

# SVENSK STANDARD

## SS-EN 16713-3:2016



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### **Pooler för hemmiljö – Vattensystem – Del 3: Behandling – Krav**

### **Domestic swimming pools – Water systems – Part 3: Water treatment – Requirements**

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The European Standard EN 16713-3:2016 has the status of a Swedish Standard. This document contains the official English version of EN 16713-3:2016.

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EUROPEAN STANDARD

**EN 16713-3**

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2016

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ICS 97.220.10

English Version

## Domestic swimming pools - Water systems - Part 3: Water treatment - Requirements

Piscines privées à usage familial - Systèmes de distribution d'eau - Partie 3: Traitement - Exigences

Schwimmbäder für private Nutzung - Wassersysteme - Teil 3: Aufbereitung - Anforderungen

This European Standard was approved by CEN on 5 December 2015.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## European foreword

This document (EN 16713-3:2016) 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of an identical text or by endorsement, at the latest by August 2016, and conflicting national standards shall be withdrawn at the latest by August 2016.

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.

EN 16713, *Domestic swimming pools — Water systems*, currently comprises:

- *Part 1: Filtration systems— Requirements and test methods;*
- *Part 2: Circulation systems— Requirements and test methods;*
- *Part 3: Water treatment— Requirements.*

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## 1 Scope

This European Standard specifies requirements and test methods for equipment and means of pool water treatment utilized in domestic swimming pools.

This standard applies for swimming pools as defined in EN 16582-1 and will be read in conjunction with it.

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;
- natural and nature like pools.

NOTE For filtration systems see EN 16713-1 and for circulation systems see EN 16713-2.

The purpose of this standard is furthermore to ensure a consistently high quality of pool water in terms of hygiene in order to prevent damage to human health, particularly as a result of pathogens. At the same time, account is also to be taken of the well-being of the bathers (e.g. by minimizing the side effects caused by disinfectants). To this end, requirements are specified for water quality and water treatment.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 15031, *Chemicals used for treatment of swimming pool water — Aluminium based coagulants*

EN 15074, *Chemicals used for treatment of swimming pool water — Ozone*

EN 15797, *Chemicals used for the treatment of swimming pool water — Iron based coagulants*

EN 16380, *Chemicals used for treatment of swimming pool water — Potassium peroxomonosulfate*

EN 16400, *Chemicals used for treatment of swimming pool water — Hydrogen peroxide*

EN 16582-1:2015, *Domestic swimming pools — Part 1: General requirements including safety and test methods*

EN 16582-2:2015, *Domestic swimming pools — Part 2: Specific requirements including safety and test methods for inground pools*

EN 16582-3:2015, *Domestic swimming pools — Part 3: Specific requirements including safety and test methods for aboveground pools*

EN 16713-1, *Domestic swimming pools — Water systems — Part 1: Filtration systems — Requirements and test methods*

EN 16713-2, *Domestic swimming pools — Water systems — Part 2: Circulation systems — Requirements and test methods*



### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16582-1:2015, EN 16582-2:2015 and in EN 16582-3:2015, and the following apply.

#### 3.1

##### **water treatment**

way to ensure water quality through physical and chemical actions

#### 3.2

##### **pool water**

water in the swimming or bathing pool

#### 3.3

##### **disinfection**

killing or inactivating certain microorganisms

#### 3.4

##### **filtrate**

water after the filtration process

#### 3.5

##### **fill water**

water used for the initial filling and for topping up

#### 3.6

##### **flow**

##### **$Q$**

volume of water flowing through a certain cross section per unit time

#### 3.7

##### **pollutants**

undesirable inorganic and organic substances and microorganisms which enter, or are already present, in the pool water

#### 3.8

##### **free chlorine**

dominating forms of chlorine (dissolved gas  $\text{Cl}_2$ , hypochlorous acid  $\text{HOCl}$ , hypochlorite ion  $\text{OCl}^-$ ) depending upon the pH-value

Note 1 to entry: In the pH-range relevant in the pool application, these forms are  $\text{HOCl}/\text{OCl}^-$ .

#### 3.9

##### **active chlorine**

proportion of free chlorine available as the biologically active hypochlorous acid ( $\text{HOCl}$ ) at a given pH

### 4 Requirements

#### 4.1 General

Depending on the equipment being installed and type of chemicals used, the necessary instructions and safety requirements (e.g. hazards of using chemicals inappropriately) shall be provided to the pool owner.

Pool water treatment is essential for the safety of the users but incorrect treatment can also be the cause of various disorders (e.g. stains, discolorations, corrosion). The different problems related to improper pool water treatment or materials are listed in EN 16582-1:2015, Annex D (as an example for polyester shells but can be in a similar way for other pool materials e.g. liner, paint, tiles, mineral coating and pool equipment).

## 4.2 Fill water specifications

Water that is obtained from a mains water supply is deemed to be suitable as fill water without testing.

Water that is not obtained from a mains water supply should be tested for suitability and treated, if necessary. The following maximum values are recommended for the fill water:

- iron: 0,1 mg/l;
- copper: 0,2 mg/l;
- manganese: 0,05 mg/l;
- polyphosphate as phosphorus: 0,01 mg/l;
- nitrates: 50 mg/l.

If these values are exceeded it is recommended to treat the water to achieve the recommended values.

Phosphates introduced into the swimming pool water both with the fill water, and by the swimmers, promote algal growth. By optimization of flow, treatment (e.g. filtration and flocculation) and operation, the growth of microorganisms can be reduced together with the reduction of the phosphates.

## 4.3 Physical and chemical pool water requirements

The following parameters ensure good quality bathing water. To ensure that these parameters can be achieved and maintained, the following shall be considered:

- a) pool design according to EN 16582 (all parts) and EN 16713-1 and EN 16713-2;
- b) pool installation according to EN 16582 (all parts) and EN 16713-1 and EN 16713-2;
- c) pool operation and maintenance;
- d) physical and chemical parameters should be checked regularly with suitable measuring equipment.

Basic parameters for good quality bathing water are the pH value, free chlorine (or alternate disinfectants) and combined chlorine (if applicable).

If chlorine is not used or actively measured, the redox potential is one method of measurement.

**Table 1 — Indicative physical and chemical parameters when using chlorine disinfectant**

Parameter	Value
Water clarity	clear view of the pool bottom
Colour of the water	no colour should be observed <sup>e, f</sup>
Turbidity in FNU/NTU	max 1,5 (preferably less than 0,5)
Nitrate concentration above that of fill water in mg/l	max 20
Total organic carbon (TOC) in mg/l <sup>a</sup>	max 4,0
Redox potential against Ag/AgCl 3,5 m KCl in mV	min 650
pH value <sup>c, d</sup>	6,8 to 7,6
Free active chlorine (without cyanuric acid) in mg/l	0,3 to 1,5
Free chlorine used in combination with cyanuric acid in mg/l	1,0 to 3,0
Cyanuric acid in mg/l	max 100 <sup>b</sup>
Combined chlorine in mg/l	max 0,5 (preferably close to 0,0 mg/l)
When using alternative/additional disinfectants other appropriate parameters may be considered.	
<p><sup>a</sup> When using organic compounds this value may be higher.</p> <p><sup>b</sup> If national regulations allow &gt; 100 mg/l then a suitable treatment should be applied (e.g. dilution).</p> <p><sup>c</sup> Subject to the flocculant(s) used (if any).</p> <p><sup>d</sup> When pH is greater than 7,5 the free active chlorine is less than 50 %.</p> <p><sup>e</sup> Natural water sources may introduce water colouration.</p> <p><sup>f</sup> Intentional water colouration is excluded.</p>	

#### 4.4 Flocculation/coagulation

The finest of dirt particles, hardly visible or invisible, may be present in the water. Due to their very small size these can pass through the filter under certain circumstances. In order to prevent this, the smallest of dirt particles could be converted into larger particles with the help of a flocculation agent.

The use of flocculants/coagulants has long been used to assist in the enhancement of water quality. It is particularly relevant in the removal of microorganism, e.g. Cryptosporidium cyst, which occurs in human faeces and is virtually impervious to disinfection. Consequently it shall be removed by filtration.

The following substances are commonly used as flocculants/coagulants:

- a) aluminium based coagulant, as in EN 15031;
- b) iron based coagulant, as in EN 15797;

Special caution is needed with the use of iron based coagulants, to avoid the development of corrosion and stains.

These substances all form a gelatinous precipitate by hydrolysis and shall be removed by cleaning.