SLOVENSKI STANDARD
oSIST prEN 12285-1:2014

01-julij-2014

V delavnici izdelani jekleni rezervoarji - 1. del: Enoplaščni in dvoplaščni ležeči valjasti rezervoarji za podzemno skladiščenje gorljivih in negorljivih tekočin, ki onesnažujejo vodo

Workshop fabricated steel tanks - Part 1: Horizontal cylindrical single skin and double skin tanks for the underground storage of flammable and nonflammable water polluting liquids

Werksgefertigte Tanks aus Stahl - Teil 1:Liegende zylindrische ein- und doppelwandige Tanks zur unterirdischen Lagerung von brennbaren und nicht brennbaren wassergefährdenden Flüssigkeiten, Deutsche Fassung prEN 12285-1:2012

Ta slovenski standard je istoveten z: **prEN 12285-1 rev**

ICS:

13.300	Varstvo pred nevarnimi izdelki	Protection against dangerous goods
23.020.10	Nepremične posode in rezervoarji	Stationary containers and tanks

oSIST prEN 12285-1:2014 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 12285-1 rev

March 2014

ICS 13.300; 23.020.10

Will supersede EN 12285-1:2003

English Version

Workshop fabricated steel tanks - Part 1: Horizontal cylindrical single skin and double skin tanks for the underground storage of flammable and nonflammable water polluting liquids

Réservoirs en acier fabriqués en atelier - Partie 1: Réservoirs horizontaux cylindriques à simple ou double paroi pour le stockage enterré de liquides inflammables et non inflammables polluant l'eau

Werksgefertigte Tanks aus Stahl - Teil 1: Liegende zylindrische ein- und doppelwandige Tanks zur unterirdischen Lagerung von brennbaren und nichtbrennbaren wassergefährdenden Flüssigkeiten

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 265.

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.

This draft European Standard was established by CEN 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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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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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. prEN 12285-1 rev:2014 E

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Foreword

This document (prEN 12285-1:2014) has been prepared by Technical Committee CEN/TC 265 “Metallic tanks for the storage of liquids”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12285-1:2003.

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.

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

This document will supersede EN 12285-1:2003.

Compared to EN 12285-1:2003, this draft has been restructured as follows:

— Old Clause 3 Terms and definitions has been combined with old Clause 4 Symbols and abbreviations

— Old Clause 5 Designation and purchaser's specification has been combined with new Clause 7 Classification and designation

— Old Clause 6 Materials, Clause 7 Design, Clause 8 Fabrication and Clause 10 Handling and installation have been replaced by new Clause 4 Product characteristics

— Old Clause 9 Testing has now become Clause 5 Testing, assessment and sampling methods

— Old Clause 11 Marking of the tank and manufacturer's statement has now been combined with new Clause 8 Marking, labelling and packaging

In addition, prEN 12285-1 includes a new clause as follows:

— Clause 6 Assessment and verification of constancy of performance (AVCP)

Furthermore, Annex ZA has been revised to align with the Construction Products Regulation (CPR) (305/2011).

Annex ZA does not apply to the tanks installed in industrial processes, nor in petrol stations as these products are excluded from the mandate M/131 "*Pipes, tanks and ancillaries not in contact with water intended for human consumption*" (see Annex I of the mandate M/131).

The informative annexes A and B give further guidance; A on transport, storage and installation procedures and B on the liquid-material combinations to be chosen.

Introduction

This European Standard is part of a family of standards involving storage tanks . Normal ambient temperatures considered in this standard are -20 °C to +50 °C. Where temperatures are outside this range it could become necessary to consider further requirements. These could include temperature control measures or material control (see 4.2.2).

CEN/TC 265 WG8

Shop fabricated metallic tanks

Underground tanks
(EN 12285-1)

Aboveground tanks
(EN 12285-2)

1 Scope

This standard specifies the product characteristics and test/assessment methods for workshop fabricated cylindrical, horizontal steel tanks, single (type S) and double skin (type D) intended to be used for the underground storage of water polluting liquids (both flammable and non-flammable) at normal ambient temperature conditions (-20 °C to +50 °C) within the following limits:

— from 800 mm up to 3000 mm nominal diameter and,

— up to a maximum overall length of 6 times the nominal diameter

— for liquids with a maximum density of up to 1,9 kg/l and,

— with an operating pressure (P_o) of maximum 1,5 bar (abs.) and,

— for double skin tanks with a vacuum leak detection system where the kinematic viscosity does not exceed 5×10^{-3} m^2/s.

Tanks designed to this standard allow for an earth cover of 1.5m and for the tank to withstand traffic loads from a properly constructed roadway

This standard is not applicable for the storage of liquids having dangerous good classes listed in Table 1 because of the special dangers involved.

Table 1 — List of dangerous goods the storage of which are not covered by this standard

UN-classification	Dangerous Good
Class 1	Explosives
Class 4.2	Substances liable to spontaneous combustion
Class 4.3	Substances which in contact with water emit flammable gases
Class 5.2	Organic peroxides
Class 6.2	Infectious substances
Class 7	Radioactive substances, hydrocyanic or hydrocyanic solvent liquids, metal carbons, hydrofluoric acid, bromide liquids

NOTE The classifications referred to are those adopted by the United Nations Committee of Experts on the Transport of Dangerous Goods (not to be interpreted as tank classes described in 7.2.)

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 287–1, *Qualification test of welders — Fusion welding — Part 1: Steels.*

EN 10025, *Hot rolled products of non-alloy structural steels — Technical delivery conditions.*

EN 10028–2, *Flat products made of steels for pressure purposes — Part 2: Non-alloy and alloy steels with specified elevated temperature properties.*

EN 10028-7, *Flat products made of steels for pressure purposes — Part 7: Stainless steels.*

EN 10051:1997, *Continuously hot-rolled uncoated plate, sheet and strip of non-alloy and alloy steels — Tolerances on dimensions and shape.*

EN 10088–1, *Stainless steels — Part 1: List of stainless steels.*

EN 10204:1995, *Metallic products — Types of inspection documents.*

EN ISO 898–1, *Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs (ISO 898-1).*

EN ISO 8501–1, *Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness — Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings (ISO 8501-1).*

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

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

EN ISO15614-1, 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)

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

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

3.1.1
tank
workshop fabricated cylindrical containments for the storage of liquids

Note 1 to entry: They are made of steel plates, equipped with dished ends and consist of one or more compartments

3.1.2
underground tank
tank which is totally or partially imbedded in the ground

3.1.3
compartment
single storage fluid space within a tank

3.1.4
explosion pressure shockproof tank
tank which is designed to withstand an internal explosion without leakage; permanent deformations are permissible

Note 1 to entry: Where the atmospheric pressure is 1 bar the maximum explosion pressure is measured at 10 bar (abs.)

3.1.5
single skin tank
impermeable containment consisting of a tank of single containment

Note 1 to entry: They also constitute the inner tank of a double skin tank.

3.1.6double skin tank
impermeable self contained tank with outer skin welded around the inner tank

3.1.7
operating pressure (P_o)
pressure inside the tank above the liquid during operating conditions

3.1.8
test pressure (P_{t1})
pressure to which the tank or compartment is subjected for testing

3.1.9
interstitial test pressure (P_{t2})
Effective pressure at the bottom of the tank to which the interstitial space between the skins is subjected for testing.

Note 1 to entry: It is only applicable for double skin tanks.

3.1.10
nominal volume
storage capacity for which the tank is designed

3.1.11
actual volume
volume which is equal to or greater than the nominal volume

Note 1 to entry: The safe working capacity of the tank should usually not exceed 97 % of the nominal volume in normal operating temperatures.

3.2 Symbols and abbreviations

For the purpose of this standard the following symbols apply:

Dimensions in mm

d_1 External nominal diameter of the tank

d_2 Inside diameter of the manway

d_3 Diameter of the manway cover

h_1 Length of the straight flange of the dished end

k_p Pitch circle diameter of manway bolts

l_c Length of the compartment of a tank without dished ends

l_o Overall length of the tank

l_z Length of the tank without dished ends

p_t test pressure

r_1 Crown radius of dished ends

r_2 Knuckle radius of dished ends

r_3 Knuckle radius of the outer dished end

s_1 Nominal thickness of inner skin and inner dished ends

s_2 Interstitial space

s_3 Nominal thickness of outer skin

s_4 Nominal thickness of outer dished ends

s_5 Nominal thickness of compartment dished ends

s_6 Nominal thickness of manway flange and cover

s_7 Plate thickness of manway body

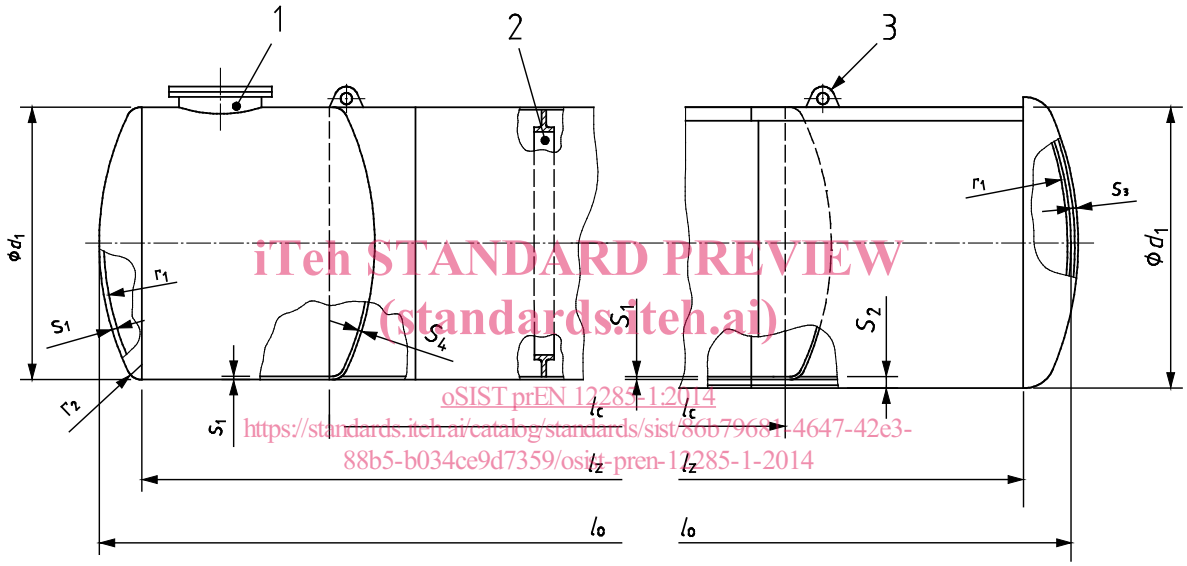
γ incline angle for T-joint welding

Tank type S

(single skin)

Tank type D

(double skin)



Key

1 nozzle detail see figure 3
2 example for stiffening ring see figure 4
3 lifting lug

Figure 1 — Example of tank symbols

4 Product characteristics

4.1 General

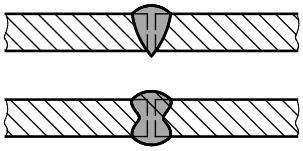
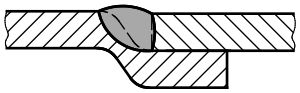
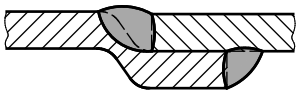
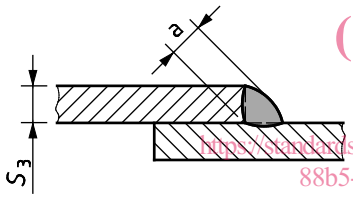
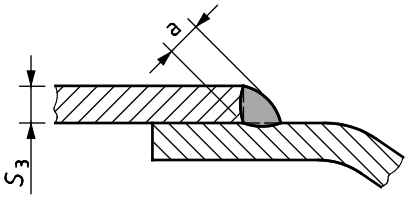
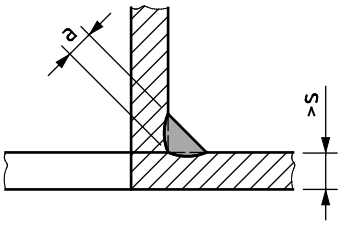
The tank material shall be appropriate in relation to the storage media, Guidelines on material specifications in relation to storage media is provided in Annex B

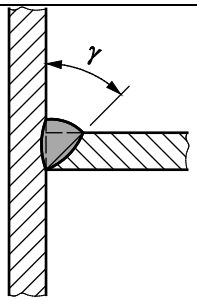
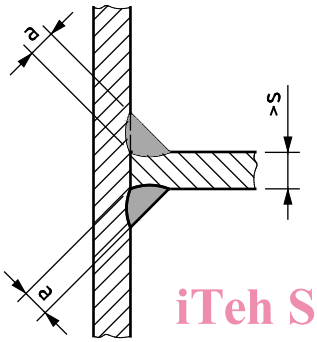
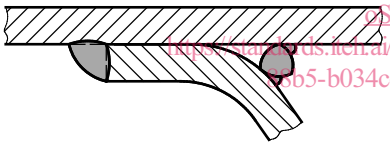
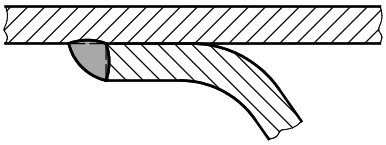
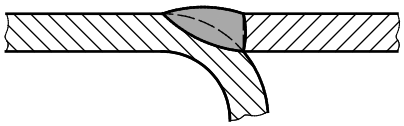
4.2 Welding

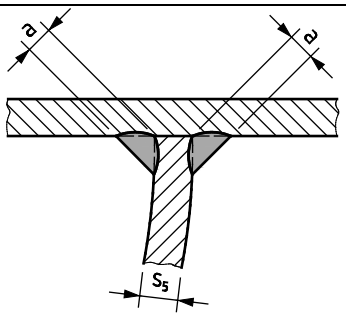
4.2.1 Types of joints

The welding related to the different types of joint is given in Table 2.The types of welded joints shall be in accordance with Table 2. All internal attachments shall be continuously welded.

Table 2 — Types of welded joints

No	Types of joints	Class of tanks and liquid (liquid touched wall) applicable welding
1	Square butt joint 	Plate misalignment shall not exceed 0,3 s_1 respectively 0,3 s_3 or 2 mm For all classes
2a	Joggled butt joint 	For class A and hydro¬carbon liquids For double and single skin tanks Not permissible with inner coating
2b	Joggled butt joint 	For class A, B and C
3a	Overlap joint 	For class A, B and C For outer skin a = 0,7 s_3
3b	Overlap joint 	For class A, B and C For outer skin a = 0,7 s_3
4	Fillet weld in T-joint 	For class A, B and C For nozzles in the outer skin a = 0,7 s_{min} s_{min}: thickness of the thinner plate
5	Fillet weld (full penetration) in T-joint	For class A, B and C For manholes, nozzles and inspection covers γ = 45°

No	Types of joints	Class of tanks and liquid (liquid touched wall) applicable welding
		
6	Double fillet weld in T-joint 	For class A, B and C For manholes, nozzles and stiffening rings a = 0,7 s_{min} s_{min}= thickness of the thinner plate
7a	Fillet weld in overlap joint 	For class A, B and C For compartment dished ends with knuckle radius
7b	Fillet weld in overlap joint 	For class A, B and C For compartment dished ends with knuckle radius Not permissible with inner coating
8	Butt joint 	For class A and B For compartment dished ends with knuckle radius Not permissible with inner coating
9	Double fillet weld in T-joint	For class A and B For compartment dished ends without knuckle radius a = 0,7 s_5

No	Types of joints	Class of tanks and liquid (liquid touched wall) applicable welding
		

4.2.2 Shell plate arrangement

Cross seams shall not be used. Longitudinal welds shall not be used in the bottom half of the tank.

Shell plate joints shall be offset, having a minimum distance *e* of five times the wall thickness but not less than 25 mm.

Key

e minimum distance

Figure 2 — Shell-plate arrangement for inner and outer skin

4.2.3 Consumables

All welding rods/wires and other consumables shall be compatible with the basic material.

4.2.4 Interstitial space

The interstitial space gap should be as small as practically possible but suitable for the leak detection system to function.

There shall be at least two sockets for the leak detection system and these shall be located at the highest point of the interstitial space.

The interstitial space shall be connected to a leak detection system in order to monitor the integrity of the tank permanently; the leak detection systems shall fulfil the requirements of e EN 13160–1 to –7.

4.3 Additional requirements

4.3.1 Roundness of the tank

When tested in accordance with 5.6.1, the maximum out of roundness of the completed tank after manufacture shall not exceed 1,5%.of the diameter.

4.3.2 Manways and inspection covers

The tanks shall be equipped with at least one inspection cover per compartment. In cases where inspection covers are not allowed, the tanks shall have one manway of at least d_2 = 600 mm. No part of a compartment shall be more than 10 m from a manway. Single skin tanks shall always have a manway.

Manway (inspection covers, nozzles) shall be of set-through or set-on-type. Nozzles and flanges shall either be welded inside and outside, or by full penetration.

For the dimensions of the manways and their components see Table 3.

Gaskets shall be provided and shall be suitable for their purpose.

Table 3 — Dimensions of manway components

Inside diameter	Plate thickness of manway body	Diameter of cover	Pitch circle diameter	Bolt hole diameter	Flange thickness and cover thickness		Bolts	
d_2	s_7	d_3	K_p		s_6		Thread size	Number
mm	mm	mm	mm	mm	mm			
					Class A	Class B and C		
600[a]	6	720	680		12	16	M16	32
800	7	920	880	18	12	20		44
1000[b]	7	1120	1080		—	20		48

[a] If a manway is required and no specification is given by the purchaser this diameter shall be used.

[b] For tanks of class C inside diameters of the manway (d2) exceeding 800 mm is not permitted.

Instead of the manway covers shown in the Figure 3 and dimensioned in Table 3, pressed parts of manway (Covers and/or nozzles) may be used in class A tanks with a plate thickness at least equal to the thickness of the inner tank s_1. A ribbed or pressed manway cover shall withstand the test pressure P_t.

The gasket shall be in one piece and as wide as the flange.

Inspection covers for tanks of class A with $d_1 \leq 1250$ mm and tanks of classes B and C with $d_1 \leq 1000$ mm. The diameter of the inspection cover shall not be larger than 300 mm and not smaller than 120 mm, and the thickness of the inspection cover shall be equal to the minimum thickness of the inner tank.

4.3.3 Structural bolts

Structural bolts used shall be in accordance with EN ISO 898-1, with a property class being at least 4.6. The material chosen shall be compatible with the tank material.

4.3.4 Tank fittings, pipes and nozzles

Materials used for the fabrication of tank accessories if welded to the tank shall be compatible with the tank material .