

# SLOVENSKI STANDARD

## SIST EN 12285-3:2019

01-junij-2019

Nadomešča:  
SIST EN 12285-1:2003

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**V delavnici izdelani rezervoarji iz jekla - 3. del: Ležeči enoplaščni in dvoplaščni valjasti rezervoarji za podzemno skladiščenje vnetljivih in nevnetljivih tekočin, ki onesnažujejo vodo in ki se uporabljajo za ogrevanje in hlajenje stavb**

Workshop fabricated steel tanks - Part 3: Horizontal cylindrical single skin and double skin tanks for the underground storage of flammable and nonflammable water polluting liquids for heating and cooling of buildings

Werksgefertigte Tanks aus Stahl - Teil 3: Liegende zylindrische ein- und doppelwandige Tanks zur unterirdischen Lagerung von brennbaren und nichtbrennbaren wassergefährdenden Flüssigkeiten, die für das Heizen und Kühlen von Gebäuden vorgesehen sind <https://standards.iteh.ai/catalog/standards/sist/f4548b3a-9ac7-40cb-a78e-32e15c8b4403/sist-en-12285-3-2019>

Réservoirs en acier fabriqués en atelier - Partie 3 : Réservoirs horizontaux cylindriques à simple et double paroi pour le stockage enterré de liquides inflammables et non inflammables polluant l'eau pour le chauffage et le refroidissement des bâtiments

**Ta slovenski standard je istoveten z: EN 12285-3:2019**

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**ICS:**

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

**SIST EN 12285-3:2019**

**en,fr,de**

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EUROPEAN STANDARD

EN 12285-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2019

ICS 13.300; 23.020.10

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English Version

## Workshop fabricated steel tanks - Part 3: Horizontal cylindrical single skin and double skin tanks for the underground storage of flammable and nonflammable water polluting liquids for heating and cooling of buildings

Réservoirs en acier fabriqués en atelier - Partie 3 : Réservoirs horizontaux cylindriques à simple et double paroi pour le stockage enterré de liquides inflammables et non inflammables polluant l'eau pour le chauffage et le refroidissement des bâtiments

Werksgefertigte Tanks aus Stahl - Teil 3: Liegende zylindrische ein- und doppelwandige Tanks zur unterirdischen Lagerung von brennbaren und nichtbrennbaren wassergefährdenden Flüssigkeiten, die für das Heizen und Kühlen von Gebäuden vorgesehen sind

This European Standard was approved by CEN on 14 May 2018.

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SIST EN 12285-3:2019

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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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**EN 12285-3:2019 (E)****European foreword**

This document (EN 12285-3:2019) 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 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by month October 2019, and conflicting national standards shall be withdrawn at the latest by January 2021.

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, together with EN 12285-1:2018, supersedes EN 12285-1:2003.

Compared to EN 12285-1:2003, this documentt 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, EN 12285-3:2019 includes a new clause as follows:

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

Annex A provides guidance on environmental aspects. For liquid-material combinations to be chosen, further information is given in EN 12285-1:2018, Annex B.

This European Standard *Workshop fabricated steel tanks* consists of 3 parts:

- *Part 1: Horizontal cylindrical single skin and double skin tanks for the underground storage of flammable and nonflammable water polluting liquids other than for heating and cooling of buildings*
- *Part 2: Horizontal cylindrical single skin and double skin tanks for the aboveground storage of flammable and non-flammable water polluting liquids*
- *Part 3: Horizontal cylindrical single skin and double skin tanks for the underground storage of flammable and nonflammable water polluting liquids for heating and cooling of buildings*

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this document: 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.

## 1 Scope

This document 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), specifically used for storage and/or supply of fuel for building heating/cooling systems, and of hot or cold water not intended for human consumption 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 1,1 kg/l and;
- with an operating pressure (Po) of maximum 50 kPa (0,5 bar(g)) and minimum – 5 kPa (–50 mbar(g)) and;
- for double skin tanks with a vacuum leak detection system where the kinematic viscosity does not exceed  $5 \times 10^{-3} \text{ m}^2/\text{s}$ .

Two tank types are distinguished:

- Type S: Single skin;
- Type D: Double skin.

Tanks designed to this document allow for an earth cover of up to 1,5 m. If there are imposed traffic loads or a greater earth cover, calculation will occur.

This document is not applicable to tanks installed in industrial processes or in petrol stations, nor to loads and special measures necessary in areas subject to risk of earthquakes and/or to flooding.

## 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 1090-2:2008+A1:2011, *Execution of steel structures and aluminium structures - Part 2: Technical requirements for steel structures*

EN 10025-2:2004, *Hot rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels*

EN 10204:2004, *Metallic products - Types of inspection documents*

EN 13160-1, *Leak detection systems - Part 1: General Principles*

EN 13160-2, *Leak detection systems - Part 2: Requirements and test/assessment methods for pressure and vacuum systems*

EN 13160-3, *Leak detection systems - Part 3: Requirements and test/assessment methods for liquid systems for tanks*

**EN 12285-3:2019 (E)**

EN ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs with specified property classes - Coarse thread and fine pitch thread (ISO 898-1)*

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

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 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)*

**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>

**3.1.1****tank**

workshop fabricated cylindrical containment for the storage of liquids

Note 1 to entry: Tanks 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 fluid storage space within a tank

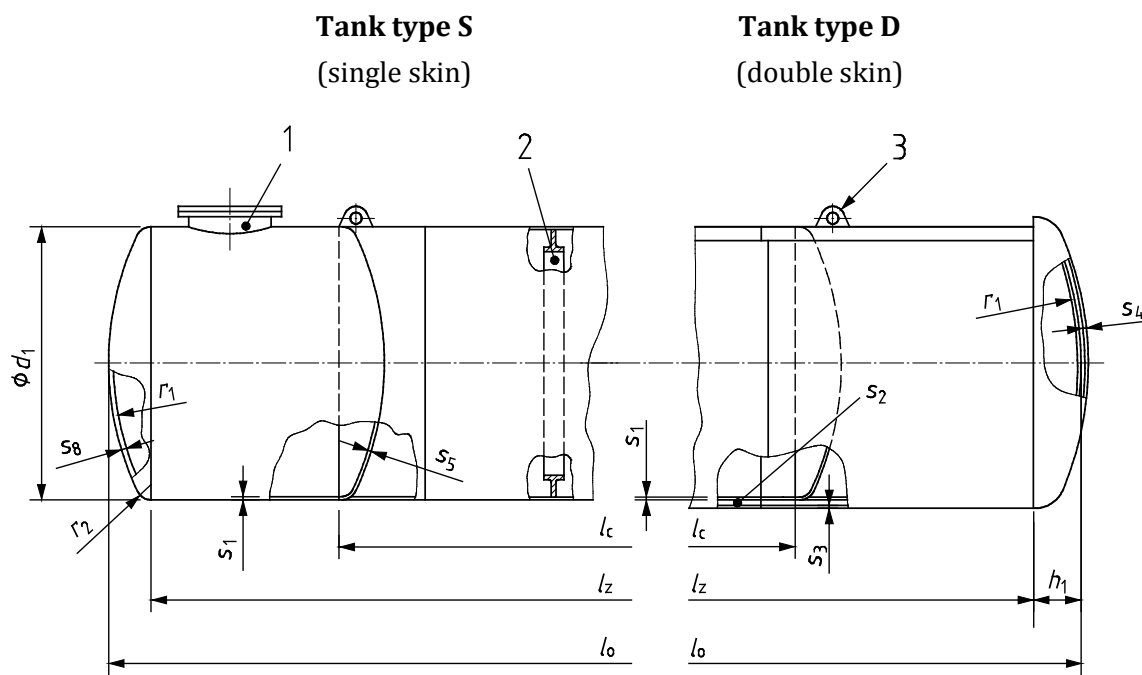
**3.1.4****single skin tank**

impermeable containment consisting of a tank of single containment

Note 1 to entry: A single skin tank also constitutes the inner skin of a double skin tank.

Note 2 to entry: See Figure 1.



**Key**

- 1 for manway detail, see Figure 3
- 2 for example for stiffening ring, see Figure 4
- 3 lifting lug

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**Figure 1 — Example of tank symbols**

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**3.1.5****double skin tank**

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

Note 1 to entry: See Figure 1.

**3.1.6****operating pressure**

$p_o$

pressure bar (g) inside the tank above the liquid during operating conditions

**3.1.7****prototype tank test pressure**

$p_{t1}$

pressure bar (g) to which the tank or compartment is subjected for testing

**3.1.8****prototype interstitial space test pressure**

$p_{t2}$

pressure bar (g) to which the interstitial space between the skins is subjected for testing

Note 1 to entry: Only applicable for double skin tanks.

## EN 12285-3:2019 (E)

## 3.1.9

**tank leak tightness test pressure** $p_{t3}$ 

pressure bar (g) to which the tank or compartment is subjected to leak testing

## 3.1.10

**interstitial space leak tight test pressure** $p_{t4}$ 

pressure bar (g) to which the interstitial space is subjected to leak testing

Note 1 to entry: Only applicable for double skin tanks.

## 3.1.11

**nominal volume**

storage capacity for which the tank is designed

## 3.1.12

**actual volume**

volume which is equal to or greater than the nominal volume

## 3.2 Symbols and abbreviations

For the purpose of this document, the following symbols apply:

a	dimension for welding
	NOTE 1 See Figure 2
$d_1$	External nominal diameter of the tank
$d_2$	Internal diameter of the manway
$d_3$	Diameter of the manway cover and corresponding flange
$h_1$	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
	NOTE 2 For a single compartment tank $L_c = L_z$
$l_o$	Overall length of the tank
$l_z$	Length of the tank without dished ends
	NOTE 3 For a single compartment tank $L_c = L_z$
$p_t$	Test pressure
$p_{t1}$	Test pressure for prototype test of tank
$p_{t2}$	Test pressure of prototype test of interstitial space
$p_{t3}$	Test pressure of leak tightness test of tank
$p_{t4}$	Test pressure of leak tightness test of interstitial space
$r_1$	Crown radius of dished ends
$r_2$	Knuckle radius of dished ends
$s_1$	Nominal thickness of shell (single walled tank) and inner shell (double walled tank)
$s_2$	Interstitial space
$s_3$	Nominal thickness of outer shell
$s_4$	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
$s_8$	Nominal thickness of inner dished ends
$\gamma$	Incline angle for T-joint welding

## 4 Product characteristics

### 4.1 General

The tank material shall be suitable for long term contact with the stored media. Guidelines on material specifications in relation to stored media is provided in EN 12285-1:2018, Annex B.

The safe working capacity of the tank should usually not exceed 97 % of the nominal volume at ambient temperatures ( $-20\text{ }^{\circ}\text{C}$  to  $+50\text{ }^{\circ}\text{C}$ ).

### 4.2 Manufacturing

#### 4.2.1 Qualification of the company and welding qualification of the personnel

The manufacturer has to prove that he is able to master the procedures necessary for manufacturing the tanks in a proper manner.

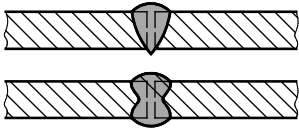
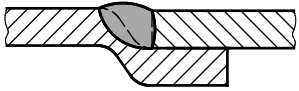

The manufacturer can prove this by means of a welding certificate for execution class EXC 2 in accordance with EN 1090-2 or a higher class. In deviation of EN 1090-2:2008+A1:2011, Table 14, the welding coordination personnel responsible for coordinating the manufacturing process of the tanks has to have special technical expertise in accordance with EN ISO 14731.

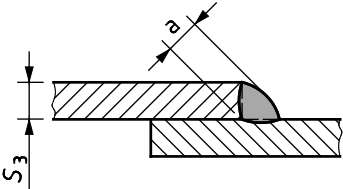
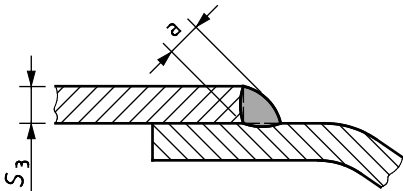
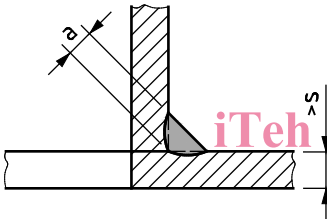
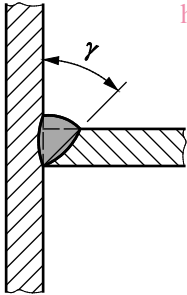
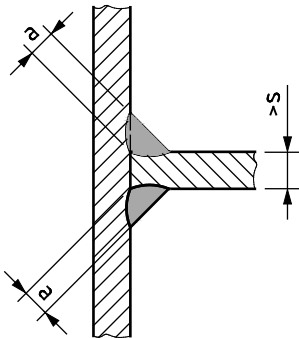
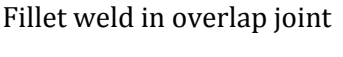
#### 4.2.2 Types of joints

Welding procedures shall be in accordance with EN ISO 15607, EN ISO 15609-1, EN ISO 15614-1.

The welding related to the different types of joints is given in Table 1. The types of welded joints shall be in accordance with Table 1. All internal attachments shall be continuously welded.

**Table 1 — Types of welded joints**

Number	Types of joints	Applicable welding of tanks and liquid (liquid touched wall)
1	Square butt joint 	Plate misalignment shall not exceed $0,3 s_1$ respectively $0,3 s_3$ or 2 mm
2a	Joggled butt joint 	For hydrocarbon liquids only For double and single skin tanks Not permissible with inner coating
2b	Joggled butt joint 	

Number	Types of joints	Applicable welding of tanks and liquid (liquid touched wall)
3a	Overlap joint 	For outer skin $a = 0,7 s_3$
3b	Overlap joint 	For outer skin on outer dished end $a = 0,7 s_3$
4	Fillet weld in T-joint 	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 manways, nozzles and inspection covers $\gamma = 45^\circ$
6	Double fillet weld in T-joint 	For manways, nozzles and stiffening rings $a = 0,7 s_{min}$ $s_{min}$ = thickness of the thinner plate
7a	Fillet weld in overlap joint 	For compartment dished ends with knuckle radius