SLOVENSKI STANDARD
SIST EN 16713-2:2016

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Plavalni bazeni za domačo uporabo - Vodni sistemi - 2. del: Sistemi vodnega kroženja - Zahteve in preskusne metode

Domestic swimming pools - Water systems - Part 2: Circulation systems - Requirements and test methods

Schwimmbäder für private Nutzung - Wassersysteme - Teil 2: Umwälzsysteme - Anforderungen und Prüfverfahren

Piscines privées à usage familial - Systèmes de distribution d'eau - Partie 2: Systèmes de circulation - Exigences et méthodes d'essai

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EUROPEAN STANDARD

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English Version

Domestic swimming pools - Water systems - Part 2: Circulation systems - Requirements and test methods

Piscines privées à usage familial - Systèmes de distribution d'eau - Partie 2: Systèmes de circulation - Exigences et méthodes d'essai

Schwimmbäder für private Nutzung - Wassersysteme - Teil 2: Umwälzsysteme - Anforderungen und Prüfverfahren

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COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 16713-2:2016) 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of an identical text or by endorsement, at the latest by August 2016, and conflicting national standards shall be withdrawn at the latest by August 2016.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 circulation systems and is applicable to equipment used in domestic swimming pools and designed for the circulation of water (introduction and/or extraction).

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;

— pre filtration;

— natural and nature like pools.

NOTE For filtration systems see EN 16713–1 and for treatment systems EN 16713–3.

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

EN ISO 3386-1, *Polymeric materials, cellular flexible — Determination of stress-strain characteristic in compression — Part 1: Low-density materials (ISO 3386-1)*

EN ISO 9906:2012, *Rotodynamic pumps — Hydraulic performance acceptance tests — Grades 1, 2 and 3 (ISO 9906:2012)*

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

3 Terms and definitions

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

3.1
water operated leisure feature
feature formed as a result of water, being emitted either into, or from, a swimming pool

EXAMPLE Waves, water cannons, rain sprays, waterfalls, mushrooms and rapid rivers.

[SOURCE: EN 13451-3:2011+A2:2014, 3.12]

3.2
air and water operated leisure feature
feature formed as a result of air and water, being concurrently emitted into or from a swimming pool

EXAMPLE Hydromassages.

[SOURCE: EN 13451-3:2011+A2:2014, 3.14]

3.3
integrated swim jet system
device that incorporates suction outlets, usually include peripheral suction and an inlet, all within a single housing, that is designed to move a large volume of water at a high velocity, with or without the introduction of air

3.4
overflow channel
channel designed to collect and conduct overflowing surface water

Note 1 to entry: The water can be transported to e.g. a water balance tank.

3.5
channel drain
system fitted below within the overflow channel to collect the water from the overflow channel, when a balance tank is used

3.6
main drain
outlet device incorporated on the bottom of the basin

3.7
suction chamber
vessel between the suction outlet grille and the suction outlet piping, manufactured or field built

4 Requirements

4.1 Filtration system design

The components of the hydraulic system shall be sized or designed or be in sufficient number to meet the maximum performance requirements of the filtration unit (pump and filter).

4.2 Filtration system nominal flow rate

The filtration system nominal flow rate shall be designed according to the pool size, pool volume, shape, load and location in order to achieve sufficient water removal from the pool and distribution of water back into the pool. Where applicable, the volume of the overflow tank shall be included with the volume of the pool to give the total volume in the system. The total volume in the system is the volume used in all calculations.

The circulation system will ensure the greatest possible mixing of the water in the pool basin in order to provide a uniform distribution of chemical treatment and heat, making sure fine debris are kept in suspension as long as possible and that there are no “dead areas” where water movement is zero.

The filtration system shall have a sufficient nominal flow rate to allow the total volume of water contained in the pool to be recycled in no longer than 8 h. The filtration system nominal flow rate Q is calculated:

$$Q = \frac{V}{T_{TO}} \quad (1)$$

where

Q is the filtration system nominal flow rate in m^3/h;

V is the pool volume in m^3;

T_{TO} is the turnover time of the pool volume in h

4.3 Extraction of pool water

4.3.1 General

The majority of the pollution within a swimming pool is found in the top layer of the pool water and therefore good surface water removal during pool operation is essential for efficient filtration and treatment of the water. Other systems can also be used to help the efficiency of the removal of the complete water volume (e.g. bottom main drain, etc.).

4.3.2 Overflow channel

4.3.2.1 Dimension of overflow channel and channel drains

The cross section of the overflow channel shall be designed adequately to achieve sufficient temporary water storage. If the channel is to be used as a balance tank, it should be sufficiently sized to accommodate the effective volume required (see a) to d) in 4.3.2.3).

The dimension and numbers of channel drains shall be designed according to the expected:

a) water displaced by bathers;

b) amount of water created by waves;

c) nominal filtration system flow rate;

d) water and air based pool features.

The dimension of the channel drains shall be sufficient to allow water flow without pressure (under gravity only) and to minimize noise.

The internal surface of the overflow channel shall be easily cleaned to prevent the build of solid, bacteria biofilm, etc.

NOTE When overflow channels with a continuous slope are installed, the water can be extracted through one or more sufficiently designed channel drains at the lowest point.

4.3.2.2 Overflow channel cover

The overflow channel cover shall be designed to avoid entrapment for fingers and toes, be capable of taking the design flow of water and also be able to support the weight of the bathers. The cover shall collect the flow of water. National safety regulations shall also be considered.

The cover should be removable for maintenance and cleaning. Where the cover is not removable, an adapted cleaning system shall be provided.

4.3.2.3 Water balance tank

The size of the water balance tank should consider the:

a) amount of water displaced by bathers, or any submerged equipment;

b) amount of water created by waves;

c) losses of water due to splashing, evaporation, filter backwashing;

d) minimum water level in order to prevent air suction into the pump.

NOTE Water for filter backwashing can be also taken from the pool.

The water balance tank should have:

— access hatches to allow for cleaning and maintenance. The internal finish of the tank shall be easily cleaned so as to prevent the build-up of solids, bacteria etc.;

— venting or connection to the atmosphere;

— overflow drain;

— connection point for filling up water.

4.3.3 Skimmer

4.3.3.1 General

With a skimmer, the water will be removed of one or more positions at the pool.

The number of skimmers depends on, but is not limited to, the following:

— surface area;

— pool shape;

— skimmer opening size;

— nominal flow rate.

A flow rate ratio of approx. 2/3 through the skimmers and approx. 1/3 through the bottom drain(s) or additional outlets is recommended. The hazard of suction at the main drain(s) according to 4.4 shall be considered.

4.3.3.2 Installation of skimmers

When installing more than one skimmer, the skimmers shall be installed to ensure balanced flow in each skimmer.

4.3.3.3 Skimmers in outdoor pools

The positioning of skimmers should be opposite to the main wind direction.

4.3.3.4 Construction requirements

In case the skimmer lid can be walked on, the lid shall withstand the mechanical load. The skimmer lid shall be installed securely to prevent unintentional removal.

4.3.4 Main drain

The main drain shall be used in combination with surface water extraction for filtration purposes. One or more main drains can be installed in a pool. To use the main drain as pool drain it shall be installed on the deepest area of the basin.

4.4 Risk of suction entrapment

4.4.1 General

Suction devices shall be designed and installed so as to minimize the potential for entrapment of the user.

Water speed at fully submerged suction outlets should be ≤ 0,5 m/s.

Hair entrapment tests shall be performed on suction devices according to 5.3.

Safety requirements a) to c) are not applicable to:

— skimmers, because they are vented (see 4.4.3) and partly above the water level;

— integrated swim jet systems, because the users are pushed away from the outlet, as defined in 3.3 by the action of the inlet.

Additionally at least one of the following requirements shall be met:

a) multiple suction outlet system designed in such a way that:

1) a minimum of two balanced and functioning suction outlets;

2) the distance between the nearest points of the perimeters of the devices shall be as large as possible with respect to the size of the pool and the design of suction outlets, but with a minimum of 1 m to ensure the appropriate level of safety from entrapment;

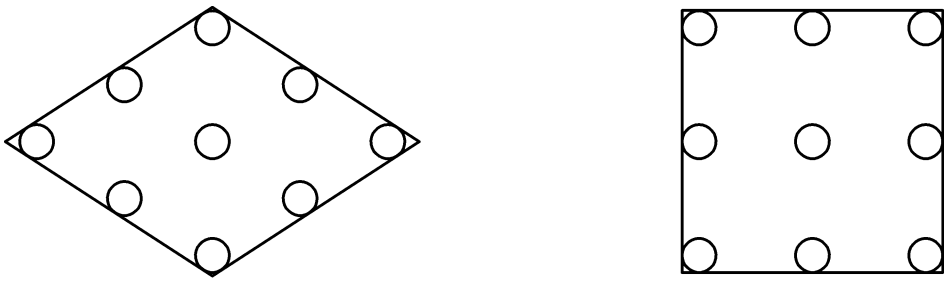
3) if any one of the suction outlets becomes blocked, the flow through the remaining suction outlet/s shall accommodate 100 % of the flow rate.

b) in case of suction outlet systems with only one grille, the grille shall be designed in such a way that, either,

1) one user cannot cover more than 50 % of the opening; or

2) raised grilles domed opposite to the flow direction, with prevalent peripheral suction. The height of the dome shall be at least 10 % of the main dimension; or

3) single grilles with a surface of the area circumscribed to the suction openings ≥ 1 m^2 (see Figure 1); or



a) b)

Figure 1 — Identification of the area circumscribed to the suction openings

c) any suitable designed outlet suction grille(s) that complies with the obstruction tests according to 5.4.

In addition to the requirements in a) to c), a vacuum release system may be provided.

When retrofitting existing installations that have a single suction outlet which does not comply with the requirements of this clause, then the following actions are required:

— the existing suction outlet shall be retrofitted with a grille conforming to b), or c);

— one or more additional suction outlets shall be provided as in a).

Vacuum release systems typically respond to a blockage of a single outlet by:

— releasing the vacuum by turning the pump off and introducing air;

— drawing out water present in a vent tube to allow air penetrates through this tube towards the suction system;

— mechanically operating valves to reverse flow through the suction outlet(s);

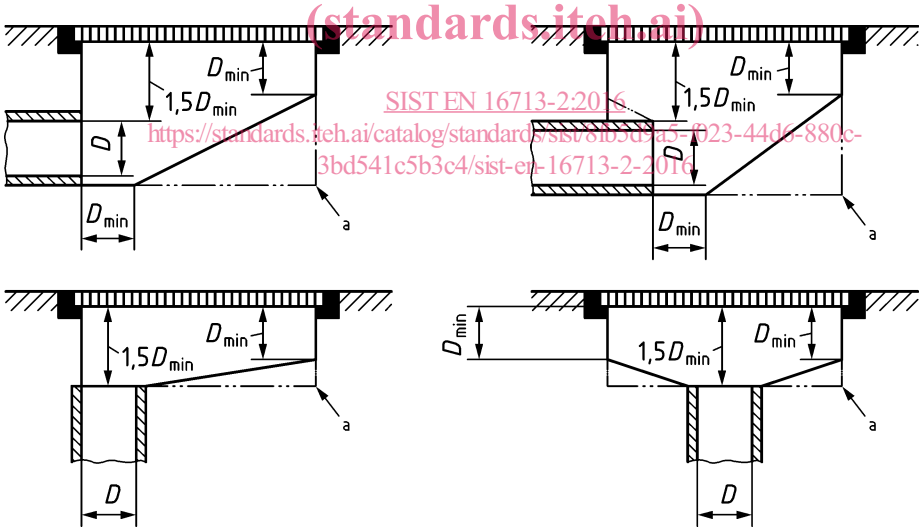
— opening a valve to atmosphere to cause a pump to lose prime.

All vacuum release systems shall be tested on outlets which meet the structural integrity and design requirements for grilles given earlier in this standard.

NOTE These devices/systems are not considered “fail safe” systems as there is no known suction vacuum release system that will completely protect against all outlet entrapment hazards. Presenting Vacuum Release Systems as “fail safe” systems would promote a false sense of security among the users of these devices/systems.

4.4.2 Suction chamber for floor and wall water outlets

Manufactured or field built floor and wall water outlets shall have a suction chamber with dimensions as shown in Figure 2.



Key

a indicates suggested suction chamber configuration

D inside diameter of the pipe

D_{min} dimension ≥ D

Figure 2 — Minimum suction chamber dimensions

4.4.3 Skimmers

Skimmers shall be effectively vented to atmosphere through openings in the lid (see Figure 3), or through a separate vent pipe.