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**Naprave za preprečitev prepolnitve za stabilne rezervoarje za tekoča goriva -
Zahteve in preskusne/ocenjevalne metode - 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

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

Dispositifs limiteurs de remplissage pour réservoirs
statiques pour carburants liquides - Exigences et méthodes
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und Kraftstoffe - Anforderungen und Prüf-
/Bewertungsverfahren - Teil 1: Überfüllsicherungen mit
Schließeinrichtung

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 393.

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.

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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.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

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Foreword

This document (prEN 13616-1:2013) 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 document is currently submitted to the CEN Enquiry.

This document, together with prEN 13616-2 and prEN 16657, will supersede EN 13616:2004.

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 — Requirements and test/assessment methods*, will consist of the following parts:
 - *Part 1: Overfill prevention devices with closure device;*
 - *Part 2: Overfill prevention devices without closure device.*
- explosion-technical parameters updated;
- informative Annex C concerning environmental aspects added;
- the requirements for the equipment of the overfill prevention devices without closure device on the static tank are fixed in prEN 13616-2;
- the requirements for the equipment of the overfill prevention devices without closure device on the tank vehicle were shifted to prEN 16657, *Tanks for the transport of dangerous goods — Transport tank equipment for overfill prevention devices for static tanks.*

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). <https://standards.iteh.ai/> 01369/sist-en-13616-1-2016

For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are an integral part of this document.

Annexes A and B are normative, Annexes C, ZA and ZB are informative.

1 Scope

This European Standard gives requirements and the corresponding test/assessment methods applicable to overfill prevention devices with closure device. The devices are usually composed by

- sensor,
- evaluation device,
- shut-off and / or alarm device.

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

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 228, *Automotive fuels — Unleaded petrol — Requirements and test methods*

EN 14214, *Automotive fuels — Fatty acid methyl esters (FAME) for diesel engines — Requirements and test methods*

EN 15376, *Automotive fuels — Ethanol as a blending component for petrol — Requirements and test methods*

EN 60204-1, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

3 Terms and definitions

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

3.1

overfill prevention device

device forming part of a supply system which automatically stops the delivery, preventing the liquid level in the tank exceeding a maximum filling level

3.2

supply system

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

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

3.3

tank vehicle

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

3.4

operational leak rate

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

prEN 13616-1:2013 (E)

3.5

vapour tight overfill prevention device

device which does not permit vapour to pass from the ullage space through the device in normal operation

4 Requirements

4.1 General

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

4.1.1 Vapour tight

The overfill prevention device shall present no leak.

4.1.2 Non vapour tight

The overfill prevention device shall present a general leak not more than a hole of \varnothing 3 mm at a pressure 3,5 kPa over pressure.

4.2 Effectiveness

4.2.1 Operational flow range and operational pressure range

4.2.1.1 Overfill prevention device by gravity fill only (see B.1)

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

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

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

4.2.1.2 Overfill prevention device by gravity or pump fill (see B.1)

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

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

The device shall withstand at static pressure of at least 40 kPa or 800 kPa after closure according to manufacturer's declaration.

4.2.2 Pressure surge range

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

4.2.2.1 Overfill prevention device by gravity fill 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.

4.2.2.2 Overfill prevention device by gravity or pump fill

For pump with a performance of 400 kPa any pressure surge created by the overfill prevention device at closure exceeding 600 kPa shall not exceed a period of more than 10 ms.

For pump 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.

4.2.3 Closure level range

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 4.2.4) shall enter the tank.

The contents of the flexible delivery hose and preferably the site delivery pipe shall be emptied into the tank.

4.2.3.1 Single stage closure device

On filling the tank to the closure level, a complete and automatic closure of the flow shall be effected.

4.2.3.2 Two stages closure device

On filling the tank to the initial closure level, automatic closure or severe restriction of the flow shall be effected. When the final closure level is reached, a complete and automatic closure of the flow shall be effected.

4.2.4 Operational leak rate

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

4.3 Construction

4.3.1 All construction materials shall be compatible with and resist chemical attack of the liquid and its vapours within the temperature range of -25 °C to +60 °C. The manufacturer shall specify all materials in contact with the liquid. When the equipment will be subjected to colder conditions, the design temperature range shall be adapted to a minimum temperature of -40 °C.

4.3.2 When the overfill prevention device forms part of an earth continuity path it shall be conductive (Resistance less than 10^6 Ohms).

4.3.3 The overfill prevention device shall be of a durable construction. Durability shall be tested in accordance with 5.2, 5.5 and test rig according to Annex A.

4.3.4 All parts of the overfill prevention device situated either internally or externally on the tank shall withstand static negative and positive pressure test to comply with 5.3. Any resultant deformation shall not prevent the device fully functioning.

4.4 Durability against wear from closure cycles

The device shall fulfil 4.2 after 1 500 cycles at the maximum flow (see Table B.1) and maximum pressure.

prEN 13616-1:2013 (E)**5 Test methods****5.1 General**

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

For all tests other than 5.2 and 5.3, the overflow prevention device shall be installed in accordance with the manufacturer's instructions in a test rig layout as shown in Annex A.

5.2 Chemical suitability test

The complete overflow prevention device, or parts normally exposed to liquid fuels or vapours, shall be subjected to a test cycle as below using the test liquid with the following test liquids:

a) Test fuel 1:

- 41,5 % in volume of toluene;
- 41,5 % in volume of iso octane;
- 15 % in volume of methanol;
- 2 % in volume of iso butanol.

b) Test fuel 2: E-85

- 85 % ethanol (according to EN 15376);
- 15 % unleaded gasoline (according to EN 228).

c) Test fuel 3: bio-diesel B-100 (according to EN 14214).

If parts of the device are subjected to contact with liquid or vapour, the device shall not be disassembled for this test. Non-contact parts may be protected simulating typical installation or protection by screening, jacketing, etc.

Test cycle consists of:

- d) total immersion in test liquid for 24 h at (20 ± 1) °C;
- e) total immersion in saturated vapour of test liquid for 24 h at (20 ± 1) °C;
- f) total immersion in test liquid for 24 h at (20 ± 1) °C;
- g) 1 h drying at (20 ± 1) °C.

For each test fuel, a fresh sample shall be used. After this test, the device shall be disassembled and inspected and there shall be no signs of damage, distortion or malfunction. The remaining tests shall then be carried out on one of these samples.

5.3 Component pressure tests

If any part of overflow 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 internal and then to an external pressure for (60 ± 5) min for each test. After the test, the device shall be working as specified.

The equipment shall be subjected to the following pressures:

- negative pressure: 30_{-5}^0 kPa ;
- pressure: 100_{0}^{+10} kPa .

5.4 Function tests

5.4.1 General

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

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

5.4.2 Operational closure test

The operational closure test shall be done on the test rig specified in the Annex A. This test has to be performed for the single stage devices or the final closure of the two stages devices.

- Verify the closure at minimum velocity.
- Record the result.
- Verify that the device remains close for pressure above 15 kPa.
- Record the result.
- Drain the system.
- Verify the closure at the maximum velocity.
- If the system closes properly and does not have any visual anomaly, the test is pass.

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

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

5.4.3 Final closure test

Repeat test according to 5.4.2 and on reaching initial level closure within 1 min, adjust flow control valve to provide the minimum flow and pressure according to 4.2.1. The device shall be closed at final closure level allowing the operational leak rate.