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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 refermables*



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 21013-1 was prepared by Technical Committee ISO/TC 220, *Cryogenic vessels*.

ISO 21013 consists of the following parts, under the general title *Cryogenic vessels — Pressure-relief accessories for cryogenic service*:

- *Part 1: Reclosable pressure-relief valves*
- *Part 2: Non-reclosable pressure-relief devices*
- *Part 3: Sizing and capacity determination*

# Cryogenic vessels — Pressure-relief accessories for cryogenic service —

## Part 1: Reclosable pressure-relief valves

### 1 Scope

This International Standard specifies the requirements for the design, manufacture and testing of pressure relief valves for cryogenic service, i.e. for operation with cryogenic fluids in addition to operation at temperatures from ambient to cryogenic. It is a requirement of this International Standard that the valves comply with ISO 4126-1; in the event of different requirements, this International Standard takes precedence.

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

**NOTE** This part of ISO 21013 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 referenced documents are indispensable for the application 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, *Safety devices for protection against excessive pressure — Part 1: Safety valves*

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

ISO 11114-2, *Transportable 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, *Cryogenic vessels — Large transportable vacuum-insulated vessels — Part 1: Design, fabrication, inspection, and testing*

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

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

ISO 21028-1, *Cryogenic vessels — Toughness requirements for materials at cryogenic temperature — Part 1: Temperatures below — 80 °C*

ISO 21028-2, *Cryogenic vessels — Toughness requirements for materials at cryogenic temperature — Part 2: Temperatures between –80 °C and –20 °C*

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

ISO 23208:2005, *Cryogenic vessels — Cleanliness for cryogenic service*

ASME B16.34-2004, *Valves — Flanged, Threaded, and Welding end*

### 3 Terms and definitions

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

#### 3.1

##### **DN**

##### **nominal size**

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

NOTE 1 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.

NOTE 2 Adapted from ISO 6708.

#### 3.2

##### **pressure**

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

NOTE This is also known as gauge pressure.

#### 3.3

##### **rated minimum temperature**

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

#### 3.4

##### **valve category A**

relief valve type which passed the test of the repeatability of seat tightness at re-seat for 1 000 cycles

NOTE The procedure for the seat-tightness test is described in 5.2.1.2.

#### 3.5

##### **valve category B**

relief valve type which passed the test of the repeatability of seat tightness at re-seat for 20 cycles

NOTE The procedure for the seat-tightness test is described in 5.2.1.2.

#### 3.6

##### **cryogenic fluid**

fluid defined as cryogenic fluid in ISO 21029-1, or ISO 21009-1, or ISO 20421-1

NOTE This includes totally evaporated liquids and supercritical fluids.

#### 3.7

##### **rated pressure**

##### **PR**

maximum pressure difference between the inside and outside of any pressure-retaining boundary for which it is designed to be operated at 20 °C

NOTE The PR of the valve is the lowest PR of any component of the valve.