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

GB/T 46630-2025

Safety valves for cryogenic vessels

低温容器用安全阀

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is modified to adopt ISO 21013-1:2021 "Pressure relief devices for cryogenic vessels in cryogenic conditions - Part 1: Repeatable shut-off devices".

The pressure relief valve.

Compared with ISO 21013-1:2021, this document has undergone many structural adjustments. A comparison of the structural numbering changes between the two documents is provided below.

See Appendix A for the table.

The technical differences between this document and ISO 21013-1:2021, and the reasons therefor, are as follows.

---Terms and definitions commonly used in safety valves, such as "nominal size," "pressure," "cryogenic medium," and "rated pressure," have been removed, and new regulations have been added.

The terms and definitions in GB/T 21465 and GB/T 12241-2021, which are referenced in the normative standard, are specified (see Chapter 3);

---The term and definition of "maximum permissible working pressure" have been added (see 3.4) to meet the needs of practical applications in my country;

---The normative reference GB/T 12243 (see 4.1, 4.3.1) has been added to clarify the technical requirements and material requirements that safety valves should meet.

Seeking to improve operability;

---The relevant content of the international standards referenced for cryogenic media has been changed to informative Appendix B (see 4.1), and applicable media are listed in tabular form.

To improve operability and facilitate the application of this document;

---ASME B16.34 has been replaced with the normatively referenced GB/T 12224 (see 4.2.7, 4.3.2.3); The normatively referenced...

GB/T 28776 replaces ISO 15761 (see 4.2.7) to adapt to my country's technical conditions and improve operability;

---The design requirements for minimum shell thickness have been modified (see 4.2.7) to adapt to my country's technical conditions and improve operability;

To improve operability, the material requirements have been expanded to include compliance with GB/T 12241, GB/T 12243, and GB/T 29026.

Requirements (see 4.3.1);

---Added the normative reference GB/T 29026, and modified the reference standards for material selection and the adoption of overseas standards in the general requirements for materials.

Requirements for graded materials (see 4.3.1) should be specified to comply with relevant safety technical specifications and improve operability;

---The conditions for exempting metallic castings from low-temperature impact testing have been modified (see 4.3.2.3) to adapt to my country's technological conditions and improve reliability.

Operability;

---ISO 21010 has been replaced with the normatively referenced GB/T 31481 (see 4.3.5.1) to adapt to my country's technical conditions and improve reliability.

Operability;

---The technical requirements for anti-static performance have been changed from "maximum resistance not exceeding 1000ohm at 28V" to "the resistance between ports not exceeding..." Under a DC voltage of 12V, the maximum resistance should not exceed 10ohm (see 4.4) to meet the needs of practical applications in my country.

To improve the safety of products in flammable environments;

---The unit for leakage rate in this document has been changed (see 5.2.1.1, 5.2.1.2, 5.2.2.4.2, 5.2.2.4.3, and 5.2.3.3). The original "Std" unit has been changed.

The standard operating conditions corresponding to "cc/s" are inconsistent with the environmental conditions corresponding to the standard operating conditions in my country. Therefore, the environmental conditions corresponding to the leakage rate are determined by...

Adding "(Values under environmental conditions of 0.1013 MPa and 15°C)" after the leakage rate unit directly improves operability;

---The experimental setup diagram has been modified by adding the serial number "4---orifice plate" (see Figure 1) to meet the requirements of actual experiments;

---The requirement for the alternative medium in the alternative test has been changed from "can also be -196°C" to "liquid nitrogen can also be used as an alternative test medium".

The medium (see 5.2.3.2) is consistent with the requirement of 5.2.2.3 because -196°C is the boiling point of liquid nitrogen, thus improving operability;

---The description of the markings on the valve body and the nameplate in the "Marking" section has been combined, and the following has been added. "The product number should be the one on the valve body." "Permanent markings" (see Chapter 6) are required to comply with relevant safety technical specifications;

---Replace "PR" in the marking with the nominal pressure [see Chapter 6f)], because the rated pressure PR is inconsistent with the relevant safety technical specifications.

conflict;

---This document does not incorporate the content of the amendment to ISO 21013-1:2021/Amd.1.2024, because that amendment introduced normative appendices.

The content of section A consists of recommended European and American documents, which are not suitable for my country's technical conditions.

The following editorial changes have been made to this document.

---To harmonize with existing standards, the standard name has been changed to "Safety Valves for Cryogenic Containers";

---A warning has been added before the scope content;

---The phrase "medium sublimation condition" should be changed to "medium deposition condition" (see 4.2.5). The original text is incorrect.

---Appendix A (Informative) "Structure Number Comparison Table" has been added;

---Appendix B (Informative) "Non-toxic Cryogenic Liquid Gases" has been added;

---References have been added.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed and is under the jurisdiction of the National Technical Committee on Standardization of Boilers and Pressure Vessels (SAC/TC262).

1 Scope

This document specifies the technical requirements, testing and inspection, and standardization of spring-loaded direct-load safety valves (hereinafter referred to as "safety valves") for cryogenic containers.

Zhihe lead seal.

This document applies to applications with nominal sizes not exceeding DN150, media temperatures below -10°C, and operating temperatures ranging from media temperature to ambient temperature.

Furthermore, safety valves are used to release cryogenic gas media. Only after a safety valve has been designed, manufactured, and tested can it be suitable for various single-phase gases.

Or a mixture of gases.

Note: This document does not provide a method for calculating the safety valve discharge capacity of a specific cryogenic vessel. For relevant calculation methods, please refer to ISO 21013-3.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

GB/T 12224 General requirements for steel valves GB/T 12241-2021 General requirements for safety valves (ISO 4126-1:2013, MOD) Note. There are no technical differences between the content referenced in GB/T 12241-2021 and the content referenced in ISO 4126-1:2013.

GB/T 12243 Spring-loaded safety valve GB/T 21465 Valve Terminology GB/T 28776 Steel gate valves, globe valves and check valves for use in the petroleum and natural gas