SLOVENSKI STANDARD
SIST EN 13341:2005+A1:2011

01-maj-2011

Plastomerne stabilne posode za nadzemno skladiščenje kurilnega olja, kerozina in dizelskih pogonskih goriv - Posode iz pihanega polietilena, rotacijsko oblikovanega polietilena in iz poliamida 6, proizvedenega z anionsko polimerizacijo - Zahteve in preskusne metode

Static thermoplastic tanks for above ground storage of domestic heating oils, kerosene and diesel fuels - Blow moulded and rotationally moulded polyethylene tanks and rotationally moulded tanks made of anionically polymerized polyamide 6 - Requirements and test methods

Ortsfeste Tanks aus Thermoplasten für oberirdische Lagerung von Haushalts-Heizölen, Kerosin und Dieselkraftstoffen - Tanks, die aus blasgeformtem und rotationsgeformtem Polyethylen sowie aus rotationsgeformtem anionisch polymerisiertem Polyamid 6 hergestellt wurden - Anforderungen und Prüfverfahren

Réservoirs statiques en thermoplastiques destinés au stockage non enterré de fioul domestique de chauffage, de pétrole lampant et de gazole - Réservoirs en polyéthylène moulés par soufflage et par rotation et réservoirs moulés par rotation fabriqués en polyamide 6 polymérisé de manière anionique - Exigences et méthodes d'essai

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23.020.10	Nepremične posode in rezervoarji	Stationary containers and tanks

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13341:2005+A1

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English Version

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This European Standard was approved by CEN on 3 February 2005 and includes Amendment 1 approved by CEN on 27 November 2010.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 13341:2005+A1:2011) has been prepared by Technical Committee CEN/TC 266 “Thermoplastic static tanks”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by July 2011, and conflicting national standards shall be withdrawn at the latest by July 2011.

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 includes Amendment 1, approved by CEN on 2010-11-27.

This document supersedes EN 13341:2005.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ⟨A1⟩ ⟨A1⟩.

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).

For relationship with Construction Product Directive (89/106/EEC), see informative Annex ZA, which is an integral part of this document.

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 United Kingdom.

Introduction

〚A1〛 *deleted text* 〈A1〉

This document does not include tanks for the transport and distribution of fuels or gasses, or tanks for the storage of gas or for cooling systems.

〚A1〛 Flammable fuels with a flash point > 55 °C as determined by EN ISO 2719 (i.e. domestic heating oil and diesel fuel) are suitable to be stored in the tanks described in this document without further requirements.

Flammable fuels with a flash point ≤ 55 °C as determined by EN ISO 2719 (i.e. kerosene) are also suitable to be stored in the tanks described in this document if the requirements concerning electrostatic behaviour according to CLC/TR 50404 are fulfilled. 〈A1〉

The attention of the user should be drawn to national safety and environmental regulations or other regulations that apply when installing thermoplastic tanks, and the suitability of fuels to be stored therein.

1 Scope

〈A1〉 This document specifies requirements for materials, physical properties and performance of single blow moulded and rotationally moulded polyethylene tanks and of rotationally moulded tanks made of anionically polymerized polyamide 6, with or without reinforcements, for above ground storage of domestic heating oil, kerosene and diesel fuels for the supply of building heating/cooling systems.

It is only applicable to static blow moulded and rotationally moulded polyethylene tanks and to rotationally moulded tanks made of anionically polymerized polyamide 6 that are subject to atmospheric pressure, but not subject to any external loading and have a capacity from 400 l up to 10 000 l. 〈A1〉

〈A1〉 *deleted text* 〈A1〉

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 13160-1, *Leak detection systems — Part 1: General principles*

EN 13160-2, *Leak detection systems — Part 2: Pressure and vacuum systems*

EN 13160-3, *Leak detection systems — Part 3: Liquid systems for tanks*

EN 13160-4, *Leak detection systems — Part 4: Liquid and/or vapour sensor systems for use in leakage containments or interstitial spaces*

EN 13160-5, *Leak detection systems — Part 5: Tank gauge leak detection systems*

EN 13160-6, *Leak detection systems — Part 6: Sensors in monitoring wells*

EN 13160-7, *Leak detection systems — Part 7: General requirements and test methods for interstitial spaces, leak protecting linings and leak protecting jackets*

EN 13501-1, *Fire classification of construction products and building elements — Part 1. Classification using test data from reaction to fire tests*

EN 13616, *Overfill prevention devices for static tanks for liquid petroleum fuels*

EN ISO 175, *Plastics — Methods of test for the determination of the effects of immersion in liquid chemicals (ISO 175:1999)*

〈A1〉 EN ISO 293:2005, *Plastics — Compression moulding of test specimens of thermoplastic materials (ISO 293:2004)* 〈A1〉

〈A1〉 EN ISO 527-2:1996, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics (ISO 527-2:1993 including Corr 1:1994)* 〈A1〉

〈A1〉 *deleted text* 〈A1〉

〈A1〉 EN ISO 1133:2005, *Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics (ISO 1133:2005)* 〈A1〉

EN ISO 1183-1, *Plastics — Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pyknometer method and titration method (ISO 1183-1:2004)*

EN ISO 1183-2, *Plastics — Methods for determining the density of non-cellular plastics — Part 2: Density gradient column method (ISO 1183-2:2004)*

A1 EN ISO 1872-2:2007, *Plastics — Polyethylene (PE) moulding and extrusion materials — Part 2: Preparation of test specimens and determination of properties (ISO 1872-2:2007)* A1

EN ISO 4892-1, *Plastics — Method of exposure to laboratory light sources — Part 1: General guidance (ISO 4892-1:1999)*

EN ISO 4892-2, A1 *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps (ISO 4892-2:2006)* A1

A1 EN ISO 15512, *Plastics — Determination of water content (ISO 15512:2008)* A1

CLC/TR 50404, *Electrostatics — Code of practice for the avoidance of hazards due to static electricity*

3 Terms and definitions

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

3.1
tank
container for the storage of domestic heating, kerosene and diesel fuels at atmospheric pressure which retains its designed shape without any reinforcements when empty

3.2
brimful capacity (of a tank)
volume of water held by the tank filled through the filling orifice to the point of overflowing

3.3
maximum filling capacity (of a tank)
value of 95 % of the brimful capacity

A1 3.4
reinforcement
constitutive element of a tank which contributes to its mechanical stability

NOTE For example, one or several strapping(s), a secondary containment A1.

4 Requirements

4.1 Materials

4.1.1 General

Raw materials and samples taken from tanks shall be tested and fulfil the requirements according to Table 1.

The proportion of regrind from the same material shall not exceed 50 % for blow-moulded tanks.

Regrind shall not be used for rotationally moulded tanks.

Tanks for external installation shall be sufficiently opaque so as to protect the contents from degradation by ultra violet light. The manufacturer may use visual or prescriptive means to demonstrate compliance with this requirement.

4.1.2 Reaction to fire

[A1] Where the tank is subject to regulatory requirements, the material shall be classified in accordance with EN 13501-1.

NOTE This sub-clause does not cover resistance to fire issues. [/A1]

4.1.3 Electrostatic behaviour

Electrostatic behaviour is not a characteristic of the tank or tank material but a phenomenon resulting from some storage media and the filling procedure. Manufacturers shall provide durable notices on all sizes of tanks with appropriate wording drawing the users attention to filling procedures according to CLC/TR 50404 for flammable liquids with a flash point < 55 °C.

[A1]

4.1.4 Content and/or release of dangerous substances

Materials used for the tanks according to this standard shall not contain or release any dangerous substances. [/A1]

Table 1 — Material requirements

Type of material	Property	Requirement	Test method
Blow moulded polyethylene	Density [a]	Shall not be less than 938 kg/m^3	A.1.1
	Melt flow rate [b]	Shall be less than 12 g/10 min at 190 °C, 21,6 kg Maximum increase of the melt flow rate of the moulded tank shall not be greater than 15 % of the value determined on the raw material.	A.1.2
	Tensile strength [c]	Tensile strength at yield shall not be less than 21 MPa. Elongation at yield shall not be more than 15 %.	A.1.3
	Resistance to oil [c]	Mass alteration shall be less than 10 %. Variation in tensile strength at yield shall not exceed 20 % of that measured in A.1.3. Change in elongation at yield shall not exceed 150 % of that measured in A.1.3.	A.1.4
Rotationally moulded polyethylene	Density [a]	A single polymer resin shall have a density not less than 934 kg/m^3.	A.2.1
	Melt flow rate [b]	Shall be 4,0 g/10 min ± 3,0 g/10 min at 190 ºC, 2,16 kg. Maximum variation of the melt flow rate of moulded tank shall not be greater than 20 % of the value determined on the raw material.	A.2.2
	Tensile strength [c]	Tensile strength at yield shall not be less than 15 MPa. Elongation at yield shall not be more than 25 %. The elongation at break shall not be less than 200 %.	A.2.3
	Resistance to oil [c]	Mass alteration shall be less than 10 %. Variation in tensile strength at yield shall not exceed 20 % of that measured in A.2.3. Change in elongation at break shall be less than 150 % of that measured in A.2.3.	A.2.4
Polyamide 6 (by anionic polymerization)	Tensile strength [c]	Tensile strength shall not be less than 30 MPa at yield. Elongation shall be more than 20 % at break.	A.3.1
	Resistance to oil [c]	Mass alteration shall be less than 0,4 %. Variation in tensile strength shall not exceed 5 % of that measured in A.3.1. Elongation at break shall be more than 20 %.	A.3.2
	Colour bleed [c]	The bleed time of any sample shall not be less than 5,5 h.	A.3.3
〈A1〉 Blow moulded polyethylene Rotationally moulded polyethylene Polyamide 6 (by anionic polymerisation)	Resistance to weathering [c]	For external installations after exposure to global radiant exposure of 34 GJ/m^2 (corresponding to a radiant exposure of 2,3 GJ/m^2 for the band from 300 nm to 400 nm) the elongation at break shall be greater than 50 % of the initial value. For internal installations the elongation at break after exposure to global radiant exposure of 3,4 GJ/m^2 (corresponding to a radiant exposure of 0,23 GJ/m^2 for the band from 300 nm to 400 nm) shall be greater than 50 % of the initial elongation at break. The manufacturer shall ensure that changing the additive package does not decrease weather resistance.	A.1.3, A.1.5 A.2.3, A.2.5 A.3.1, A.3.4 〈A1〉

[a] Test to be carried out on raw material.

[b] Test to be carried out on raw material and on sample taken from a tank.

[c] Test to be carried out on tank.

4.2 Design

4.2.1 Filling systems

In the case of direct fill, the aperture for filling shall be a minimum 38 mm in diameter and shall be covered with a cap or lid.

4.2.2 Supports

The manufacturer shall provide instructions for appropriate tank support.

4.2.3 Venting systems

All tanks shall be equipped with venting facilities. The minimum cross sectional area of the venting pipe shall not be less than the sum of the smallest cross sectional area of the filling system with a minimum diameter of 38 mm.

4.2.4 Suction/outlet system

Tanks shall be equipped with an opening permitting the safe and reliable connection of withdrawal systems. All fittings shall be corrosive resistant. The tank outlet may be installed above or below the liquid level.

4.2.5 Drainage

Where the outlet is installed below the liquid level, access shall be provided to allow the tank to be drained of sludge by means of a dip tube and pump.

4.2.6 Overflow alarm device

All tanks shall have provision for an overfill prevention system according to EN 13616.

4.2.7 Contents gauge connection facility

If the level of liquid can be seen through the walls of the tank a contents gauge is not required. In all other cases provision shall be made for a contents gauge to be fitted.

4.2.8 Leak detection system

If a leak detection system is used, it shall fulfil the requirements according to EN 13160-1 to 7.

4.2.9 Inspection facilities

Facilities for internal inspection (manholes, etc) of the tank/contents shall be designed so that they shall not affect the performance of the tank according to the requirements of this document.

5 Evaluation of conformity

5.1 General

The compliance of thermoplastic tanks with the requirements of this ⟨A1⟩ standard ⟨A1⟩ and with the stated values (including classes) shall be demonstrated by:

— initial type testing;

— factory production control (FPC) by the manufacturer, including product assessment.

⟨A1⟩ For the purposes of testing, thermoplastics tanks may be grouped into families, where it is considered that the results for one or more characteristics are representative for those same characteristics for all other products within that family.

NOTE Tanks can be in different families for different characteristics. ⟨A1⟩

5.2 Type testing

A1

5.2.1 Testing

Initial type testing (ITT) shall be performed to demonstrate compliance with this standard, for all tanks.

Tests previously performed in accordance with the provisions of this standard (same tank, same characteristic(s), test method, sampling procedure, system of attestation of conformity, etc.) may be taken into account.

All essential characteristics, for which the manufacturer declares performances, are subject to Initial Type Testing.

Whenever one of the following changes occurs the Initial Type Tests shall be repeated as given in Table 2:

i) when the method of production is altered in such a way as to affect type test performance;

ii) when the manufacturer changes the base polymer grade used;

iii) when changes are made in the dimensions of wall thickness, height, diameter, length, width or configuration for any tank.

Test methods, given in Annexes A and B, which shall be used for ITT, are specified in Table 2.

5.2.2 Sampling

A sufficient number of tanks shall be randomly selected from the production batch to complete all the tests for ITT.

Table 2 — Initial type testing of tanks

Type of tank	Property	Test method	Testing relevant to [a]				Number of tanks per family to be tested	Comment
			I	i	ii	iii		
Blow moulded polyethylene tanks	Density	A.1.1	+		+		1	Any one from the family
	Melt flow rate	A.1.2	+		+			
	Tensile strength	A.1.3	+		+			
	Resistance to oil	A.1.4	+		+			
	Resistance to weathering	A.1.5	+		+			
Rotationally moulded polyethylene tanks	Density	A.2.1	+		+		1	Any one from the family
	Melt flow rate	A.2.2	+		+			
	Tensile strength	A.2.3	+		+			
	Resistance to oil	A.2.4	+		+			
	Resistance to weathering	A.2.5	+		+			
Polyamide 6 tanks by anionic polymerization	Tensile strength	A.3.1	+		+		1	Any one from the family
	Resistance to oil	A.3.2	+		+			
	Colour bleed	A.3.3	+		+			
	Resistance to weathering	A.3.4	+		+			
	Water content	B.9	+		+			
All tanks	Capacity	B.1	+			+	Each	
					+		1	Any one from the family
	Visual appearance	B.2	+			+	Each	
					+		1	Any one from the family
	Mass	B.3	+			+	Each	
					+		1	Any one from the family
	Wall thickness	B.4	+			+	Each	
					+		1	Any one from the family
	Impact resistance	B.5	+			+	Each	
				+	+		1	The most critical tank [c]
	Deformation or elongation [b]	B.6	+			+	Each	
				+	+		1	The most critical tank [c]
	Pressure resistance	B.7	+			+	Each	
				+	+		1	The most critical tank [c]
	Leak tightness	B.8	+			+	Each	
				+	+		1	The most critical tank [c]

[a] I is initial type test in case of a new family
i), ii) and iii) are changes as mentioned in 5.2.1
+ means testing relevant for the characteristic
void means testing not relevant for the characteristic

[b] see Tables 4 and 5 for the choice of the test method

[c] the most critical tank of the family as defined during the Initial Type Test "I".
If none, the largest tank will normally be selected assuming this size is considered as having the worst performance

A1