

D`Uglca YfbY`ghUV]bY`dcgcXY`nUbUXnYa bc`g`UX]y Yb`Y`_i f]`bY[Uc`Už`Yfcn]bU]b
X]nY`g`_l`dc[cbg`_l` [cf]j`!`DcgcXY]n`d] UbY[Udc`]Yh]YbUžfc]hUW]g`_c
cV`_cj UbY[Udc`]Yh]YbU]b`n`dc`]Ua]XU*`ždfc]nj YXYbY[Un`Ub]cbg`_c
dc`]a Yf]nUW]c`!`NU h]j Y`]b`dfYg`_i gbY`a YtcXY

Thermoplastics static tanks for above ground storage of domestic heating oils, kerosene and diesel fuels - Blow moulded polyethylene, rotationally moulded polyethylene and polyamide 6 by anionic polymerization tanks - Requirements and test methods

iTeh STANDARD PREVIEW

Ortsfeste Tanks aus Thermoplasten für die oberirdische Lagerung von Heizölen, Kerosin und Dieselkraftstoffen - Tanks, die aus blasgeformtem Polyethylen, rotationsgeformtem Polyethylen und durch anionische Polymerisation von Polyamid 6 hergestellt wurden - Anforderungen und Prüfverfahren [SIST EN 13341:2005](https://standards.iteh.ai/catalog/standards/sist/6dcd329c-c3be-4ac4-b263-cc82cd07bca8/sist-en-13341-2005)

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Réservoirs statiques en thermoplastiques destinés au stockage non enterré de fioul domestique, combustible liquide pour appareil mobile de chauffage/pétrole lampant et gazole - Réservoirs en polyéthylène moulés par soufflage, en polyéthylène moulés par rotation et en polyamide 6 par polymérisation anionique - Exigences et méthodes d'essai

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English version

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This European Standard was approved by CEN on 3 February 2005.

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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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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Foreword

This document (EN 13341:2005) 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 September 2005, and conflicting national standards shall be withdrawn at the latest by December 2006.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Introduction

This document has been prepared to provide requirements and test methods for materials, physical properties, and performance criteria of blow moulded and rotationally moulded static thermoplastics tanks.

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.

Flammable liquids with a flash point > 55 °C as determined by EN ISO 2719 are suitable to be stored in the tanks described in this document without further requirements.

Flammable liquids with a flash point ≤ 55 °C as determined by EN ISO 2719 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.

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.

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1 Scope

This document specifies requirements for materials, physical properties and performance of single blow moulded and rotationally moulded polyethylene tanks or polyamide 6 (by anionic polymerisation) tanks, with or without reinforcements, for above ground storage of domestic heating oil, kerosene and diesel fuels.

It is only applicable to static blow moulded and rotationally moulded polyethylene tanks and polyamide 6 (by anionic polymerisation) tanks that are subject to atmospheric pressure and have a capacity from 450 l up to 10 000 l.

This document does not consider the consequences of wind or snow loading which is considered to be an installation issue.

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)*

EN ISO 527-3:1995, *Plastics — Determination of tensile properties — Part 3: Test conditions for films and sheets (ISO 527-3:1995)*

EN ISO 960, *Plastics — Polyamides (PA) — Determination of water content (ISO 960:1998)*

EN ISO 1133:1999, *Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics (ISO 1133:1997)*

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

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

EN ISO 1872-2, *Plastics — Polyethylene (PE) moulding and extrusion materials — Part 2: Preparation of test specimens and determination of properties (ISO 1872-2:1997)*

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

EN ISO 4892-2, *Plastics — Method of exposure to laboratory light sources — Part 2: Xenon-arc sources (ISO 4892-2:1994)*

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

Where the product is subject to regulatory requirements, tanks made from polyethylene and polyamide 6 may be declared as Class F without further testing (CWFT) or the material shall be classified according to EN 13501-1, mounted and tested in conditions representative of the product's intended use.

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.

4.1.4 Release of dangerous substances

Materials used in products shall not release any dangerous substances in excess of the maximum permitted levels specified in a relevant European Standard for the material or permitted in the national regulations of the member state of destination.

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 °C, 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 |
| Blow moulded polyethylene | Resistance to weathering ^c | For external installations after exposure to total irradiance of 34 GJ/m ² , the elongation at break shall be greater than 50 % of the initial value. | A.1.3, A.1.5 |
| Rotationally moulded polyethylene | | For internal installations the elongation at break after exposure to total irradiance of 3,4 GJ/m ² , shall be greater than 50 % of the initial elongation at break. | A.2.3, A.2.5 |
| Polyamide 6 (by anionic polymerisation) | | The manufacturer shall ensure that changing the additive package does not decrease weather resistance. | A.3.1, A.3.4 |
| <p>^a Test to be carried out on raw material.</p> <p>^b Test to be carried out on raw material and on sample taken from a tank.</p> <p>^c Test to be carried out on tank.</p> | | | |

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 document and with the stated values (including classes) shall be demonstrated by:

- initial type testing;

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

For the purposes of testing, thermoplastic tanks may be grouped into series, where it is considered that the selected property is common to all thermoplastic tanks within that family.

5.2 Type testing

5.2.1 Initial type testing

Initial type testing (ITT) shall be performed to demonstrate conformity with this document, for all product types.

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

For a series of tanks produced by the same mould design, the initial type test shall be carried out on the largest tank of a series, whereby the tank height may differ by 20 % in a series. All the other aspects of the design remaining the same, a reduction of mass equal to the mass of the segment of tank is permitted.

All characteristics in Clause 4 shall be subject to ITT, with the exception of "release of dangerous substances" which may be assessed indirectly by controlling the content of the substance concerned.

5.2.2 Further type testing

Whenever one of the following changes occur the type tests shall be repeated (see Table 2).

- a) when the method of production is altered in such a way as to affect type test performance;
- b) when the manufacturer changes the base polymer grade used;
- c) when changes are made in the dimensions of wall thickness, height, diameter, length, width or configuration for any one tank capacity.

5.2.3 Sampling

A minimum of three samples for ITT shall be randomly selected from the production batch.

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

Table 2 — Initial type testing of tanks

| Type of tank | Property | Test Method | Circumstances requiring ITT in 5.2.2 |
|--|--|-------------|--------------------------------------|
| Blow moulded polyethylene tanks | Density | A.1.1 | b) |
| | 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 | b) |
| | 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 | b) |
| | 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 | a), b), c) |
| | Visual appearance | B.2 | |
| | Mass | B.3 | |
| | Wall thickness | B.4 | |
| | Impact resistance | B.5 | |
| | Deformation or elongation ^a | B.6 | |
| | Pressure resistance | B.7 | |
| | Leak tightness | B.8 | |
| ^a See Tables 4 and 5 for the choice of the test method. | | | |