



BSI Standards Publication

## Domestic swimming pools

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Part 1: General requirements including safety and test methods

## National foreword

This British Standard is the UK implementation of EN 16582-1:2015+A1:2021. It supersedes BS EN 16582-1:2015, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by A1 A1

The UK participation in its preparation was entrusted to Technical Committee SW/136/8, Swimming pools and aquatic equipment.

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

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English Version

## Domestic swimming pools - Part 1: General requirements including safety and test methods

Piscines privées à usage familial - Partie 1 : Exigences  
générales et de sécurité et méthodes d'essai

Schwimmbäder für private Nutzung - Teil 1:  
Allgemeine Anforderungen einschließlich  
sicherheitstechnischer Anforderungen und  
Prüfverfahren

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## European foreword

This document (EN 16582-1:2015+A1:2021) has been prepared by Technical Committee CEN/TC 402 “Domestic pools and spas”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by November 2021 and conflicting national standards shall be withdrawn at the latest by November 2021.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 includes Amendment 1 approved by CEN on 11 December 2020.

This document supersedes EN 16582-1:2015.

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

This document is part of a series of standards dealing with domestic swimming pools which consists of:

- *Part 1: General requirements including safety and test methods;*
- *Part 2: Specific requirements including safety and test methods for inground pools;*
- *Part 3: Specific requirements including safety and test methods for aboveground pools.*

This European Standard has to be read in conjunction with local and national regulations if they exist.

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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Introduction

This part of EN 16582 specifies requirements including safety and test methods that are generally applicable to domestic swimming pools. For specific types of pools these requirements are supplemented or modified by the requirements of specific standards which have been issued as additional parts of this European Standard.

As specific standards exist, this general standard should not be used alone.

The users of this standard could be either in a Business to consumer (B to C) relationship, such as constructors, installers, retailers, etc. or in a Business to business (B to B) relationship, such as manufacturers, suppliers, distributors, etc. Safe products are the basis of the consumers' safety and therefore, this European Standard should take into account the following topics:

- product safety and performance requirements;
- safe construction and installation,
- safe use, which could include information and red flags for consumers (e.g. “Don’t leave your child unattended in the pool”).

Special attention should also be paid to environmental aspects, according to CEN Guide 4 (e.g. minimizing water being wasted, etc.).

## 1 Scope

This European Standard specifies the general safety and quality requirements and test methods for domestic swimming pools. These requirements and test methods are applicable to inground, aboveground or recessed swimming pool structures, including their installation and means of access.

This standard does not apply to:

- pools for public use covered by EN 15288-1;
- spas for domestic or public use;
- paddling pools according to EN 71-8.

## 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 350-2, *Durability of wood and wood-based products - Natural durability of solid wood - Part 2: Guide to natural durability and treatability of selected wood species of importance in Europe*

EN 351-1, *Durability of wood and wood-based products - Preservative-treated solid wood - Part 1: Classification of preservative penetration and retention*

EN 335, *Durability of wood and wood-based products - Use classes: definitions, application to solid wood and wood-based products*

EN 460, *Durability of wood and wood-based products - Natural durability of solid wood - Guide to the durability requirements for wood to be used in hazard classes*

EN 1990:2002, *Eurocode - Basis of structural design*

A1 deleted text A1

EN 14843:2007, *Precast concrete products - Stairs*

HD 60364-7-702, *Low-voltage electrical installations - Part 7-702: Requirements for special installations or locations - Swimming pools and fountains*

EN ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods (ISO 1461)*

EN ISO 4628-2, *Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 2: Assessment of degree of blistering (ISO 4628-2)*

EN ISO 4628-3, *Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 3: Assessment of degree of rusting (ISO 4628-3)*

EN ISO 9227, *Corrosion tests in artificial atmospheres - Salt spray tests (ISO 9227)*

CEN/TS 16165, *Determination of slip resistance of pedestrian surfaces - Methods of evaluation*

ISO 20712-1, *Water safety signs and beach safety flags - Part 1: Specifications for water safety signs used in workplaces and public areas*

EN 16713-3 <sup>A1</sup>, *Domestic swimming pools - Water systems - Part 3: Treatment - Requirements*

### 3 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 <https://www.iso.org/obp>

#### 3.1

##### **basin**

specific water tank where water-related activities are carried out

#### 3.2

##### **usage class 4 wood**

situation where the wood or wood-based product is in contact with the ground or fresh water and therefore permanently exposed to wetting

#### 3.3

##### **point-of-purchase information**

information given to consumer prior to purchase so that they can make informed choices

#### 3.4

##### **swimming pool kit**

set of compatible and consistent elements of a swimming pool comprising of the pool or the structure, the means of access, the filtration and skimming system with hydraulic connections necessary for its operation, installation and commissioning manual, and the operating and maintenance manual

#### 3.5

##### **inground swimming pool kit**

swimming pool kit, designed to be installed in the ground, with structural elements that ensure intrinsic resistance to internal and external pressures

#### 3.6

##### **aboveground swimming pool kit**

swimming pool kit, designed to be placed on the ground or any suitable flat horizontal surface, with structural elements that ensures intrinsic resistance to internal pressures

#### 3.7

##### **recessed swimming pool kit**

swimming pool kit, designed to be installed in the ground, in a masonry structure or equivalent that ensures resistance to internal and external pressures, if required

#### 3.8

##### **watertightness**

degree to which water is prevented from leaking from the pool shell

### 3.9

#### **liner**

removable independent pocket, factory-made from flexible, expandable, plasticized poly(vinyl chloride) (PVC-P) membranes, capable of achieving a certain level of watertightness

Note 1 to entry: The liner contributes to the watertightness of a swimming pool in the same way as the parts to be sealed and the pipework.

### 3.10

#### **coping**

independent add-on feature, which forms the total or partial edge of a pool, on its periphery, on the upper part of the wall

Note 1 to entry: Add-on features with a width greater than or equal to 50 mm are considered as copings.

Note 2 to entry: On some swimming pools, the top coping also functions as the liner lock.

### 3.11

#### **reinforced membrane**

composite made of various thermoplastic sheets, applied on a layer comprising a reinforcement

### 3.12

#### **membrane**

sheet made of calendered or extruded, waterproof and gas-pervious, plasticized poly(vinyl chloride) (PVC-P), packaged in rolls, for use in the manufacture of swimming pool liners

### 3.13

#### **operating and maintenance manual**

operating guide and common recommendations on use for safety and maintenance

### 3.14

#### **installation and commissioning manual**

document indicating the various installation and commissioning operations

### 3.15

#### **frame work**

all of the resistant parts that support and/or reinforce the wall in view of forming the peripheral structure

### 3.16

#### **tool**

hand held device that can be used to secure, perform or facilitate mechanical operations

Note 1 to entry: A screw driver, key or coin are considered as tools.

### 3.17

#### **pool wall**

generally upright structure serving to enclose or divide water, or to protect an area

### 3.18

#### **parts to be embedded**

equipment, fixed firmly into the surrounding structure, mainly in the pool that have the specific functions such as water circulation/filtration, lighting, counter-current swimming devices, sound system, air injection, alarm sensors, cameras, portholes, etc.

**3.19****swimming pool (pool)**

artificial basin, where water is filtered being disinfected and retains continuous residual disinfection properties, renewed and recycled, as well as all of the equipment strictly necessary for its operation capable of achieving a certain level of watertightness

**3.20****structure**

part, or assembly of parts, designed to support loads and provide a sufficient degree of rigidity

[SOURCE: EN 1990:2002, modified]

Note 1 to entry: The structure guarantees the stability and cohesion of a pool.

Note 2 to entry: The "coping" is considered only if it contributes to the strength of the structure.

**3.21****effective volume of water**

capacity of the pool tank guaranteed by the manufacturer and determined from the water depth recommended by the manufacturer

**3.22****means of access**

design feature to facilitate entry to and/or exit from the basin

**3.23****tread**

horizontal component or upper surface of a step

**3.24****step**

part of the stairs, or of a ladder, consisting of a tread and possibly a riser

[SOURCE: EN 14843:2007, modified]

**3.25****platform**

upper, horizontal tread, connecting the two legs of a ladder

**3.26****ladder**

structure used for entering and exiting the water, formed from rails connected by steps or treads, and/or platform(s)

**3.27****stair**

succession of horizontal stages (steps or landings) which makes it possible to pass on foot to other levels

[SOURCE: EN 14843:2007, modified]

### 3.28

#### **pool handrail**

design feature to be gripped or grasped intended to assist the user to balance, to enter, to move around and/or to get out of the water

### 3.29

#### **grip**

holding of the hand around the entire circumference of a support

Note 1 to entry: See Figure 1.

Note 2 to entry: See Table 6.

[SOURCE: [A1](#) EN 1176-1:2017, 3.16 [A1](#), modified - Note to entry has been added.]

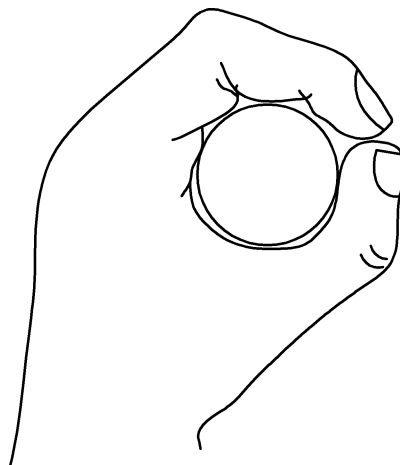


**Figure 1 — Grip**

### 3.30

#### **grasp**

holding of the hand around part of the circumference of a support

Note 1 to entry: See Figure 2.

Note 2 to entry: See Table 6.

[SOURCE: [A1](#) EN 1176-1:2017, 3.17 [A1](#), modified - Note to entry has been added.]

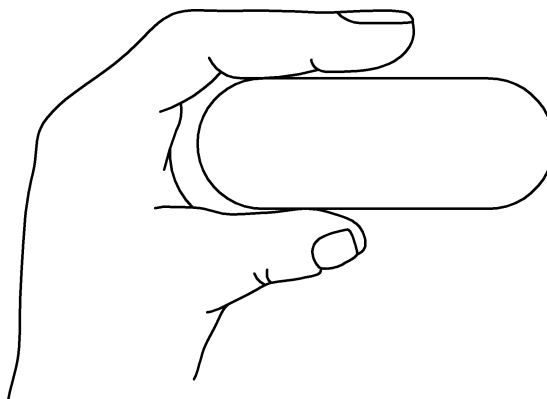


Figure 2 — Grasp

**3.31****thermosetting polymer shell**

main element of the prefabricated swimming pool (generally a polyester shell), that is a homogeneous structure, which is watertight and whose function is to contain the water

**3.32****entrapment**

hazard presented by the situation in which a body, or part of a body, or clothing can become trapped

Note 1 to entry: Entrapment is only considered where the user is not able to free himself/herself.

**3.33****laminated polyester or composite materials**

polymeric materials jointly implemented to form a shell structure serving as pool, coating and watertightness

**3.34****chemical barrier layer**

technical resin layer immediately under the aesthetic layer, reinforced or not

**3.35****aesthetic layer (coating)**

surface in contact with water, generally a resin

Note 1 to entry: Its use is limited to pools whose temperature is lower or equal to 28 °C unless otherwise specified by the manufacturer.

**3.36****aesthetic disorders**

staining, stain rings, discoloration due to an aggressive chemical water treatment product or physicochemical parameters of water

**3.37****water treatment**

use of chemical products and / or processes associated with filtration ensuring clean and healthy water

Note 1 to entry: The water treatment ensures water quality suitable for swimming according to the series **EN 16713 A1**.

### 3.38

#### **adult supervisor(s)**

parent or responsible adult appointed by a parent

### 3.39

#### **deck**

fitted surface, contiguous to pool

Note 1 to entry: The loose ground (grass, sand, etc.) is not considered as part of the deck.

## **4 General requirements and test methods**

### **4.1 General**

In use, installed according to the installation and commissioning manual, the swimming pool shall meet the requirements of this document.

If the pool structure includes any water system covered by the **EN 16713 series A1**, the EN 16582 series shall be read in conjunction with the **EN 16713 series A1**.

Assembled in accordance with the installation and commissioning manual, the electrical installation of any material related to the pool and its surrounding shall also comply with the requirements of HD 60364-7-702 or valid national requirements.

NOTE 1 HD 60364-7-702 applies only for fixed installations.

When a membrane is used as a watertight system, it is not mandatory to have a minimum thickness, however any relevant standards shall apply if they exist.

NOTE 2 For PVCP membrane, EN 15836-1 or EN 15836-2 could apply.

NOTE 3 For composition requirements, the professionals' attention is drawn to the change in the regulations in particular concerning the possible risks inherent with the use of heavy metals.

All manufacturers are required to carry out, either internally or via a test laboratory, the tests mentioned in Clause 4 for each new or revised material process.

### **4.2 Tolerances**

The indicated dimensions and measurements are given with a tolerance of  $\pm 3\%$  (unless otherwise indicated).

### **4.3 Water leakage**

Wherever possible, swimming pools should be built so that they are watertight, as leakage and other water losses may affect the building and surrounding properties.

The maximum leakage is specified in Table 1.

Once installed, the swimming pool shall be watertight according to one of the classes of Table 1 as stated in the point of sale information.

**Table 1 — Watertightness classification**

| <b>Tightness Class</b> | <b>Maximum leakage</b><br>litre per m <sup>2</sup> per day or<br>mm per day |
|------------------------|-----------------------------------------------------------------------------|
| W <sub>0</sub>         | 0                                                                           |
| W <sub>1</sub>         | 1                                                                           |
| W <sub>2</sub>         | 2                                                                           |
| W <sub>3</sub>         | 3                                                                           |

The measurement of any water loss should be carried out over a period of 7 days.

The drop in water level excludes evaporation losses, bathing activity, the temperature and humidity throughout the test period (and in the case of outdoor pools, the degree of exposure of the site to wind and sunshine).

Once installed, the swimming pool pipework shall be watertight according to class W<sub>0</sub> of Table 1.

If applicable, the balance tank shall meet the minimum watertightness classification of the swimming pool.

#### **4.4 Minimum performance requirements for structural materials**

##### **4.4.1 General**

The structural design and materials shall be in accordance with accepted structural engineering practices.

Any combination of different materials in direct contact with each other shall be compatible and not negatively affect each other's properties or structural integrity.

The requirements of this section do not apply to non-structural elements of the swimming pool, including, but not limited to, elements with solely decorative function. When the swimming pool water affects the resistance of the structural material, the requirements for water quality shall be stated and accompany the affected materials.

The parameters mentioned in document  EN 16713-3  shall be met. In addition, there shall be no influence on the water quality according to  EN 16713-3 , if the material comes into contact with the pool water.

Selection of materials for the construction of the swimming pool shall be conducted under consideration of external influences, including but not limited to temperature, UV, chemicals (under normal conditions of use) etc., when appropriate, that may influence their structural integrity.

**EXAMPLE** Materials used for the pool construction and lining are given in Table 2 and Table 3.

**Table 2**

| <b>Pool construction</b>                            |
|-----------------------------------------------------|
| PVC                                                 |
| PVC reinforced membrane (above ground pool)         |
| Concrete                                            |
| Styrofoam Formstone                                 |
| GRP one piece pool                                  |
| Composite construction                              |
| Polypropylene                                       |
| Steel panels                                        |
| Aluminium panels                                    |
| Steel & Aluminium support frames                    |
| Stainless Steel                                     |
| Glass (complete or min. one side / wall)            |
| Wood                                                |
| Brick wall construction (expanded polystyrene, ...) |

**Table 3**

| <b>Pool lining</b>      |
|-------------------------|
| Concrete                |
| Liner                   |
| Tiles                   |
| Coating                 |
| GRP                     |
| PVC                     |
| Stainless steel         |
| Glass                   |
| Natural stone           |
| Polypropylene (PP)      |
| Painting                |
| Mineral coat            |
| PVC reinforced membrane |

#### 4.4.2 Specific requirements and testing for corrosion resistance

Any material that may be affected by corrosion (including but not limited to steel, stainless steel, aluminium and other metallic materials) and utilized for the construction of the swimming pool shall be treated for corrosion resistance, if applicable, and shall meet any of the following minimum requirements, as applicable.

The tested metal parts shall be assembled according to the installation instructions.

The tests are conducted according to EN ISO 9227 on all metal parts, coated (organic or inorganic coating) or not coated, contributing to the resistance of the structure's constitutive elements.

The following are excluded:

- elements having only decorative functions;
- elements embedded and/or fixed in concrete provided that they are commercial products commonly used in masonry constructions;
- all non-structural elements;
- hot-galvanized parts with a surface treatment thickness of  $\geq 50 \mu\text{m}$  or prescriptions given in EN ISO 1461

NOTE Hot-galvanized parts with a surface treatment thickness of  $\geq 50 \mu\text{m}$  which correspond more or less to  $375 \text{ g/m}^2$ .

In accordance with EN ISO 9227, subject the structure samples to be tested to salt spray for:

- 192 h for aboveground and recessed swimming pool kits for the parts above the ground;
- 192 h for inground and/or recessed swimming pool kits for the parts in the ground and whose parts to be tested are  $\geq 3 \text{ mm}$ ;
- 400 h for inground and/or recessed swimming pool kits for the parts in the ground and whose parts to be tested are  $< 3 \text{ mm}$ .

On completion of these corrosion tests, all of the products shall meet the visual requirements described below:

- red oxidation: assess the results obtained on steel parts, coated or not, referring to the recommendations of EN ISO 4628-3. The number of red rust pits on the surface shall conform to grade RI 3 or lower;
- white oxidation is accepted on zinc-galvanised, electrogalvanised or bichromated parts;
- green oxidation is accepted on material including copper;
- brown oxidation is accepted on stainless steel;
- the degree of blistering of organic coatings shall not exceed density 2, and the size of any blister shall not exceed size 3 as defined in EN ISO 4628-2.

#### 4.4.3 Osmosis resistance of composites and polymers

Dip a  $150 \text{ mm} \times 100 \text{ mm}$  test sample, immersed to half its height, in distilled water at a constant temperature of  $60^\circ\text{C}$  for 15 d.

Protect the sample on its edges and its rear face, to avoid contact with water.

On completion of this test, no blister (i.e. density 0), porosity, cracking or fibre prominence, shall be detected on the surface after testing, compared to a control specimen as defined in EN ISO 4628-2.

Only the manufacturer is concerned with this test method which shall be applied for each new manufacturing process. This test is only applicable before installation of the product for the end user.

A longer test period may validate a higher integrity of the polymer.

For polyester shells, refer to Annex D for additional requirements.

#### 4.4.4 Wood

Structural elements made of wood or wood-based material shall meet the requirements of use class 4 according to EN 335.

Compatible woods may be chosen according to two distinct approaches:

- using naturally durable woods (excluding sapwood) as defined in EN 350-2, that meet the requirements for use in applicable hazard classes in EN 460.
- using wood with conferred durability (preservation treatments while conserving the sapwood), that meets the requirements for use in applicable hazard classes in EN 351-1.

To achieve the parameters stated in  $\boxed{A_1}$  EN 16713-3  $\boxed{A_1}$ , the water treatment has to be adjusted in the case of wooden material in contact with the water.

### 4.5 Injury risks

#### 4.5.1 Small elements, edges and corners

When the swimming pool is being used, any protrusion on accessible parts liable to present a risk of injury shall be protected by a method which in order to be removed, requires the use of a tool or a minimum amount of force of 60 N, with an accuracy of 2 N.

During the installation, equipment made of wood, fibreglass, or other materials shall be free of splinters.

Small accessible and grippable elements shall not fully enter into the template shown in Figure 3 (EN 71-1) or they shall be fixed to the item to which they belong such that they cannot be detached under a force of 60 N, with an accuracy of 2 N, applied in any direction whatsoever.

Dimensions in millimetres

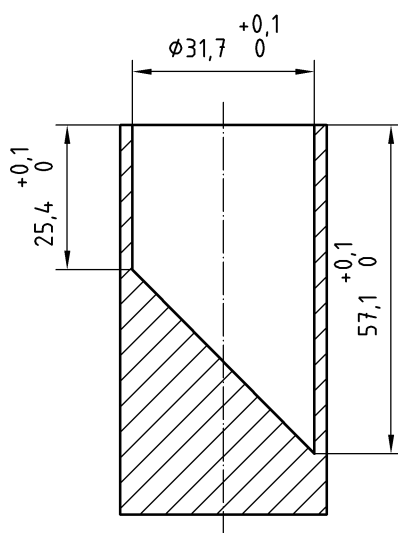


Figure 3 — Template for small elements

All edges, protruding parts and corners accessible without use of tools or minimum amount of force of 60 N ( $\pm 2$ N) shall be designed not to cause any injury. When necessary they shall be treated appropriately to remove this risk (see Figure 4).