SLOVENSKI STANDARD
SIST EN 13616-1:2016

01-oktober-2016

Nadomešča:
SIST EN 13616:2004
SIST EN 13616:2004/AC:2006

Naprave za preprečitev prepolnitve za nepremične rezervoarje za tekoča goriva - Zahteve in metode za preskušanje in ocenjevanje - 1. del: Naprave za preprečitev prepolnitve z zaporno napravo

Overfill prevention devices for static tanks for liquid fuels - Requirements and test/assessment methods - Part 1: Overfill prevention devices with closure device

Überfüllsicherungen für ortsfeste Tanks für flüssige Brenn- und Kraftstoffe - Anforderungen und Prüf-/Bewertungsverfahren - Teil 1: Überfüllsicherungen mit Schließeinrichtung

Dispositifs limiteurs de remplissage pour réservoirs statiques pour carburants liquides - Exigences et méthodes d'essai/d'évaluation - Partie 1: Dispositifs limiteurs de remplissage avec dispositif de fermeture

Ta slovenski standard je istoveten z: **EN 13616-1:2016**

ICS:

23.020.10	Nepremične posode in rezervoarji	Stationary containers and tanks
75.200	Oprema za skladiščenje nafte, naftnih proizvodov in zemeljskega plina	Petroleum products and natural gas handling equipment

SIST EN 13616-1:2016 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13616-1

June 2016

ICS 23.020.10

Supersedes EN 13616:2004

English Version

Overfill prevention devices for static tanks for liquid fuels - Part 1: Overfill prevention devices with closure device

Dispositifs limiteurs de remplissage pour réservoirs statiques pour carburants liquides - Partie 1: Dispositifs limiteurs de remplissage avec dispositif de fermeture

Überfüllsicherungen für ortsfeste Tanks für flüssige Brenn- und Kraftstoffe - Teil 1: Überfüllsicherungen mit Schließeinrichtung

This European Standard was approved by CEN on 8 April 2016.

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-CENELEC 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-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, 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 United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

European foreword ... 4
1 Scope ... 5
2 Normative references ... 5
3 Terms and definitions ... 5
4 Requirements ... 6
4.1 General ... 6
4.1.1 Vapour tight ... 6
4.1.2 Non vapour tight ... 6
4.2 Effectiveness ... 6
4.2.1 General ... 6
4.2.2 Operational flow range and operational pressure range ... 6
4.2.3 Pressure surge range ... 7
4.2.4 Closure level range ... 7
4.2.5 Operational leak rate ... 7
4.3 Construction ... 7
4.4 Durability against wear from closure cycles ... 8
5 Test methods ... 8
5.1 General ... 8
5.2 Chemical suitability test ... 8
5.3 Temperature range test ... 8
5.4 Component pressure tests ... 9
5.5 Function tests ... 9
5.5.1 General ... 9
5.5.2 Final closure level test ... 9
5.5.3 Operational leak rate after final closure level test ... 10
5.5.4 Pressure surge test ... 10
5.6 Mechanical strength ... 10
5.7 Vapour tight – Non vapour tight test procedure ... 11
5.7.1 Vapour tight test procedure ... 11
5.7.2 Non vapour tight test procedure ... 11
5.8 Durability test ... 11
6 Assessment and verification of constancy of performance - AVCP ... 11
6.1 General ... 11
6.2 Type testing ... 11
6.2.1 General ... 11
6.2.2 Test samples, testing and compliance criteria ... 12
6.2.3 Test reports ... 13
6.2.4 Shared other party results ... 13
6.2.5 Cascading determination documentation of the product type testing results ... 14
6.3 Factory production control (FPC) ... 15
6.3.1 General ... 15
6.3.2 Requirements ... 15
6.3.3 Product specific requirements ... 18
6.3.4 Procedure for modifications ... 18

6.3.5 One-off products, pre-production products (e.g. prototypes) and products produced in very low quantity 19
7 Classification 19
8 Marking, labelling and packaging 20
8.1 Identification 20
8.2 Instruction plate 20
8.3 Technical documentation 20
Annex A (normative) Equipment for use in a hazardous area 21
A.1 General 21
A.2 Avoidance or reduction of ignition sources 21
A.3 Electrical equipment 21
A.4 Non-electrical equipment 21
A.5 Electrostatic discharge 21
Annex B (normative) Test rigs layouts 22
Annex C (normative) Additional information on diameter and flow rate 23
Annex D (informative) Environmental checklist 24
Annex ZA (informative) Clauses of this European Standard addressing the provisions of the EU Construction Products Regulation 26
ZA.1 Scope and relevant characteristics 26
ZA.2 Procedure for AVCP of overfill prevention devices with closure device 27
ZA.2.1 System(s) of AVCP 27
ZA.2.2 Declaration of performance (DoP) 28
ZA.2.2.1 General 28
ZA.2.2.2 Content 28
ZA.2.2.3 Example of DoP 29
ZA.3 CE marking and labelling 31
Annex ZB (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2014/34/EU 33
Bibliography 34

European foreword

This document (EN 13616-1:2016) has been prepared by Technical Committee CEN/TC 393 "Equipment for storage tanks and for filling stations", the secretariat of which is held by DIN.

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 December 2016, and conflicting national standards shall be withdrawn at the latest by 2017-07-11.

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, together with EN 13616-2 and EN 16657, supersedes EN 13616:2004.

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 or ZB, which is an integral part of this document.

According to EN 13616:2004, the following fundamental changes are given:

— splitting of EN 13616:2004; the new EN 13616, under the general title *Overfill prevention devices for static tanks for liquid fuels*, will consist of the following parts:

  - *Part 1: Overfill prevention devices with closure device;*
  - *Part 2: Overfill prevention devices without closure device.*

— parameters regarding explosion safety updated;

— informative Annex C concerning environmental aspects added;

— the requirements for overfill prevention devices without closure device on static tanks are in EN 13616-2;

— the requirements for overfill prevention devices without closure device on the tank vehicle were moved to EN 16657, *Tanks for the transport of dangerous goods — Transport tank equipment for overfill prevention devices for static tanks*.

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 contains requirements, test and assessment methods, marking, labelling and packaging applicable to overfill prevention devices with closure device. The devices are usually composed by

— sensor,

— evaluation device,

— closure device.

Overfill prevention devices intended to be used in/with underground and/or above ground, non-pressurized, static tanks designed for liquid fuels.

NOTE Liquid fuel means liquids for internal combustion engines, heating/cooling boilers and generators.

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 1127-1:2011, *Explosive atmospheres — Explosion prevention and protection — Part 1: Basic concepts and methodology*

EN 14879-4:2007, *Organic coating systems and linings for protection of industrial apparatus and plants against corrosion caused by aggressive media — Part 4: Linings on metallic components*

EN 60079-14, *Explosive atmospheres — Part 14: Electrical installations design, selection and erection (IEC 60079-14)*

EN ISO 80079-36:2016, *Explosive atmospheres — Part 36: Non-electrical equipment for explosive atmospheres — Basic method and requirements (ISO 80079-36:2016)*

3 Terms and definitions

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

3.1
overfill prevention device
device installed in a supply system, which automatically stops the delivery, preventing the liquid level in the tank exceeding a final closure level

3.2
initial closure level
lower level than final closure level at which the overfill prevention device stops the liquid flow and which level it can be reopened

3.3
final closure level
level at which the overfill prevention device prevents any further product, apart from a permissible leak rate, entering the storage tank

3.4
supply system
connection hoses, fittings, devices and any fixed pipework through which the liquid is delivered to the static tank from any tank vehicle

Note 1 to entry: The supply system includes both tank vehicle and stationary tank equipment.

3.5
tank vehicle
vehicle built to carry liquids in integral tanks comprising one or more compartments intended for discharge to static tanks

3.6
operational leak rate
permitted flow rate of liquid allowed to pass through the overfill prevention device after final closure

3.7
operational pressure
pressure in the filling pipe which can be reached during the filling of the tank, excluding the pressure during the closure of the overfill prevention device

3.8
vapour tight overfill prevention device
device where no vapour can pass through from the ullage spaces in normal operation

4 Requirements

4.1 General

The overfill prevention device shall be either vapour tight or non-vapour tight.

4.1.1 Vapour tight

The overfill prevention device shall not leak vapour between the filling pipe and the tank vapour space.

4.1.2 Non vapour tight

The overfill prevention device shall not present an overall vapour leak greater than the equivalent leak from a hole of Ø 3 mm at a pressure 3,5 kPa pressure.

4.2 Effectiveness

4.2.1 General

For pressure, flow velocity, flow rate and time the tolerances are ± 5 %.

4.2.2 Operational flow range and operational pressure range

4.2.2.1 Overfill prevention device for gravity filling only (see Table C.1)

The device shall work at flow velocities between 0,2 m/s and 3 m/s.

The device shall not re-open at a static pressure > 15 kPa after closure.

The device shall withstand static pressure of at least 200 kPa after closure.

4.2.2.2 Overfill prevention device for gravity or pump filling (see Table C.1)

The device shall work at flow velocities between 0,2 m/s and 3 m/s.

The device shall not open at a static pressure > 15 kPa after closure.

The device shall withstand a static pressure of at least 600 kPa or 800 kPa after closure according to manufacturer's declaration.

4.2.3 Pressure surge range

4.2.3.1 General

The operation of the overfill prevention device shall not generate pressure in excess of the design criteria of the supply system.

4.2.3.2 Overfill prevention device for gravity filling only

Any pressure surge created by the overfill prevention device at closure, exceeding 300 kPa, shall not exceed a period of more than 10 ms.

4.2.3.3 Overfill prevention device for gravity or pump filling

For pumps with a performance of 600 kPa, any pressure surge created by the overfill prevention device at closure exceeding 900 kPa shall not exceed a period of more than 10 ms.

For pumps with a performance of 800 kPa any pressure surge created by the overfill prevention device at closure exceeding 1 200 kPa shall not exceed a period of more than 10 ms.

4.2.4 Closure level range

4.2.4.1 General

For both, single and two stage closure devices once the final closure level is reached, no further liquid other than the operational leak rate (see 4.2.5) shall enter the tank.

The final closure level shall be set so that after final closure of any device, the contents of the flexible delivery hose (and preferably the site delivery pipe) can be emptied into the tank.

4.2.4.2 Single stage closure device

On filling the tank to the final closure level, a complete and automatic closure of the flow, other than the operational leak rate (see 4.2.5), shall be effected.

4.2.4.3 Two stages closure device

On filling the tank to the initial closure level, automatic closure of the flow shall be effected. After reopening, and when the final closure level is reached, a complete and automatic closure of the flow, other than the operational leak rate (see 4.2.5), shall be effected.

4.2.5 Operational leak rate

The device shall not have a leak flow rate greater than 300 l/h after initial or final closure level at operational pressure.

4.3 Construction

4.3.1 Requirements for equipment for use in hazardous area according to Annex A.

4.3.2 All construction materials shall be compatible with and resist chemical attack by the liquid and its vapours, within the temperature range of −20 °C to +40 °C. The manufacturer shall specify all materials in contact with the liquid. Chemical suitability shall be tested in accordance with 5.2.

NOTE For equipment designed for operation in explosive atmospheres the normal ambient temperature range is −20°C to +40°C, unless otherwise specified and marked. See Annex A and relevant standards indicated for complete information.

4.3.3 The overfill prevention device shall be of a durable construction. Durability shall be tested in accordance with 5.2, 5.6 and test rig according to Annex B.

4.3.4 All parts of the overfill prevention device situated either internally or externally on the tank shall withstand static negative pressure of ($30\ ^{0}_{-5}$) kPa and positive pressure of ($100\ ^{0}_{-5}$) kPa test to comply with 5.4.

4.4 Durability against wear from closure cycles

The device shall fulfil 4.2 after 1 500 cycles at the maximum flow (see Table C.1) and operational pressure given in 4.2.2.1 and 4.2.2.2 on the test rig according to Annex B.

5 Test methods

5.1 General

The manufacturer shall compile a list of all components and supply specifications to demonstrate that these components will not be affected in the design temperature range.

For all tests other than 5.2 and 5.4, the overfill prevention device shall be installed in accordance with the manufacturer's instructions in a test rig layout as shown in Annex B.

5.2 Chemical suitability test

The durability of all materials of the complete overfill prevention device normally exposed to liquids or their vapours, shall be tested against chemical attacks for the declared liquid with the test liquid of each relevant group according to Annex C of EN 14879-4:2007.

Respectively three samples shall be immersed into test liquid and shall be exposed to their vapour 56 days at a temperature of (+20 ± 5) °C.

After this test the functionality of the overfill prevention device shall be checked.

5.3 Temperature range test

A fresh sample shall be used. The manufacturer shall compile a list of all components and supply specifications to demonstrate that these components will not be affected in the design temperature range. The different components shall be separately tested at the temperature of −20°C and +40°C.

A complete overfill prevention device shall be subjected to the temperatures; all mechanisms shall move, function freely and close by a manual test.

The manual test shall include a final closure simulation, and verify leak rate complies with 4.2.5 at −20°C and +40°C.

5.4 Component pressure tests

If any part of overfill prevention device is designed to be installed inside the tank or any other part of the system which may be pressurized, it shall be placed in a closed pressure vessel and subjected to an external pressure for (60 ± 5) min for each test. After the test, the device shall be working correctly, according to 5.5.

The equipment shall be subjected, in the vessel, to the following pressures:

— negative pressure: $30^{\ 0}_{-5}$ kPa ;

— pressure: $100^{+10}_{\ 0}$ kPa .

Any resultant deformation shall not prevent and after the test, the device shall be working according to 5.5.

5.5 Function tests

5.5.1 General

The overfill prevention device shall be mounted in accordance with manufacturer's instructions in a test rig layout shown in Figure B.1.

The test liquid for these tests can be water containing a corrosion preventing agent or an aliphatic petroleum distillate.

5.5.2 Final closure level test

5.5.2.1 The final closure level test shall be carried out on the test rig specified in the Annex B. According to 4.2.2, the overfill prevention device shall be tested by gravity and/or by pump delivery. This test shall be performed for single stage devices or the final closure of two stages devices.

5.5.2.2 The overfill prevention device for gravity filling shall be tested as follows:

— Verify the initial (if applicable) or final closure level at minimum velocity according to 4.2.2.1.

— Record the result.

— Verify that the device remains closed at pressures above 15 kPa.

— Record the result.

— Drain the filling line through the overfill prevention device.

— Verify the initial (if applicable) or final closure level at the maximum velocity according to 4.2.2.1.

— Record the result.

— Drain the filling line through the overfill prevention device.

— Verify the final closure level (if initial closure level applicable) at the maximum velocity according to 4.2.2.1 by 5 %.

— If the system closes and drains correctly, the device has passed.

5.5.2.3 The overfill prevention device for pump filling shall be tested as follows:

— Verify the initial (if applicable) or final closure level at minimum velocity according to 4.2.2.2.

— Record the result.

— Verify that the device remains closed at pressures above 15 kPa.

— Record the result.

— Drain the filling line through the overfill prevention device.

— Verify the initial (if applicable) or final closure level at the maximum velocity according to 4.2.2.2.

— Record the result.

— Drain the filling line through the overfill prevention device.

— Verify the final closure level (if initial closure level) at the maximum velocity according to 4.2.2.2 by 5 %.

— If the system closes and drains correctly, the device has passed.

5.5.2.4 Overfill prevention devices for gravity or pump filling shall be 100 % tested according to 5.5.2.2 and 5 % according to 5.5.2.3.

The maximum operational pressure surge shall not exceed that specified in 4.2.2.

After initial closure level (if applicable), the supply system shall be allowed to drain down according to manufacturer's instructions and verified to have occurred.

5.5.3 Operational leak rate after final closure level test

After final closure level, within 1 min of the final closure measure the leakage rate through the assembly. This shall not exceed the value as specified in 4.2.5. The test shall be completed on the test rig specified in the Annex B.

5.5.4 Pressure surge test

The maximum pressure surge generated at the pressure test point upon closure of the device shall be measured and shall not exceed the requirement in 4.2.3. This may be checked simultaneously with flow closure tests according to 5.5.2.

The surge pressure shall be recorded at maximum flow rate in accordance with 4.2.2.1 and 4.2.2.2 using a pressure sensor located in the pipework within 200 mm above the device on the test rig specified in Annex B.

The pressure sensor and its measuring system shall have a response time of 1 ms.

Surge tests shall be carried out in accordance with Figure B.1. The bore size of the hose shall be equal to the overfill prevention device size.

5.6 Mechanical strength

With the valve closed, maintain an internal to external pressure of 1,5 times the maximum static pressure according to 4.2.2.1 for (120 ± 10) s. There shall be no permanent deformation detected by a visual inspection. The device shall then be submitted to the durability test.