SLOVENSKI STANDARD
SIST EN 14433:2023

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Nadomešča:
SIST EN 14433:2015

Cisterne za prevoz nevarnega blaga - Oprema cisterne za prevoz tekočih kemikalij in utekočinjenih plinov - Izpustni ventili

Tanks for the transport of dangerous goods - Tank equipment for the transport of liquid chemicals and liquefied gases - Foot valves

Tanks für die Beförderung gefährlicher Güter - Ausrüstung für Tanks für die Beförderung von flüssigen Chemieprodukten und Flüssiggasen - Bodenventile

Citernes de transport de matières dangereuses - Équipements de la citerne pour le transport de produits chimiques liquides et de gaz liquéfié - Clapets de fond

Ta slovenski standard je istoveten z: **EN 14433:2023**

ICS:

13.300	Varstvo pred nevarnimi izdelki	Protection against dangerous goods
23.020.20	Posode in vsebniki, montirani na vozila	Vessels and containers mounted on vehicles

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EUROPEAN STANDARD

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EN 14433

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ICS 23.020.20; 23.060.99

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English Version

Tanks for the transport of dangerous goods - Tank equipment for the transport of liquid chemicals and liquefied gases - Foot valves

Citernes destinées au transport de matières dangereuses - Équipements de la citerne pour le transport de produits chimiques liquides et de gaz liquéfiés - Clapets de fond

Tanks für die Beförderung gefährlicher Güter - Ausrüstung für Tanks für die Beförderung von flüssigen Chemieprodukten und Flüssiggasen - Bodenventile

This European Standard was approved by CEN on 21 May 2023.

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

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European foreword

This document (EN 14433:2023) has been prepared by Technical Committee CEN/TC 296 “Tanks for transport of dangerous goods”, 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of an identical text or by endorsement, at the latest by January 2024, and conflicting national standards shall be withdrawn at the latest by January 2024.

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

This document supersedes EN 14433:2014.

This document has been submitted for reference in:

— the RID; and

— the technical annexes of the ADR.

NOTE These regulations take precedence over any clause of this document. It is emphasized that RID/ADR are being revised regularly at intervals of two years which may lead to temporary non-compliances of the clauses of this document with the regulations.

The main changes compared to the previous edition are listed below:

a) the Scope has been revised;

b) Normative references have been updated;

c) the definition and source for 3.4 has been changed;

d) a Note has been added to 5.2.6;

e) revision of Clause 5 “Design and materials”;

f) a new Clause 6 “Welding” has been introduced.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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

1 Scope

This document specifies the requirements for foot valves for use on tanks with a minimum working pressure greater than 50 kPa for the transport of dangerous goods by road and rail.

It is applicable to metallic equipment on tanks for the following functions for internal stop valves:

— primary closure of gravity discharge lines (liquid substances);

— primary closure of bottom discharge lines (liquid gases: liquid phase and gas phase);

— primary closure of top discharge (poisonous liquefied gases: liquid phase and gas phase);

— and other internal valves as specified in Annex F of EN 14564:2019 according to the scope of this document.

NOTE 1 The document is also applicable to liquefied gases including LPG; however, for a dedicated LPG standard see EN 13175 [3].

NOTE 2 Valves according to this document can be used as primary closure in case of top discharge of liquids and other products.

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.

EN 10204, *Metallic products - Types of inspection documents*

EN 12266-1:2012, *Industrial valves - Testing of metallic valves - Part 1: Pressure tests, test procedures and acceptance criteria - Mandatory requirements*

EN 12266-2:2012, *Industrial valves - Testing of metallic valves - Part 2: Tests, test procedures and acceptance criteria - Supplementary requirements*

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 12516-3:2002, *Valves - Shell design strength - Part 3: Experimental method*

EN 13445-3, *Unfired pressure vessels - Part 3: Design*

EN ISO 3834-1, *Quality requirements for fusion welding of metallic materials - Part 1: Criteria for the selection of the appropriate level of quality requirements (ISO 3834-1)*

EN ISO 3834-3, *Quality requirements for fusion welding of metallic materials - Part 3: Standard quality requirements (ISO 3834-3:2021)*

EN ISO 9606 (all parts), *Approval testing of welders - Fusion welding - Part 4: Nickel and nickel alloys (ISO 9606 (all parts))*

EN ISO 14732, *Welding personnel - Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials (ISO 14732)*

EN ISO 15613, *Specification and qualification of welding procedures for metallic materials - Qualification based on pre-production welding test (ISO 15613)*

EN ISO 15614 (all parts), *Specification and qualification of welding procedures for metallic materials - Welding procedure test (ISO 15614 (all parts))*

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
maximum working pressure
MWP
maximum pressure up to which the valve can be operated, not more than the test pressure divided by 1,3

[SOURCE: ADR/RID chapter 6.8]

3.2
maximum allowable working pressure
MAWP

maximum pressure up to which the valve can be operated, not more than the test pressure divided by 1,3 (liquified gases) respectively 1,5 (liquids)

[SOURCE: ADR/RID chapter 6.7]

3.3
test pressure
pressure used for the pressure tests

3.4
nominal size
DN
alphanumeric designation of size for components of a pipework system, which is used for reference purposes. 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 1 to entry: The number following the letters DN does not represent a measurable value and should not be used for calculation purposes except where specified in the relevant standard.

Note 2 to entry: In those standards which use the DN designation system, any relationship between DN and component dimensions should be given, e.g. DN/OD or DN/ID.

[SOURCE: EN ISO 6708:1995]

4 Function

The foot valve is a primary valve located in the lower part of the tank to allow the controlled loading and discharge of the product and to ensure leak tightness in the closed condition.

5 Design and materials

5.1 General

The foot valve shall be designed for a working pressure of at least 300 kPa. The foot valve shall normally be a non-pressure balanced design. If the valve is a pressure balanced design, a surge pressure of 5 times the MWP shall not jeopardize the tightness of the housing or the function of the valve. The manufacturer shall specify in drawings and other papers, the design and the materials of the foot valve. The valve specification shall include information regarding mating tank flange details.

5.2 Design

5.2.1 The valve shall provide a closure located within the tank shell.

5.2.2 The valve closure shall be positioned so that the pressure in the tank acts to increase the force on the valve seat, and shall be so designed as to prevent self-opening of the valve.

5.2.3 The opening of the valve shall be such as to give a minimum flow path through the valve of a diameter equal to the DN designation of the valve.

5.2.4 The operating mechanism shall be protected from inadvertent operation in transit either by a latching device or by locating within an enclosure.

5.2.5 The internal stop-valve of all filling and all discharge openings of tanks (for tank containers with a capacity greater than 1 m^3) intended for the carriage of liquefied flammable or toxic gases shall be instant-closing and shall close automatically in the event of an unintended movement of the tank or in the event of fire. It shall also be possible to operate the internal stop-valve by remote control.

NOTE This function can be achieved by additional components, which are not in the scope of this document.

5.2.6 The operating mechanism of each valve shall have an indicator for the direction of opening and/or closing.

This may be added at the valve, tank or vehicle. In this case, this shall be stated in the manual or type approval of the valve.

5.2.7 The external valve casing shall have a weakened section (e.g. a shear groove in the external casing or other appropriate means) so positioned that should the valve casing be removed by a severe impact, the sealing capability of the valve shall not be affected. This requires that, in the case of a bottom-operated valve, the operating mechanism of the valve be not directly connected to the valve closure.

5.2.8 Regarding the calculation of flanges and body wall thickness the requirements given in EN 12516-1, EN 12516-2 and EN 12516-3 or EN 13445-3 apply.

5.3 Materials

5.3.1 The manufacturer shall provide, with the equipment, the material specification for those parts that may come into contact with the product.

5.3.2 The material elongation at fracture of the pressure-loaded components of the valve shall be a minimum of 12 %.

5.3.3 The materials for the valve casing shall be permanently marked with the material designation corresponding to European pressure vessel material standards or with an equivalent national standard designation.

5.3.4 Proof of the quality characteristics for the valve body shall be provided by means of an inspection certificate 3.1 in accordance with EN 10204 for metallic materials (with additional consideration of EN 764-4 and -5) or an equivalent document.

6 Welding

6.1 Qualification

6.1.1 Manufacturers of welded service equipment shall have a manufacturing system for welding which respects the principles of EN ISO 3834-1 and EN ISO 3834-3 as a minimum.

6.1.2 Welding procedures shall be qualified according to EN ISO 15613 and EN ISO 15614 (all parts) (level 1 or level 2 for EN ISO 15614-1).

6.1.3 Welders shall be qualified according to EN ISO 9606 (all parts) and operators of welding equipment shall be qualified according to EN ISO 14732.

6.2 Welded joints

Recommended weld shapes are given in EN 1708-1.

7 Test media

7.1 Hydraulic tests

Hydraulic tests shall be carried out using a fluid in accordance with EN 12266-2:2012, A.1.5.

7.2 Pneumatic tests

Pneumatic tests shall be carried out using a gas in accordance with EN 12266-2:2012, A.1.5.

8 Type tests

8.1 General

Each valve used for testing shall conform to the drawings and dimensions specified and specification provided by the manufacturer. Each design of valve, as verified in Annex A, shall be subjected to a type test. Type testing according to 8.2 to 8.6 shall be carried out under ambient conditions. If the valve is required to operate outside the temperature range –40 °C to +50 °C, the design shall be taken into account either in the type testing or by a validated calculation method. For the calculation of the test pressure, EN 12516-3:2002, 6.3 and 6.4 apply.

The tests shall be carried out with the casing/valve attached to a flange equivalent to that for which its use is intended.

8.2 Valve casing hydraulic pressure test

The valve casing shall be hydraulically tested, using a test medium conforming to 6.1 at a pressure equal to a minimum of 2,25 times the MWP or 400 kPa whichever is the greater. The test pressure shall be maintained for a minimum of 5 min on the valve casing without permanent deformation occurring.

8.3 Valve assembly pressure test

The valve assembly shall be hydraulically or pneumatically tested, using a test medium conforming to 7.1 or 7.2 at a pressure equal to 1,5 times the MWP (MAWP), or 400 kPa, whichever is the greater. The test pressure shall be maintained for a minimum of 10 min on the valve assembly. The leakage shall not exceed Rate A as specified in EN 12266-1:2012, Table A.5. Each assembly pressure test shall be carried out:

a) with the valve in the closed position and the outlet open to test for leakage from the seats;

b) with the valve in the open position and the outlet closed off to test for leakage from gland seals and body joints.

8.4 Closure, casing and valve assembly pneumatic tightness tests

For each design of the valve, as specified in Annex A, the closure, the casing and the valve assembly shall be pneumatically tested, using a test medium conforming to 7.2, at pressures equal to 20 kPa and 1,0 times the MWP (MAWP).

The valve closure, casing and valve assembly shall be totally immersed in a water bath, or, where total immersion of the valve closure, casing and valve assembly is not possible, a suitable leak detection fluid shall be applied. The test pressure shall be maintained for a minimum of 10 min on the valve closure, casing and valve assembly. The leakage shall not exceed Rate A as specified in EN 12266-1:2012, Table A.5. Each pneumatic tightness test shall be carried out:

a) with the valve in the closed position and the outlet open to test for leakage from the valve seats;

b) with the valve in the open position and the outlet closed off to test for leakage from gland seals or body joints.

If the tests specified above do not cover all seals to the environment, these seals of the valve assembly shall also be tested.