

# Welded static non-pressurized thermoplastic tanks —

## Part 1: General principles

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British Standard

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# National foreword

This British Standard is the official English language version of EN 12573-1:2000.

The UK participation in its preparation was entrusted to Technical Committee PRI/62, Static thermoplastic tanks, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

## Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

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## Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 27 and a back cover.

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English version

## Welded static non-pressurized thermoplastic tanks - Part 1: General principles

Cuves statiques soudées en matières thermoplastiques  
sans pression - Partie 1: Principes généraux

Geschweißte ortsfeste drucklose Behälter (Tanks) aus  
Thermoplasten - Teil 1: Allgemeine Grundsätze

This European Standard was approved by CEN on 14 February 2000.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 266, Thermoplastic static tanks, the Secretariat of which is held by BSI.

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 March 2001, and conflicting national standards shall be withdrawn at the latest by March 2001.

The primary design calculations are derived from EN 1778, Characteristic values for welded thermoplastic constructions – Determination of allowable stresses and moduli for design of thermoplastic equipment. Safety factors have been defined for four categories of tank as detailed in 4.2.

EN 12573, Welded static non-pressurized thermoplastic tanks, consists of:

- Part 1: General principles;
- Part 2: Calculation of vertical cylindrical tanks;
- Part 3: Design and calculation for single skin rectangular tanks;
- Part 4: Design and calculation of flanged joints.

This standard is intended to be used as part of a certification scheme covered by EN ISO 9001 including items such as the approval testing of welders according to prEN 13067.

Additional to the requirements of this standard, it is necessary to establish requirements concerning the inspection of fabrication, the tightness test, frequency of tests and the type of certificate in accordance with EN ISO 9001.

The informative annex A is a questionnaire for the purchaser on conditions of service for a welded static non-pressurized thermoplastic tank.

The informative annex B gives examples of construction details for the design of welded joints.

The performance of thermoplastic tanks is also dependent on their transport and site installation and recommendations in these areas are given in the informative annex C.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

## 1 Scope

This standard specifies general principles for welded static non-pressurized thermoplastic tanks. It applies to work shop and site fabrications.

The standard covers tanks with a capacity of 0,45 m<sup>3</sup> (450 litres) and above.

Tanks which comply with the requirements of this standard are not intended to withstand internal pressure or vacuum other than that which may occur during the transfer of fluids (including gases) in their normal operation.

This standard applies to tanks fabricated in the following thermoplastics:

Polyethylene (PE)  
Polypropylene (PP)  
Poly (vinyl chloride) (PVC)  
Poly (vinylidene fluoride) (PVDF)

NOTE: Design data for these materials is given in EN 1778.

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- |             |                                                                                                                                                      |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| EN 1778     | Characteristic values for welded thermoplastic constructions - Determination of allowable stresses and moduli for design of thermoplastic equipment. |
| prEN 13067  | Plastics welding personnel - Approval testing of welders - Thermoplastics welded assemblies.                                                         |
| EN ISO 9001 | Quality systems - Model for quality assurance in design/development, production, installation and servicing (ISO 9001:1994).                         |

## 3 Definitions

For the purposes of this standard, the following definitions apply.

### 3.1 brimful capacity

volume of water held by the tank filled through the filling orifice to the point of overflowing

### 3.2 maximum filling capacity

value of 95 % of the brimful capacity

## 4 Design requirements

### 4.1 General

The manufacturer shall determine from the purchaser all factors relevant to the design of the tank. A recommended enquiry form for this purpose is given in annex A.

## 4.2 Safety factor

In the design calculation, an overall safety factor (S) for the tank shall be selected and agreed between the contracting partners. There are four categories of tank:

Category 2,0 (corresponding to a safety factor 2,0)

Category 1,7 (corresponding to a safety factor 1,7)

Category 1,5 (corresponding to a safety factor 1,5)

Category 1,3 (corresponding to a safety factor 1,3)

## 4.3 Material compatibility

Compatibility with contents shall be established using the procedures set down in EN 1778.

## 4.4 Calculated design life

The minimum calculated design life for a welded static non-pressurized thermoplastic tank shall be at least 10 years and 1 year for bunds subjected to liquid load. When specified by the purchaser, this calculated design life may be extended to a maximum of 25 years.

## 4.5 Nozzles

An inlet and an outlet nozzle are required. In the case of closed tanks, to reduce the risk of pressurizing the tank, a venting nozzle with a nominal diameter of 1,3 times the nominal diameter of the largest inlet or outlet nozzle is required.

## 4.6 Manhole

In the case of closed tanks with a capacity of 2,0 m<sup>3</sup> (2 000 litres) and above, at least one manhole shall be provided to allow internal access and retrieval.

## 4.7 Welded joints

Recommendations for the design of welded joints are given in annex B.

## 5 Marking

Tanks shall be marked by means of an attached identification plate with, at least, the following information:

- a) tank manufacturer;
- b) material of construction;
- c) designed contents or density, chemical reduction factor, and design temperature;
- d) maximum filling capacity;
- e) date of fabrication;
- f) manufacturer's identification no.;
- g) location for use; internal or external;
- h) category of tank;
- i) calculated design life;
- j) the number of this standard.

An example of an identification plate is shown in Figure 1.

## 6 Packaging, loading, transport and installation

Recommendations for the packaging, loading, transport and installation of welded static non-pressurized thermoplastic tanks are given in annex C.

NOTE: It is recommended that information giving details of installation, any change of use, etc., should be recorded by the user when such events occur. This will result in a continuous record of a tank's service history.

|                                                 |                                                                                  |
|-------------------------------------------------|----------------------------------------------------------------------------------|
| <b>TANK MANUFACTURER</b>                        | <b>Tankworks plc</b>                                                             |
| <b>MANUFACTURERS IDENTIFICATION NO</b>          | <b>ABC 123</b>                                                                   |
| <b>DATE OF FABRICATION</b>                      | <b>15 March 1995</b>                                                             |
| <b>MATERIAL OF CONSTRUCTION</b>                 | <b>High density polyethylene</b>                                                 |
| <b>MAXIMUM FILLING CAPACITY</b>                 | <b>30 cubic metres</b>                                                           |
| <b>DESIGN CONTENTS</b>                          | <b>Hydrochloric acid 36 %<br/>Density 1,13<br/>Chemical reduction factor 1,3</b> |
| <b>DESIGN TEMPERATURE</b>                       | <b>30 °C</b>                                                                     |
| <b>LOCATION</b>                                 | <b>Internal</b>                                                                  |
| <b>CATEGORY OF TANK</b>                         | <b>1,7</b>                                                                       |
| <b>CALCULATED DESIGN LIFE</b>                   | <b>10 years</b>                                                                  |
| <b>THIS STORAGE TANK COMPLIES WITH EN 12573</b> |                                                                                  |

NOTE: The marking on the left side is normative and the values on the right side are understood as an example.

Figure 1 — Example of a tank identification plate