SLOVENSKI STANDARD
SIST EN 1626:2009

01-april-2009

Nadomeġļa:
SIST EN 1626:2001

Kriogene posode - Ventili za kriogeno podroļje

Cryogenic vessels - Valves for cryogenic service

Kryo Behälter - Absperrarmaturen für tiefkalten Betrieb

Récipients cryogéniques - Robinets pour usage cryogénique

Ta slovenski standard je istoveten z: **EN 1626:2008**

ICS:

23.020.40	Proti mrazu odporne posode (kriogenske posode)	Cryogenic vessels
23.060.01	Ventili na splošno	Valves in general

SIST EN 1626:2009 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1626

November 2008

ICS 23.020.40; 23.060.01

Supersedes EN 1626:1999

English Version

Cryogenic vessels - Valves for cryogenic service

Récipients cryogéniques - Robinets pour usage cryogénique

Kryo Behälter - Absperrarmaturen für tiefkalten Betrieb

This European Standard was approved by CEN on 13 September 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.

CEN members are the national standards bodies of 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 United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 1626:2008: E

Contents

Foreword

This document (EN 1626:2008) 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of an identical text or by endorsement, at the latest by May 2009, and conflicting national standards shall be withdrawn at the latest by May 2009.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 will supersede EN 1626:1999.

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 EU Directive(s).

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

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.

1 Scope

This European Standard specifies the requirements for the design, manufacture and testing of valves for cryogenic service, i.e. for operation with cryogenic fluids below - 10 °C as well as at ambient conditions to allow for start-up and run-down. It specifies additional requirements for cryogenic service for the appropriate valve product standard.

NOTE 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).

It applies to sizes up to DN 150 including vacuum jacketed cryogenic valves.

This European Standard is not applicable to safety valves and valves for liquefied natural gas (LNG).

It is intended that the valve be designed and tested to satisfy a pressure rating (PN or Class). Valves may then be selected with a PN or Class equal to or greater than the maximum allowable pressure (PS) of the equipment with which it is to be used.

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 19, *Industrial valves - Marking of metallic valves*

EN 736-1, *Valves - Terminology - Part 1: Definition of types of valves*

EN 736-2, *Valves - Terminology - Part 2: Definition of components of valves*

EN 736-3, *Valves - Terminology - Part 3: Definition of terms*

EN 1092-1, *Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 1: Steel flanges*

EN 1251-1, *Cryogenic vessels - Transportable vacuum insulated vessels of not more than 1000 litres volume – Part 1: Fundamental requirements*

EN 1252-1, *Cryogenic vessels - Materials - Part 1: Toughness requirements for temperatures below - 80 °C*

EN 1333, *Flanges and their joints - Pipework components - Definition and selection of PN*

EN 1759-1, *Flanges and their joint – Circular flanges for pipes, valves, fittings and accessories, Class designated – Part 1: Steel flanges, NPS ½ to 24*

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

EN 12266-1, *Industrial valves - Testing of valves - Part 1: Pressure tests, test procedures and acceptance criteria - Mandatory requirements*

EN 12266-2, *Industrial valves - Testing of valves - Part 2: Tests, test procedures and acceptance criteria - Supplementary requirements*

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

EN 12516-1, *Industrial valves – Shell design strength – Part 1: Tabulation method for steel valve shells*

EN 12516-2, *Industrial valves - Shell design strength - Part 2: Calculation method for steel valve shells*

EN 12516-4, *Industrial valves – Shell design strength – Part 4: Calculation method for valve shells manufactured in metallic materials other than steel*

EN ISO 6708, *Pipework components - Definition and selection of DN (nominal size) (ISO 6708:1995)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 736-1, EN 736-2 and EN 736-3, and the following apply.

3.1
nominal size (DN)
defined in accordance with EN ISO 6708

3.2
pressure rating
either nominal pressure (PN) as defined in accordance with EN 1333 and EN 1092-1 or Class rating as defined in EN 1759-1

3.3
specified minimum temperature
lowest temperature the valve is specified for

3.4
valve category A
valves intended to be operated with normal frequency (above 20 cycles a year)

3.5
valve category B
valves intended to be operated only occasionally i.e. with a frequency below 20 cycles a year

4 Requirements

4.1 Materials

4.1.1 Metallic materials

Metallic materials to be used in the construction of cryogenic valves shall be suitable for general valve uses as defined in EN 12516-1, EN 12516-2 and EN 12516-4. In addition, the following requirements apply:

4.1.1.1 Toughness requirements

Materials which exhibit a ductile/brittle transition shall have minimum impact test values specified in EN 1252-1. These requirements apply only to the critical parts of the valve exposed to cryogenic temperatures (and not to control elements for example).

Non ferrous materials which can be shown to have no ductile/brittle transition do not require additional impact tests.

4.1.1.2 Corrosion resistance

Materials shall be resistant to or protected from normal atmospheric corrosion and to the medium handled.

4.1.1.3 Oxygen compatibility

If the specified minimum temperature is equal to or below the boiling point of air (approximately – 190 °C at atmospheric pressure) or the valve is intended for oxygen service the materials which are, or likely to be, in contact with oxygen or an oxygen enriched air shall be oxygen compatible in accordance with EN 1797.

4.1.1.4 Flammable gas compatibility

For hydrogen service, see EN 1797.

Copper alloys less than 70 % of copper shall be used for fluids containing acetylene.

4.1.2 Non metallic materials

Non metallic materials to be used in packing, seats and glands shall:

- have mechanical properties which will allow the valves to pass the sample valve test for category A valves as defined in this standard (see 5.2);
- be oxygen compatible, if applicable, see 4.1.1.3.

If non metallic materials are used for structural parts, their suitability shall be proven.

4.2 Design

4.2.1 General

The valves shall fulfil their function in a safe manner within the temperature range from + 65 °C to their specified minimum temperature and the pressure range intended for use.

4.2.2 Packing gland

Valves can have an extended stem. The length of the extension shall be sufficient to maintain the stem packing at a temperature high enough to permit operation within the normal temperature range of the packing material.

Valves without an extended stem shall have a stem packing capable of operating at the specified minimum temperature. The handle shall be designed to remain operable for the duration of the sample valve test in accordance with 5.2.3.2.

Gland designs incorporating a gland nut with a male or female thread shall be such that the nut shall not unscrew unintentionally, for example when the valve is operated.

4.2.3 Operating positions

Valves with an extended stem shall be capable of operation with the valve stem at any position from the vertical to 25° above the horizontal.

4.2.4 Trapped liquid

Cavities where liquid can be trapped and build up detrimental pressures due to evaporation or expansion of the liquid during warming up of the valve are not permitted.

NOTE For ball and gate valves this requirement can be met by the provision of a pressure relief hole or passage or other means, e.g. pressure relieving seats, to relieve pressure in the bonnet and body cavities to the upstream side of the valve.

4.2.5 Valve bonnet

Valve bonnets may be brazed, welded, bolted, screwed or union type. Union type bonnets shall not be used on valves greater than DN 50. Union nuts shall be locked to the body. Screwed bonnets shall also be secured by a union nut or another device offering equivalent safety.

4.2.6 Securing of gland extension

For bronze or copper alloy valves of PN 100 or greater, the gland extensions shall be mechanically secured in the bonnet prior to brazing. (For instance by screwing).

4.2.7 Seat (seating assembly)

Valves may have metal/metal or metal/soft or soft/soft seating assembly. Soft seat materials shall be adequately supported to prevent cold flow of the seat material or shall be backed by a secondary metal seat.

4.2.8 Blow-off safety of the spindle

The valve stem/shaft shall be secured so that it cannot be blown out of the body in the event of the gland being removed while the valve is under pressure.

4.2.9 Torque

The maximum torque to operate manual valves under service conditions, when applied at the rim of the hand wheel or lever, shall not exceed 350 x R N.m, except for valve seating and unseating, when it shall not exceed 500 x R Nm. For a hand-wheel, R is the radius of the wheel in meters. For a lever R is the length of the lever in meters minus 0,05 m.

The valve shall be robust enough to withstand 1000 R N.m or equivalent in linear force as specified above without damage. A lower value is permitted if there is a limiting torque or stroke device. Stems/shafts torsional strength within the pressure boundary shall be designed to exceed the torsional strength of the stem/shaft to the packing by at least 10 %.

Valves intended for actuator operation may have torque or linear force requirements deviating from the above. The sample valve tests shall then be performed including a proper actuator to operate the valve.

4.2.10 Electrical continuity and explosion proofness

All valves shall have a maximum electrical resistance of 1000 Ω in order to ensure electrical continuity to prevent build-up of static electricity.

For flammable fluids, any equipment attached to or associated with a valve shall be suitable for the hazard zone.

5 Testing

5.1 Production tests

The production test shall be performed in accordance with the requirements of applicable valve product standards. If these standards refer to EN 12266-1 and EN 12266-2, closure test leakage rate A is required.

5.2 Type testing

5.2.1 Selection of sample valves

One sample valve shall be tested. It shall be representative of the valves to be produced. If a range of valves of identical design but with different size is to be tested, one sample of the smallest and one sample of the largest shall be tested.

5.2.2 Verification of the design

A second sample valve shall be inspected to ensure that the design satisfies the requirements of Clause 4.

5.2.3 Ambient condition tests

5.2.3.1 Initial tests

The sample valve shall first pass the tests as described in 5.1.