



BSI Standards Publication

Cryogenic vessels — Pressure-relief accessories for cryogenic service

Part 1: Reclosable pressure-relief valves

National foreword

This British Standard is the UK implementation of ISO 21013-1:2021+A1:2024. It supersedes BS ISO 21013-1:2021, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to ISO text carry the number of the ISO amendment. For example, text altered by ISO amendment 1 is indicated by A1 A1.

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A list of organizations represented on this committee can be obtained on request to its committee manager.

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Cryogenic vessels — Pressure-relief accessories for cryogenic service —

Part 1: Reclosable pressure-relief valves

*Réipients cryogéniques — Dispositifs de sécurité pour le service
cryogénique —*

Partie 1: Soupapes de sûreté pour service cryogénique



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 220, *Cryogenic vessels*.

This second edition cancels and replaces the first edition (ISO 21013-1:2008), which has been technically revised.

The main changes are as follows:

- update of the terms and definitions;
- revision of cryogenic tests, in particular, the test setup.

A list of all parts in the ISO 21013 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Cryogenic vessels — Pressure-relief accessories for cryogenic service —

Part 1: Reclosable pressure-relief valves

1 Scope

This document specifies the requirements for the design, manufacture and testing of pressure relief valves for cryogenic service, i.e. for operation with cryogenic fluids below $-10\text{ }^{\circ}\text{C}$ in addition to operation at ambient temperatures from ambient to cryogenic.

This document is applicable to valves not exceeding a size of DN 150 designed to relieve single-phase vapours or gases. A valve can be specified, constructed and tested such that it is suitable for use with more than one gas or with mixtures of gases.

NOTE This document does not provide methods for determining the capacity of relief valve(s) for a particular cryogenic vessel. Such methods are provided in ISO 21013-3.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4126-1:2013, *Safety devices for protection against excessive pressure — Part 1: Safety valves*

ISO 11114-1, *Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 1: Metallic materials*

ISO 11114-2, *Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 2: Non-metallic materials*

ISO 15761, *Steel gate, globe and check valves for sizes DN 100 and smaller, for the petroleum and natural gas industries*

ISO 20421-1:2019, *Cryogenic vessels — Large transportable vacuum-insulated vessels — Part 1: Design, fabrication, inspection and testing*

ISO 21009-1:2008, *Cryogenic vessels — Static vacuum-insulated vessels — Part 1: Design, fabrication, inspection, and tests*

ISO 21010, *Cryogenic vessels — Gas/material compatibility*

ISO 21028-1, *Cryogenic vessels — Toughness requirements for materials at cryogenic temperature — Part 1: Temperatures below $-80\text{ }^{\circ}\text{C}$*

ISO 21028-2, *Cryogenic vessels — Toughness requirements for materials at cryogenic temperature — Part 2: Temperatures between $-80\text{ }^{\circ}\text{C}$ and $-20\text{ }^{\circ}\text{C}$*

ISO 21029-1:2018, *Cryogenic vessels — Transportable vacuum insulated vessels of not more than 1 000 litres volume — Part 1: Design, fabrication, inspection and tests*

ISO 23208, *Cryogenic vessels — Cleanliness for cryogenic service*

ASME B16.34: 2017, *Valves — Flanged, Threaded, and Welding end*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

DN

nominal size

alphanumeric designation of size for components of a pipe work system, which is used for reference purposes

Note 1 to entry: It comprises the letters DN followed by a dimensionless whole number which is indirectly related to the physical size, in millimetres, of the bore or outside diameter of the end connections.

[SOURCE: ISO 6708:1995, 2.1, modified — Moved additional information from the definition into a Note 1 to entry and deleted the previous two Notes to entry.]

3.2

pressure

gauge pressure

pressure for which the value is equal to the algebraic difference between the absolute pressure and the atmospheric pressure

3.3

rated minimum temperature

lowest temperature for which the pressure relief valve is rated by the manufacturer

3.4

category A valve

relief valve which can be expected to relieve pressure during normal operation of the cryogenic vessel

Note 1 to entry: The procedure for the seat-tightness test is described in [5.2.1.2](#).

3.5

category B valve

relief valve which is not expected to relieve pressure during normal operation due to the provision of an alternative relieving or control device, e.g. a pressure regulating vent valve designed for frequent operation

Note 1 to entry: The procedure for the seat-tightness test is described in [5.2.1.2](#).

3.6

cryogenic fluid

refrigerated liquefied gas

gas which is partially liquid because of its cold temperature

Note 1 to entry: This includes totally evaporated liquids and supercritical fluids.

3.7

PS

maximum allowable pressure

maximum pressure for which the equipment is designed as specified by the manufacturer

Note 1 to entry: Overpressure and relieving pressure are defined in ISO 4126-1.