder leaves the manufacturer, when a cylinder that has passed periodic inspection leaves the inspection station, and when a filling and using unit takes back an empty cylinder or dispatches a full one, the traceability label shall be checked for completeness, legibility and correctness, and it shall be possible to identify and query it by scanning with a mobile phone. The manufacturer shall take effective process measures during production to prevent the surface of the traceability label from being damaged or covered. The periodic inspection unit shall take effective process measures during inspection to prevent the surface of the traceability label from being damaged or covered. When a fuel gas cylinder is treated so as to remove it from service, its electronic number shall be recorded and its status shall be marked in the relevant traceability system.

Traceability label - appearance and dimensions. The surface coating shall be complete and free from defects, the symbols, characters and artwork shall be clear and complete, and the shape, structure and dimensions shall conform to the drawing.

Traceability label - bendability. The traceability label of a fuel gas cylinder shall be bendable; after the bending test, the surface of the label shall show no cracks or other damage visible to the eye. No bendability requirement applies to the traceability label of a fuel gas cylinder valve.

Traceability label - scratch resistance. The hardness rating shall reach a pencil hardness of 7H or harder.

Traceability label - high-temperature resistance. After the high-temperature test, the content of the label shall still be identifiable by scanning with a mobile phone.

Traceability label - fire resistance. After the fire test, the content of the label shall still be identifiable by scanning with a mobile phone.

Traceability label - corrosion resistance. After the salt spray test, the content of the label shall still be identifiable by scanning with a mobile phone.

Traceability system - general. The architecture of the system shall be built in accordance with GB/T 43072. Starting from the manufacturing traceability system as its source, it may be extended by links to the stages of registration for use, filling management, periodic inspection and removal of the cylinder from service, and also to the stages of distribution and end use of bottled fuel gas.

Traceability system - basic requirements for the manufacturing traceability system. The manufacturing record data of each fuel gas cylinder and each fuel gas cylinder valve produced by the manufacturer shall be recorded individually; the manufacturing record data of fuel gas cylinders shall conform to Annex A and those of fuel gas cylinder valves to Annex B. The certificate of conformity, the batch quality certificate, the supervisory inspection certificate, the type test certificate and the mark of the unit owning the cylinder shall be recorded for each batch and uploaded to the traceability information system, with download and update services provided; scanning the traceability label with a mobile phone shall give direct access to that information. The system shall be able to publish and update the manufacturing record data, and the manufacturer shall be responsible for linking them to the official website registered by the enterprise. The system shall provide a public scanning query function, so that scanning the traceability label shows the manufacturing data published by the manufacturer for the cylinder and the valve, together with hazard warnings and defect recall notices. The system shall provide a hyperlink scanning and reading service to the filling and use traceability system for fuel gas cylinders, implemented as set out in Annex C. The system shall provide download and update services for the manufacturing record data to the filling and using units, the registration bodies and the periodic inspection units, implemented as set out in Annex D and satisfying at least one of the following three methods: a data interface protocol; an intermediate database; or export and import of spreadsheets. The manufacturer of the fuel gas cylinder or fuel gas cylinder valve shall send the manufacturing record data of the products it dispatches to a third-party public backup service system at the same time; where the manufacturer is unable to provide a normal traceability information service, the third-party public backup service system takes over the service. The traceability system shall keep the manufacturing record data of the cylinders and valves and shall provide data services, and the period of data retention and data service shall be not less than the design service life of the cylinder and the valve. The information security protection level of the traceability system shall meet the requirements of the first protection level of GB/T 22240-2020, and technical and