SLOVENSKI STANDARD
SIST EN 12972:2018

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Nadomešča:
SIST EN 12972:2015

Cisterne za prevoz nevarnega blaga - Preskušanje, pregled in označevanje kovinskih cistern

Tanks for transport of dangerous goods - Testing, inspection and marking of metallic tanks

Tanks für die Beförderung gefährlicher Güter - Prüfung, Inspektion und Kennzeichnung von Metalltanks

Citernes destinées au transport de matières dangereuses - Épreuve, contrôle et marquage des citernes métalliques

Ta slovenski standard je istoveten z: **EN 12972:2018**

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

SIST EN 12972:2018 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12972

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ICS 13.300; 23.020.20

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English Version

Tanks for transport of dangerous goods - Testing, inspection and marking of metallic tanks

Citernes destinées au transport de matières dangereuses - Épreuve, contrôle et marquage des citernes métalliques

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This European Standard was approved by CEN on 20 May 2018.

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

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

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European foreword

This document (EN 12972:2018) has been prepared by Technical Committee CEN/TC 296 “Tanks for the 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of an identical text or by endorsement, at the latest by January 2019, and conflicting national standards shall be withdrawn at the latest by January 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12972:2015.

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

In comparison with EN 12972:2015, the following fundamental changes have been made:

a) alignment with RID [1] and ADR [2] as known at publication of this document;

b) update of the normative references;

c) addition of requirements for NDT and manufacturing tolerances;

d) amendment of hydraulic pressure test and leakproofness test;

e) deletion of Subclauses 5.6.4 “Test fluid” and 5.6.5 “Precautions for gas as a test fluid”;

f) deletion of Annex C “Hydraulic pressure testing with gases – hazards and precautions”.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

The types and frequencies of the inspections and tests as well as the responsibilities are given by the relevant regulations concerning the transport of dangerous goods. This document becomes mandatory if declared as such in the relevant regulation concerning the transport of dangerous goods. In all the other cases, it will remain voluntary like any European Standard, and aim at being used as a guidance for the testing, inspection and marking of metallic tanks.

1 Scope

This document specifies testing, inspection and marking for the type approval, initial inspection, periodic inspection, intermediate inspection and exceptional check of metallic tanks (shell and equipment) of fixed tanks (tank vehicles), demountable tanks, tank-wagons, portable tanks and tank containers for the transport of dangerous goods.

This document is not applicable to battery-vehicles and battery-wagons comprising cylinders, tubes, pressure drums, bundles of cylinders, and multiple element gas containers (MEGCs), independent of whether the elements are receptacles or tanks.

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 590, *Automotive fuels – Diesel - Requirements and test methods*

EN 837-1, *Pressure gauges – Part 1: Bourdon tube pressure gauges - Dimensions, metrology, requirements and testing*

EN 837-2, *Pressure gauges – Part 2: Selection and installation recommendations for pressure gauges*

EN 837-3, *Pressure gauges – Part 3: Diaphragm and capsule pressure gauges - Dimensions, metrology, requirements and testing*

EN 12079-1, *Offshore containers and associated lifting sets – Part 1: Offshore container - Design, manufacture and marking*

EN 12663-2, *Railway applications - Structural requirements of railway vehicle bodies – Part 2: Freight wagons*

EN 13094:2015, *Tanks for the transport of dangerous goods - Metallic tanks with a working pressure not exceeding 0,5 bar - Design and construction*

EN ISO 148-1, *Metallic materials - Charpy pendulum impact test – Part 1: Test method (ISO 148-1)*

EN ISO 3452-1, *Non-destructive testing - Penetrant testing – Part 1: General principles (ISO 3452-1)*

EN ISO 3834-2, *Quality requirements for fusion welding of metallic materials – Part 2: Comprehensive quality requirements (ISO 3834-2)*

EN ISO 4136, *Destructive tests on welds in metallic materials - Transverse tensile test (ISO 4136)*

EN ISO 5173, *Destructive tests on welds in metallic materials - Bend tests (ISO 5173)*

EN ISO 6520-1:2007, *Welding and allied processes - Classification of geometric imperfections in metallic materials – Part 1: Fusion welding (ISO 6520-1:2007)*

EN ISO 9015-1:2011, *Destructive tests on welds in metallic materials - Hardness testing – Part 1: Hardness test on arc welded joints (ISO 9015-1:2001)*

EN ISO 9016:2012, *Destructive tests on welds in metallic materials - Impact tests - Test specimen location, notch orientation and examination (ISO 9016:2012)*

EN ISO 9606-1, *Qualification testing of welders - Fusion welding – Part 1: Steels (ISO 9606-1)*

EN ISO 9606-2, *Qualification test of welders - Fusion welding – Part 2: Aluminium and aluminium alloys (ISO 9606-2)*

EN ISO 9606-3, *Approval testing of welders - Fusion welding – Part 3: Copper and copper alloys (ISO 9606-3)*

EN ISO 9606-4, *Approval testing of welders - Fusion welding – Part 4: Nickel and nickel alloys (ISO 9606-4)*

EN ISO 9712, *Non-destructive testing - Qualification and certification of NDT personnel (ISO 9712)*

EN ISO 11666, *Non-destructive testing of welds - Ultrasonic testing - Acceptance levels (ISO 11666)*

EN ISO 14731, *Welding coordination - Tasks and responsibilities (ISO 14731)*

EN ISO 14732, *Welding personnel - Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials (ISO 14732)*

EN ISO 15607, *Specification and qualification of welding procedures for metallic materials - General rules (ISO 15607)*

CEN ISO/TR 15608, *Welding - Guidelines for a metallic materials grouping system (ISO/TR 15608)*

EN ISO 15609-1, *Specification and qualification of welding procedures for metallic materials - Welding procedure specification – Part 1: Arc welding (ISO 15609-1)*

EN ISO 15614-1, *Specification and qualification of welding procedures for metallic materials -Welding procedure test – Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1)*

EN ISO 15614-2, *Specification and qualification of welding procedures for metallic materials - Welding procedure test – Part 2: Arc welding of aluminium and its alloys (ISO 15614-2)*

EN ISO 17636-1, *Non-destructive testing of welds - Radiographic testing – Part 1: X- and gamma-ray techniques with film (ISO 17636-1)*

EN ISO 17636-2, *Non-destructive testing of welds - Radiographic testing - Part 2: X- and gamma-ray techniques with digital detectors (ISO 17636-2)*

EN ISO 17637, *Non-destructive testing of welds - Visual testing of fusion-welded joints (ISO 17637)*

EN ISO 17638, *Non-destructive testing of welds - Magnetic particle testing (ISO 17638)*

EN ISO 17639:2013, *Destructive tests on welds in metallic materials - Macroscopic and microscopic examination of welds (ISO 17639:2003)*

EN ISO 17640, *Non-destructive testing of welds - Ultrasonic testing - Techniques, testing levels, and assessment (ISO 17640)*

EN ISO 17643:2015, *Non-destructive testing of welds - Eddy current examination of welds by complex plane analysis (ISO 17643:2015)*

EN ISO 23277:2015, *Non-destructive testing of welds - Penetrant testing - Acceptance levels (ISO 23277:2015)*

EN ISO 23278:2015, *Non-destructive testing of welds - Magnetic particle testing - Acceptance levels (ISO 23278:2015)*

IMO MSC/Circ. 860, Guidelines for the approval of offshore containers handled in open seas[1]

UN Manual of Tests and Criteria, Part IV[2]

3 Terms, definitions, symbols and abbreviations

3.1 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:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

NOTE 1 The definitions of terms used in this document are taken as those given by the applicable regulations concerning the transport of dangerous goods unless otherwise stated.

NOTE 2 Additional terms and definitions can be found in EN 14564 [3].

3.1.1
expert
dependent on national law, individual person approved by the competent authority, or national body approved by the competent authority, or inspection body approved by the competent authority, to perform designated inspections and tests in accordance with the scope of their approval

Note 1 to entry: According to RID/ADR testing and inspection duties are allocated to either the competent authority or to inspection bodies or individual experts approved by the competent authority. RID and ADR include detailed requirements on the qualification, obligations, accreditation and approval of these inspection bodies.

[1] May be purchased from the International Maritime Organization (IMO), 4 Albert Embankment, Lambeth, London SE1 7SR, United Kingdom.

[2] May be purchased from the United Nations Economic Commission for Europe (UNECE), 8 Avenue de la Paix, 1202 Geneva, Switzerland.

3.1.2
protective lining or coating
lining or coating protecting the metallic tank material against corrosion or reaction with the substances to be transported

Note 1 to entry: This does not apply to lining or coating used only to protect the substance to be carried.

3.1.3
repair
correction of a defect

Note 1 to entry: It does not include normal service and servicing operations of the shell or service equipment or replacement of gaskets or service equipment to the same specification.

3.1.4
technical code
code or standard(s) according to which the tank has been designed and constructed

Note 1 to entry: RID/ADR use this term in context with tanks which are NOT designed, constructed and tested according to referenced standards. For the purpose of this standard, EN 14025 [4] and EN 13094 are considered to be technical codes.

3.1.5
modification
<tanks for the transport of dangerous goods> work on an existing tank with a valid, or expired, or withdrawn type approval which causes a non-conformity with the type approval mentioned above

3.1.6
alteration
<tanks for the transport of dangerous goods> work on an existing tank with a valid, or expired, or withdrawn type approval leaving the tank inside the scope of the type approval provided the original type approval is in conformity with the relevant regulation on the transport of dangerous goods at the time of the work

3.2 Symbols and abbreviations

For the purpose of this document, the following symbols and abbreviations apply.

3.2.1 General symbols and abbreviations:

e	nominal shell thickness
D_i	internal tube diameter
NDT	non-destructive testing
λ	joint coefficient

3.2.2 NDT symbols (used in Tables 1 and 2):

VT	Visual testing
UT	Ultrasonic testing
PT	Penetrant testing
MT	Magnetic particle testing

RT Radiographic testing

ET Eddy current testing

3.2.3 Weld position symbols (see Figure 1, used in Table 1):

N "Tee"-junction (weld node)

C Circular (or transverse) joints of the same cylindrical or conical part and of a rotating or ring-shaped part

NC Longitudinal joints or joints that do not belong to the C type

The weld of a hemispherical end is similar to a longitudinal weld (NC) when it is located beyond the cylindrical part of the end.

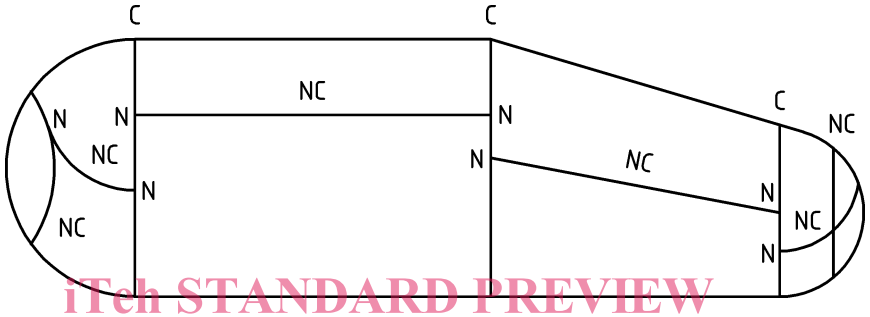

Figure 1 — Weld position symbols

3.2.4 Welding imperfection symbols (used in Tables 3 and 6):

a nominal fillet weld throat thickness

b width of weld reinforcement (width of excess weld)

d diameter of pore

h height of imperfection

l length of imperfection

t wall or plate thickness

w width of imperfection

3.2.5 Material property symbols (used in Annex B):

A elongation at break

R_e yield strength

R_m tensile strength

3.2.6 Manufacturing tolerance symbols (used in Annex F):

d_1 middle line alignment

D internal shell diameter

O out of roundness

P peaking

4 Inspections and tests

4.1 General

In accordance with the relevant regulations concerning the transport of dangerous goods, shells and their equipment shall undergo inspections for issuing the type approval certificate, inspection for modification of a tank and initial, intermediate and periodic inspections and exceptional checks, if needed, as indicated in the survey table in Annex A and as given in this standard.

All inspections and tests carried out according to this document shall state the condition of the tank at the time of inspection or testing.

4.2 Inspection for type approval

4.2.1 General

The inspection for type approval shall be carried out on a prototype tank of either a single tank or a range of tanks. A type approval which includes a limited variation of the design will allow the following variations to the design without requiring a new approval, if there are no other conflicting technical or legal requirements:

— a decrease in the initial design temperature range;

— a decrease in the maximum gross mass;

— a reduction in volume only resulting from variations in diameter (not applicable to cross sections with recesses or protrusions) and length, providing related calculation and drawings include each proposed diameter, length and number of compartments of the shell under the most unfavourable conditions, i.e.:

  — greatest density of goods;

  — greatest shell length and diameter;

  — greatest water capacity of front compartment;

  — greatest water capacity of rear compartment. For non-cylindrical shells according to EN 13094:2015, 6.3, only the height may be reduced.

  NOTE Attention is drawn to the permitted design variations with regard to reduction of volume of portable tanks, specified in the UN Manual of Tests and Criteria, Part IV, Section 41;

— a variation in the grade of the material used may be allowed with the following reserves:

  — the same qualified welding procedures according to EN ISO 15614-1 or EN ISO 15614-2 are applicable;

  — calculation is carried out in the most unfavourable case, in particular the mechanical characteristics selected are for each element the lowest values of the grades used;

— movement or modification of nozzles and manholes provided that the same level of protection is afforded and the strength calculation takes into account the most unfavourable case;

— a decrease in the number of nozzles;

— an increase of the number of surge plates and baffles;

— an increase of the shell thickness(es) provided the same welding procedures are used;

— for pressure tanks, a decrease of the maximum working pressure;

— an increase in the thickness of the insulation used for additional protection;

— an increase in the effectiveness of the thermal insulation of the tank;

— the use of alternative service equipment if there is no change in the technical specification of the equipment and it is placed in the same location.

4.2.2 Content of inspection

4.2.2.1 Inspection for initial type approval

The inspection for initial type approval shall be carried out in accordance with the following subclauses:

— examination of documents (see 5.2.1);

— check of the design characteristics (see 5.3);

— inspection of the shell interior (see 5.4);

— inspection of the tank exterior (see 5.5);

— hydraulic pressure test (see 5.6);

— vacuum test (see 5.7, only if required and if no calculation or finite element analysis has been provided);

— leakproofness test (see 5.8);

— determination of water capacity (see 5.9);

— inspection of service equipment (see 5.10);

— inspection of frame or other structural equipment of portable tanks and tank containers (see 5.11);

— dynamic longitudinal impact test of portable tanks (see 5.12);

— check the marking on the tank (see 5.13.3).

4.2.2.2 Inspection for modifications to a type approval

Where a modification to the type approval is proposed, the applicable units of the inspection for initial type approval shall be reappraised. The inspection for type approval in the case of a modification shall be carried out on the parts that have been modified.