SLOVENSKI STANDARD
oSIST prEN 14433:2022

01-julij-2022

Cisterne za prevoz nevarnega blaga - Oprema cistern 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: **prEN 14433**

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

oSIST prEN 14433:2022 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 14433

May 2022

ICS 23.020.20; 23.060.99

Will supersede EN 14433:2014

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 liquéfié - Clapets de fond

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

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 296.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Turkey and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

Page

European foreword

This document (prEN 14433:2022) has been prepared by Technical Committee CEN/TC 296 “Tanks for transport of dangerous goods”, the secretariat of which is held by AFNOR.

This document is currently submitted to the enquiry.

This document will supersede EN 14433:2014.

This document has been submitted for reference into:

— 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 with the clauses of this document.

Compared with EN 14433:2014 the following significant changes apply:

a) change of scope;

b) added a note to 5.2.5;

c) added a note to 8.1;

d) modifications to 9.

1 Scope

This document specifies the requirements for foot valves for use on transportable 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:

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

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

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

— and other internal valves as defined in Annex F of EN 14564:2019.

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

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 11299-1:2018, *Plastics piping systems for renovation of underground gas supply networks - Part 1: General (ISO 11299-1:2018)*

3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://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
numerical designation of the size of a component which is a convenient round number approximately equal to the manufacturing dimension in millimetres

[SOURCE: EN ISO 11299-1:2018]

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.

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 relevant EN reference, where possible, for the valve casing material shall be permanently marked on the valve casing. Should no EN exist then the appropriate national standard designation may be used.

6 Test media

6.1 Hydraulic tests

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

6.2 Pneumatic tests

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

7 Type tests

7.1 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 7.2 to 7.6 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.

7.2 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.

7.3 Valve assembly pressure test

The valve assembly shall be hydraulically or pneumatically tested, using a test medium conforming to 6.1 or 6.2 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 defined 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.

7.4 Closure, casing and valve assembly pneumatic tightness tests

For each design of the valve, as defined in Annex A, the closure, the casing and the valve assembly shall be pneumatically tested, using a test medium conforming to 6.2, 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 defined above do not cover all seals to the environment, these seals of the valve assembly shall also be tested.

7.5 Cyclic test

The valve assembly shall be subjected to a mechanical cycle test to a minimum of 1 000 full cycles ("open" to "closed") without pressure and 10 full cycles ("open" to "closed") at MWP (MAWP) or maximum rating opening pressure at ambient temperature being applied. After completion of the cyclic test, the valve assembly shall be tested in accordance with 7.4 and the leakage shall not exceed Rate A as defined in EN 12266-1:2012, Table A.5.

7.6 Breakaway test

7.6.1 General

The foot valve shall be attached with a suitable gasket to a flange of requirements as defined in 5.1. The flange shall be attached to a test vessel which simulates the tank connection. All bolts intended for tank attaching of the valve shall be tightened. Vertical drop valves that are intended to be mounted to the tank and followed immediately by a tee pipe to the side of the tank should have a tee/elbow fitted to the outlet flange prior to the rigid beam. Following the breakaway of the valve body, the valve shall be hydraulically tested at pressures equal to 20 kPa and 1,0 times the MWP (MAWP). The test pressure shall be maintained for a minimum of 10 min and the leakage shall not exceed Rate B as defined in EN 12266-1:2012, Table A.5.

7.6.2 Test apparatus

The test apparatus consists of the following:

— a rigid beam capable of transmitting the impact load to the valve without permanent deformation, 1 000 mm long, rigidly attached to the foot valve outlet flange;

— a test vessel which is a pressurizable test chamber which simulates the tank and has a MWP (MAWP) at least equal to the valve to be tested;

— a suitable gasket material which is either the specific gasket material to be specified with the valve or which is specified for a range of gasket material with the lowest required seating stresses with compression recovery rate;

— a tee/elbow to change the direction of the outlet pipe simulating the piping connection to the tank.

7.6.3 Test procedure for valves conforming to ADR/RID chapter 6.8

Apply, to the beam 1 000 mm from the centre line of the inlet flange, a sufficient force, perpendicular to the valve outlet pipe and in the same plane as the foot valve tank flange, until the valve body breaks away at the shear device, or the outlet deforms more than 30° (see Figure B.1 a), b) and c)).