SLOVENSKI STANDARD
SIST EN 14433:2015

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Nadomešča:
SIST EN 14433:2006

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 flüssiger Chemieprodukte und Flüssiggase - Bodenventile

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

Ta slovenski standard je istoveten z: **EN 14433:2014**

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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English Version

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

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Foreword

This document (EN 14433:2014) 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of an identical text or by endorsement, at the latest by April 2015 and conflicting national standards shall be withdrawn at the latest by April 2015.

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 14433:2006.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This European Standard has been submitted for reference into:

— the RID [1], and

— the technical annexes of the ADR [2].

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

Compared to EN 14433:2006 the following changes have been made:

a) the scope of the standard has been enlarged to include liquefied gases;

b) the references to ADR/RID have been included in the respective clauses of the main part of the standard;

c) the normative references have been updated;

d) change of test conditions (test pressure, hold time).

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard 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 for use on tanks with gravity and/or pressure bottom loading and discharge for liquid chemicals and liquefied gases. It includes carbon dioxide while excluding refrigerated liquefied gases.

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

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 13445-1, *Unfired pressure vessels - Part 1: General*

EN ISO 11299-1:2013, *Plastics piping systems for renovation of underground gas supply networks - Part 1: General (ISO 11299-1:2011)*

3 Terms and definitions

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

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
the 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 11299-1:2013]

4 Function

The footvalve 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 leaktightness in the closed condition.

5 Design and materials

5.1 General

The footvalve shall be designed for a working pressure of at least 300 kPa. The footvalve 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 footvalve. 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.

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 13445-1 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 coupling 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 footvalve 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;