SLOVENSKI STANDARD
SIST EN 13922:2011

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Nadomešča:
SIST EN 13922:2003

Cisterne za prevoz nevarnega blaga - Oprema za obratovanje cistern - Sistemi za preprečitev prepolnitve za tekoča goriva

Tanks for transport of dangerous goods - Service equipment for tanks - Overfill prevention systems for liquid fuels

Tanks für die Beförderung gefährlicher Güter - Bedienungsausrüstung von Tanks - Überfüllsicherungssysteme für flüssige Kraft- und Brennstoffe

Citernes destinées au transport de matières dangereuses - Equipement de service pour citernes - Systèmes antidébordement au remplissage pour carburants pétroliers liquides

Ta slovenski standard je istoveten z: EN 13922:2011

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
43.080.10	Tovornjaki in priklopniki	Trucks and trailers

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EUROPEAN STANDARD

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ICS 13.300; 23.020.20

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English Version

Tanks for transport of dangerous goods - Service equipment for tanks - Overfill prevention systems for liquid fuels

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This European Standard was approved by CEN on 18 June 2011.

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.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword

This document (EN 13922:2011) 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 March 2012, and conflicting national standards shall be withdrawn at the latest by March 2012.

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 13922:2003.

Significant changes have been made to the following sections since the last edition:

— requirement concerning bonding of the tank shell to the vehicle's chassis added in 4.2;

— marking for equipment in hazardous areas updated and a note added in 6.3.7;

— referred standards updated.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The overfill prevention system prevents the maximum filling level of a compartment of a tank vehicle from being exceeded by interrupting the filling operation on the loading site.

It is not the function of an overfill prevention system to prevent volume or weight overloading. The function of the overfill prevention system is the final means of containing loaded product within a compartment and preventing a dangerous condition. It is therefore of critical importance that all components have a high degree of reliability and that all European gantries provide a compatible system with the tank trucks.

Not all the components of an overfill prevention system are necessarily supplied by one manufacturer but may include cross-compatibility parts supplied by different manufacturers/suppliers.

1 Scope

This European Standard specifies the following points regarding the minimum requirements for an overfill prevention system:

— functions;

— major components;

— characteristics;

— test methods.

This European Standard is applicable to overfill prevention systems for liquid fuels having a flash point up to but not exceeding 100 °C, excluding liquefied petroleum gas (LPG). The requirements apply to overfill prevention systems suitable for use at ambient temperatures in the range from - 20 °C to + 50 °C, subjected to normal operational pressure variations.

2 Normative references

The following referenced documents are indispensable for the application 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 590, *Automotive fuels — Diesel — Requirements and test methods*

EN 60079-0:2009, *Explosive atmospheres — Part 0: Equipment — General requirements (IEC 60079-0:2007 + corrigendum Dec. 2010)*

EN 60079-11:2007, *Explosive atmospheres — Part 11: Equipment protection by intrinsic safety "i" (IEC 60079-11:2006 + corrigendum Dec. 2006)*

EN 61000-6-2, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments (IEC 61000-6-2:2005)*

EN 61000-6-4, *Electromagnetic compatibility (EMC) — Part 6-4: Generic standards — Emission standard for industrial environments (IEC 61000-6-4:2006)*

3 Terms and definitions

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

3.1
overfill prevention system
sensors or sensor circuits, interface plug/socket, overfill prevention controller and all connecting wiring and cables

3.2
cross-compatibility
ability of one part of the overfill prevention system to be able to work safely and satisfactorily with another part of the overfill prevention system although the parts are supplied by different manufacturers

3.3
diesel
according to EN 590

3.4
dry sensor
state of the sensor when not immersed in liquid

3.5
effective cycle time
time period taken for the overfill prevention system to identify a fault condition and switch to a non-permissive

3.6
fail-safe
switching to a non-permissive if any single component failure in the overfill prevention system renders the overfill prevention system unable to detect an overfill or loss of earth bond

3.7
five-wire system
uses five wire interface signals for liquid level detection

3.8
gantry control system
controls the loading of product into the transporting vehicle

3.9
gantry control system reaction time
time period commencing when the overfill prevention controller's output changes to non-permissive and ending with the cessation of all product flow after the closure of the gantry control valve

3.10
interface
ten-pin socket connection between the transporting vehicle and the gantry

3.11
inter-operable
ability of different parts of the overfill prevention system to operate together; the functional aspect of cross-compatibility

3.12
warm-up time
period to switch to a permissive state after plug connection is made to a vehicle socket with no sensor immersed in liquid

3.13
non-permissive
output state of the overfill prevention controller which disables liquid delivery

3.14
overfill prevention controller
device mounted at the gantry which connects to the transporting vehicle and which provides a permissive or non-permissive to the gantry control system

3.15
overfill prevention system response time
period commencing when a sensor becomes wet and ending when the controller output switches to non-permissive

3.16
permissive
output state of the overfill prevention controller which enables liquid delivery

3.17
self-checking
automatic and continuous checking of the integrity of an overfill prevention system's components to verify its ability to perform its minimum functions

3.18
sensor
device and any associated circuit mounted on or in a transporting vehicle's compartment and connected to interface socket which provides the wet or dry signal to the overfill prevention controller

3.19
sensor circuit
sensor not directly wired to the interface socket but using intermediate components/electronics to transfer the sensor output to the interface socket

3.20
signal specification
electronic wave form of the signal emitted by the controller

NOTE See Figure A.1.

3.21
two-wire system
uses two-wire interface signals for liquid level detection

3.22
wet sensor
state of a sensor just sufficiently submerged in liquid to initiate a change in output from permissive to non-permissive

4 Functions

4.1 To prevent overfilling of the transporting vehicle's compartment by providing a fail-safe output to a gantry control system.

4.2 To provide a fail safe monitored earth static bonding connection from the gantry to the transporting vehicle's shell via a bonding connection to the transporting vehicle's chassis.

4.3 To provide visual indication of the status of the overfill prevention system.

5 Major components

5.1 Vehicle mounted equipment

The following equipment shall be installed on the vehicle as a minimum:

— one sensor or sensor circuit per compartment;

— vapour recovery hose interlock switch;

— one 10 pin socket;

— wiring to the sensors;

— static earth bonding provision.

5.2 Equipment fitted at the gantry

The following equipment shall be installed at the loading gantry as a minimum:

— overfill prevention controller;

— one 10 pin plug and cable for connection to vehicle socket.

6 Characteristics

6.1 Overfill prevention system working characteristics

6.1.1 Overfill

The overfill prevention system shall be an electronic system, gantry based and gantry operated. The interface wiring shall be suitable for a two-wire or a five-wire overfill prevention system and the gantry based controller shall automatically detect the difference between either overfill prevention system through a standardized 10 pin plug and socket — see Figures A.2 and A.3 — and perform its functions.

Electrical specifications for the interface are included in Annex A.

If no wet sensor or system fault is detected, the controller shall give a permissive to permit loading to begin. Upon an overfill condition or the detection of any overfill prevention system or controller fault, the controller shall switch to non-permissive.

The overfill prevention system shall be fail safe and shall be self-checking. The effective cycle time between self-checks shall be less than the overfill response time.

The overfill prevention response time shall not exceed 700 ms.

The overfill prevention system shall be capable of handling up to and including the following number of compartments for each type of installation:

— two-wire system 8 compartments;

— five-wire system 12 compartments.

6.1.2 Bonding

The overfill prevention system shall provide an earth static bonding connection from the gantry to the vehicle chassis via the cable and connection plug and socket and shall continuously verify this connection throughout the loading operation.

Should any fault be detected or the electrical resistance of the connection exceed a maximum of 10 kΩ, the gantry controller shall switch to non-permissive.

6.1.3 Severe environmental condition

Where the overfill prevention system is subjected to temperatures outside the specified temperature range all applicable temperature values shall be extended. All other requirements shall remain unchanged.

6.2 Sensors

6.2.1 General

Any of the following types of sensors may be used:

— NTC thermistor, two-wire optic or other compatible device;

— five-wire optic or other compatible device;

— sensor circuit.

6.2.2 NTC thermistor, two-wire optic or other compatible sensor

Thermistor sensors shall have a negative temperature coefficient (NTC) and shall work at any temperature in the range from – 20 °C to + 50 °C.

Thermistor sensors have a warm-up time which shall not exceed 75 s with the thermistor sensor at an ambient temperature of – 20 °C.

NOTE Optic sensors have a negligible warm-up time.

Two-wire sensors can be used on vehicles with no more than 8 compartments. The overfill prevention controller shall always monitor 8 sensors and stop all loading if any sensor detects an overfill. Vehicles equipped with two-wire sensors with less than 8 compartments shall employ an electronic dummy sensor for the unused channels of the controller.

The electronic dummy sensor shall generate a permissive signal when it is connected to a controller. The signal shall correspond to a wave form as shown in Figure A.1 with the values according to Table A.4.

A two-wire optic or other compatible sensors shall work at any temperature in the range from –20 °C to +50 °C. When connected to a gantry controller, a dry sensor shall generate a permissive signal, which shall correspond to a wave form as shown in Figure A.1 with the values according to Table A.4.

6.2.3 A five-wire optic or compatible sensor

A five-wire optic sensor or other compatible sensors shall work at any temperature in the range from - 20 °C to + 50 °C. When connected to a gantry controller, a dry sensor shall generate a permissive signal, which shall correspond to a wave form as shown in Figure A.1 with the values according to Table A.1.

6.2.4 Sensor circuit

A sensor circuit shall comply with the requirements according to 6.2.2 and 6.2.3 as applicable.

6.2.5 Response time

The reaction time from sensor going wet to the change of state of the signal at the interface socket shall not exceed 250 ms.

6.2.6 Materials of construction

The manufacturer shall provide with the equipment a full material specification for those parts that may come into contact with the liquid.

6.2.7 Electrical requirements

At the interface each sensor or sensor circuit shall be suited for controller's intrinsically safe parameters. The electrical connections of the 10-pin-socket shall comply with Figure A.4 for a two-wire-system and Figure A.5 for a five-wire-system. The socket shall comply with Figure A.2.