



SLOVENSKI STANDARD

SIST EN 13648-1:2009

01-januar-2009

Nadomešča:
SIST EN 13648-1:2002

Kriogene posode - Varnostna oprema proti prekoračitvi tlaka - 1. del: Varnostni ventili za kriogeno področje

Cryogenic vessels - Safety devices for protection against excessive pressure - Part 1: Safety valves for cryogenic service

Kryo Behälter - Sicherheitsrichtungen gegen Drucküberschreitung - Teil 1: Sicherheitsventile für den Kryo-Betrieb

Réipients cryogéniques - Dispositifs de protection contre les surpressions - Partie 1: Soupapes de sureté pour service cryogénique

Ta slovenski standard je istoveten z: **EN 13648-1:2008**

ICS:

13.240	Varstvo pred previsokim tlakom	Protection against excessive pressure
23.020.40	Proti mrazu odporne posode (kriogenske posode)	Cryogenic vessels

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EUROPEAN STANDARD
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Supersedes EN 13648-1:2002

English Version

Cryogenic vessels - Safety devices for protection against excessive pressure - Part 1: Safety valves for cryogenic service

Réceptifs cryogéniques - Dispositifs de protection contre les surpressions - Partie 1: Soupapes de sûreté pour service cryogénique

Kryo-Behälter - Sicherheitseinrichtungen gegen Drucküberschreitung - Teil 1: Sicherheitsventile für den Kryo-Betrieb

This European Standard was approved by CEN on 5 October 2008.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN 13648-1:2008) has been prepared by Technical Committee CEN/TC 268 “Cryogenic vessels”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2009, and conflicting national standards shall be withdrawn at the latest by May 2009.

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

This document supersedes EN 13648-1:2002.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EC Directive(s) 97/23/EC.

For relationship with EC Directive(s), see informative Annex ZA, which is an integral part of this document.

This European Standard is composed of the following Parts:

EN 13648-1, *Cryogenic vessels – Safety devices for protection against excessive pressure – Part 1: Safety valves for cryogenic service*;

EN 13648-2, *Cryogenic vessels – Safety devices for protection against excessive pressure – Part 2: Bursting disc safety devices for cryogenic service*;

EN 13648-3, *Cryogenic vessels – Safety devices for protection against excessive pressure – Part 3: Determination of required discharge – Capacity and sizing*.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

EN 13648-1:2008 (E)**1 Scope**

This European Standard specifies the requirements for the design, manufacture and testing of safety valves for cryogenic service, that is to say for operation with cryogenic fluids (as defined in EN 1251-1) below $-10\text{ }^{\circ}\text{C}$ in addition to operation at ambient temperature. It is a requirement of this European Standard that the valves comply with EN ISO 4126-1 or EN ISO 4126-4. In the event of different requirements, the requirements for cryogenic service are applied.

NOTE 1 A cryogenic fluid (refrigerated liquefied gas) is a gas which is partially liquid because of its low temperature (including totally evaporated liquids and supercritical fluids).

This European Standard is restricted to valves not exceeding a size of DN 100 for category B. The valves of category A are limited to DN 25 and set pressures up to 40 bars. Both categories are 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 2 All safety valves covered in this European Standard correspond to category IV of PED (Directive 97/23/EC) and category 3 of TPED (Directive 99/36/EC).

NOTE 3 This European Standard does not provide methods for determining the capacity of relief valve(s) for a particular cryogenic vessel. Such methods are provided in EN 13648-3.

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.

EN 1252-1, *Cryogenic vessels – Materials – Part 1: Toughness requirements for temperatures below $-80\text{ }^{\circ}\text{C}$*

EN 1252-2, *Cryogenic vessels – Materials – Part 2: Toughness requirements for temperatures between $-80\text{ }^{\circ}\text{C}$ and $-20\text{ }^{\circ}\text{C}$*

EN 1797, *Cryogenic vessels – Gas/material compatibility*

EN 12300, *Cryogenic vessels – Cleanliness for cryogenic service*

EN ISO 4126-1:2004, *Safety devices for protection against excessive pressure – Part 1: Safety valves (ISO 4126-1:2004)*

EN ISO 4126-4:2004, *Safety devices for protection against excessive pressure – Part 4: Pilot operated safety valves (ISO 4126-4:2004)*

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 pipework system, which is used for reference purposes and which comprises the letters DN followed by a dimensionless whole number that is indirectly related to the physical size, in millimetres, of the bore or outside diameter of the end connections

[adapted from EN ISO 6708:1995]

3.2**pressure**

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

3.3**specified minimum temperature**

lowest temperature for which the safety valve is specified

3.4**safety valve category A**

safety valve which might be expected to relieve periodically during operation of the cryogenic vessel due to the absence of an alternative relieving or control device

EXAMPLE A pressure regulating vent valve designed for frequent operation.

3.5**safety valve category B**

safety valve which would not be expected to relieve during normal operation due to the provision of an alternative relieving or control device

3.6**cryogenic fluid**

gas which is partially liquid because of its low temperature

NOTE The cryogenic fluids include evaporated liquids and supercritical fluids. The refrigerated but non-toxic gases given in Table 1 and mixtures of them are referred to as cryogenic fluids.

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Table 1: Refrigerated but non-toxic gases

Item and group	Identification number, name and description ^a
3° A	Asphyxiant gases 1913 Neon, refrigerated liquid 1951 Argon, refrigerated liquid 1963 Helium, refrigerated liquid 1970 Krypton, refrigerated liquid 1977 Nitrogen, refrigerated liquid 2187 Carbon dioxide, refrigerated liquid 2591 Xenon, refrigerated liquid 3136 Trifluoromethane, refrigerated liquid 3158 Gas, refrigerated liquid, N.O.S. ^b
3° O	Oxidizing gases 1003 Air, refrigerated liquid 1073 Oxygen, refrigerated liquid 2201 Nitrous oxide, refrigerated liquid, oxidizing 3311 Gas, refrigerated liquid, oxidizing, N.O.S. ^b
3° F	Flammable gases 1038 Ethylene, refrigerated liquid 1961 Ethane, refrigerated liquid 1966 Hydrogen, refrigerated liquid 1972 Methane, refrigerated liquid or natural gas, refrigerated liquid, with high methane content 3138 Ethylene, acetylene and propylene mixture, refrigerated liquid, containing at least 71,5 % ethylene with not more than 22,5 % acetylene and not more than 6 % propylene 3312 Gas, refrigerated liquid, flammable, N.O.S. ^b
^a Item and group, identification number, name and description according to the United Nations. ^b N.O.S. = not otherwise specified.	

3.7 relieving pressure

pressure used for the sizing of a safety valve which is greater than or equal to the set pressure plus overpressure

NOTE For set pressure and overpressure definitions see EN ISO 4126-1.

4 Requirements

4.1 General

The valve shall satisfy all the requirements of EN ISO 4126-1 or EN ISO 4126-4 except in cases where these Standards include diverging requirements, then this European Standard shall be applied.

4.2 Design

4.2.1 Design temperature

The valve shall be suitable for operation at all temperatures between the specified minimum temperature and + 65 °C.

4.2.2 Drainage

The design of the valve or its installation shall be such as to avoid accumulation of water within it, even when the specified outlet connection is fitted.

4.2.3 Stem guiding

The design of guiding shall avoid malfunction of the valve due to deposition and freezing of atmospheric moisture on and within the valve during normal operation. The valve shall be sufficiently robust such that the effectiveness of the guiding cannot be defeated by normal handling.

4.2.4 Inserts

Where soft disc inserts are used to ensure leak tight shut off (see 5.2.2), the design shall be such as to prevent cold flow of the insert to a degree that results in the valve failing to operate correctly.

4.2.5 Sublimating cryogenics

Where the valve is specified as suitable for service with products that, when vented to atmosphere from any pressure between the valve's relieving pressure and re-seating pressure and at any temperature within the valve's specified operating temperature range, condense from gas or vapour directly to solid, for example CO₂, the design shall be such as to avoid the valve failing to operate correctly due to deposition of solid product within the valve body or its outlet.

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4.3 Materials

4.3.1 General

This clause indicates important material properties for safe use of safety valves (prevention of embrittlement, gas compatibility, etc.).

NOTE It does not address all the PED essential requirements relevant to materials (in particular no recommended materials are listed).

Materials that may come into contact with the process fluid during operation shall be compatible with the process fluid. The materials of all components shall have mechanical properties suitable for their minimum operating temperatures.

4.3.2 Metallic materials

Metallic materials shall be in conformance with EN 1252-1 or EN 1252-2 as appropriate to the specified minimum temperature.

4.3.3 Corrosion resistance

In addition to resistance to normal atmospheric corrosion (or adequate protection), particular care shall be taken to ensure that the valve cannot be rendered inoperative by accumulation of corrosion products. Some copper alloys are susceptible to stress corrosion cracking, consequently careful consideration shall be given before selection of these materials for components under stress.