SLOVENSKI STANDARD
SIST EN 17645:2022

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Plavalni bazeni za domačo uporabo - Učinkovitost ravnanja z okoljem - Vrednotenje učinkov, metodologija in klasifikacija uporabe zunanjih bazenov in njihove opreme

Domestic swimming pools - Environmental performance efficiency - Performance evaluation, methodology, and classification of the use of outdoor pools and their equipment

Schwimmbäder für die private Nutzung - Umwelteinfluss von Schwimmbädern für die private Nutzung - Anforderungen an die Konstruktion und Benutzung, Prüfverfahren und Klassifizierung der Geräte und Funktionen

Piscines privées à usage familial - Efficience des performances environnementales - Évaluation de la performance, méthodologie et classification de l'utilisation des piscines extérieures et de leurs équipements

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Domestic swimming pools - Environmental performance efficiency - Performance evaluation, methodology, and classification of the use of outdoor pools and their equipment

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

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European foreword

This document (EN 17645:2022) has been prepared by Technical Committee CEN/TC 402 “Domestic pools & 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of an identical text or by endorsement, at the latest by February 2023, and conflicting national standards shall be withdrawn at the latest by February 2023.

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Introduction

The majority of our energy is generated by the use of finite global resources. This process is also producing waste products and harmful emissions.

Every product has an impact on the environment during all the stages of its life cycle, such as, for example, the extraction of resources, the acquisition of raw materials, production, distribution, use and end-of-life processing, including final disposal. These impacts range from light to significant, may be short- or long-term, and occur on a global, regional or local scale.

The need to improve the environmental performance efficiency of a product that may occur in all the stages of its life is recognized around the world. The environmental performance efficiency of products can be increased by taking environmental questions into consideration.

There are already many standards, directives, scientific documents, etc. pertaining to the environmental impact and the sustainability of products.

The environmental performance efficiency is assessed according to, amongst other things, principles of honesty, transparency, comparability and completeness, and by taking all the stakeholders into consideration. The requirements applying to functionality, quality, design and suitability which are essential for domestic swimming pools, are important indicators to be taken into account, in addition to considerations related to these environmental performances and their sustainability.

In the light of existing documents (ISO Guide 64, CEN Guide 4, etc.), this is the reason why it seemed necessary to develop a standard covering criteria applying to the environment and sustainability in order to:

— address the environmental performances of domestic swimming pools in order to fill the gap in this field;

— improve the efficiency of the products on the market and encourage the development of energy-efficient and environmentally-friendly products;

— promote good practice in terms of sustainability (energy and water savings, reduction of waste and noise, etc.).

1 Scope

This document specifies the design and use requirements, the test methods and the scales of classification of the environmental performance when using a domestic swimming pool.

This document is applicable to outdoor pools, as defined in EN 16582 (all parts), intended to be permanently installed, and shall be read jointly with the latter.

This document allows the evaluation of the environmental performance efficiency of the use of domestic swimming pools.

NOTE 1 This document only covers the operational phase of the basin. All the other stages of the product life cycle, such as the extraction of resources, the acquisition of raw materials, production, distribution, use and end-of-life processing, including final disposal, are not covered by this document.

This document does not apply to:

— domestic indoor swimming pools and their specific functions of buildings housing such as air treatment or the lighting or insulation of the buildings, etc.;

— domestic spas covered by EN 17125, or their specific equipment;

— swimming pools for public use covered by EN 15288-1, or their specific equipment;

— spas for public use, or their specific equipment;

— mini-pools covered by EN 16927, or their specific equipment;

— paddling pools covered by EN 71-1 and EN 71-8, or their specific equipment;

— non-permanently installed pools covered by EN 16582 (all parts).

NOTE 2 This document does not cover non-permanently installed pools, due to the fact that absolute majority of these types of pools are not equipped with heating, and are operated and used only for relatively short time periods (range of 3-4 months). Moreover, the power consumption of pumps used are usually low (range of less than 1 kWh per day).

Nevertheless, to ensure a future objective comparison also with these types of pools and other permanently installed pools, a calculation method for non-permanently installed pools will be established and considered in the next revision of this document.

This document also does not apply to the following equipment:

— personal hygiene devices, such as showers or footbaths, or their specific equipment;

— devices for water features, such as water play equipment or fountains, or their corresponding specific equipment (dedicated pumps, etc.).

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 16582-1:2015+A1:2021, *Domestic swimming pools - Part 1: General requirements including safety and test methods*

EN 16713-1:2016, *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*

EN 16713-3:2016, *Domestic swimming pools - Water systems - Part 3: Water treatment - Requirements*

EN ISO 3744, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane (ISO 3744)*

EN 12102-2:2019, *Air conditioners, liquid chilling packages, heat pumps, process chillers and dehumidifiers with electrically driven compressors - Determination of the sound power level - Part 2: Heat pump water heaters*

EN 50564, *Electrical and electronic household and office equipment - Measurement of low power consumption*

EN ISO 6946, *Building components and building elements - Thermal resistance and thermal transmittance - Calculation methods (ISO 6946)*

EN ISO 10211:2017, *Thermal bridges in building construction - Heat flows and surface temperatures - Detailed calculations (ISO 10211:2017)*

EN 14500, *Blinds and shutters - Thermal and visual comfort - Test and calculation methods*

EN ISO 20361, *Liquid pumps and pumps units - Noise test code - Grades 2 and 3 of accuracy (ISO 20361)*

EN 14511-3:2018, *Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors - Part 3: Test methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16582-1:2015+A1:2021 and the following apply. ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform : available at https://www.iso.org/obp

— IEC Electropedia : available at https://www.electropedia.org/

3.1
indoor swimming pool
swimming pool intended for bathing, situated inside a building and covered by a fixed or mobile roof

Note 1 to entry: A basin under a shelter or a cover is not considered to be an indoor pool.

[SOURCE: EN 15288-1:2018, modified]

3.2
outdoor swimming pool
swimming pool in the open air and intended for bathing

[SOURCE: EN 15288-1:2018, modified]

3.3
inground swimming pool
swimming pool designed to be installed in the ground, with structural elements that ensure intrinsic resistance to internal and external pressures

Note 1 to entry: In the present document *IGS* is related to the inground pool structure.

[SOURCE: EN 16582-1:2015+A1:2021, 3.5, modified with deletion of "kit" and addition of a note]

3.4
aboveground swimming pool
swimming pool designed to be placed on the ground or any suitable flat horizontal surface, with structural elements that ensures intrinsic resistance to internal pressures

Note 1 to entry: In the present document *AGS* is related to the aboveground pool structure.

[SOURCE: EN 16582-1:2015+A1:2021, 3.6, modified with deletion of "kit" and addition of a note]

3.5
non-permanently installed pool
swimming pool intended to be temporarily installed (e.g. summer time)

3.6
cover
element for pools designed to cover the water in the pool, floating on or placed above the surface up to the deck level of the pool

3.7
lighting system
system made up of a light and a lamp compatible with the light

[SOURCE: Regulations EU 1194/2012 and EU 874/2012]

3.8
rated power
value of the electric power in Watts used to specify a lamp and established for a specified set of operating conditions

[SOURCE: Regulations EU 1194/2012 and EU 874/2012]

3.9
operation of the pool
actions required to operate and use the swimming pool, after the basin is filled with water for the first time

3.10
index of solar heat gain
S
capacity of an envelope to transmit the energy from solar radiation to a medium

Note 1 to entry: The index *S* is expressed in W/m^2.

Note 2 to entry: The higher the index *S*, the more of said radiation is transmitted by the envelope and the greater the environmental performance efficiency is.

3.11
index of thermal insulation
I
capacity of an envelope to transfer heat from a warm medium to a cold medium by conduction

Note 1 to entry: The index I is expressed in W/m^2.

Note 2 to entry: The higher the index *I*, the lower the insulating property of the envelope (the more it allows for the transfer of heat loss) and the greater the negative environmental performance efficiency.

3.12
index of thermal loss by evaporation
E
capacity of an envelope to limit heat loss, due to the evaporation of water, from a warm liquid water medium to a colder air medium

Note 1 to entry: The index E is expressed in W/m^2.

Note 2 to entry: The higher the index E, the greater the evaporation and the greater the negative environmental performance efficiency.

3.13
natural thermal balance
NTB
power of thermal phenomena representing the natural capacity to cause a medium separated from another medium by an envelope to naturally lose or gain energy, without any input of heat from a heating device

Note 1 to entry: The natural heat balance is expressed in W/m^2.

Note 2 to entry: The absolute value of the NTB indicates the speed at which heat exchanges (losses and gains) take place. The higher the value, the higher the speed of the exchanges.

Note 3 to entry: The positive or negative value of the NTB indicates whether gains warm up the water in the swimming pool (positive) or whether losses cause the water in the swimming pool to become colder (negative).

3.14
sound power level
L_{WA}
measurement of the total time-averaged sound energy emitted into the air by a source, weighted by a coefficient A and measured in Watts (W) relative to 1 pW, as defined in EN ISO 3744

Note 1 to entry: This value is usually expressed as a weighted sound power level A, L_{WA}, in decibels (dB).

Note 2 to entry: The measurement of the sound power level is independent of the acoustic environment of the machine.

3.15
guaranteed sound power level
value of the sound power level determined according to the requirements stated in this document, including uncertainty due to variations in production and the measurement procedures

3.16
seasonal coefficient of performance
SCOP
overall performance coefficient of the device, representative of the entire designated heating season

[SOURCE: EN 14825:2018, 3.1.70, modified]

3.17
coefficient of performance
COP
ratio of the heating capacity to the effective power input of the unit

Note 1 to entry: Expressed in Watt/Watt .

[SOURCE: EN 14511-1:2018, 3.37, modified]

3.18
staged heat pump
heat pump capable of modifying its delivered power by changing the flow rate-volume of the refrigerant fluid in a series of no more than two stages

3.19
variable-capacity heat pump
heat pump capable of modifying its delivered power by changing the compressor speed and consequently, the flow rate-volume of the refrigerant fluid in a series of at least three stages

3.20
fixed-capacity heat pump
heat pump incapable of modifying its delivered power by changing the flow rate-volume of the refrigerant fluid

3.21
standby mode
status of a powered up electrical device, ready for use and waiting for its main function(s) to be activated by a measured parameter or by the user

Note 1 to entry: Being ready for use may require the associated functions and operations, such as the display, parameter measurement, reception or waiting for data, limited activity of a microcontroller, etc. to be activated.

3.22
stop mode
status of an electrical device whose main function(s) is/are inactive, whether the device is powered up or not, further to deliberate action by the user, and the residual absorbed power of which is below 0,01 W

Note 1 to entry: When in stop mode, the main function(s) of the device can only be activated through deliberate action taken by the user.

3.23
active mode
status of an electrical device whose main function(s) is/are being executed

EXAMPLE A heat pump that is heating or cooling, an electrochlorination system that is producing chlorine, a pH regulator that is injecting a pH corrector, etc.

3.24
filtration system
all of the equipment suitable for the volume of water to be filtered, generally consisting of a filtration unit, a return/suction system, a skimmer and, if necessary, hydraulic connections

[SOURCE: EN 16713-1:2016, 3.14]

3.25
hydraulic connections
couplings, pipes and watertight equipment required for operating water circulation systems

EXAMPLE Hydraulic connections between the different components of a filtration unit or between the filtration unit and the basin.

[SOURCE: EN 16713-1:2016, 3.18]

3.26
filtration unit
assembly made up of a pump, generally centrifugal, a filter body and one or more filter elements or a mass of granular filtering material which retains the suspended solids from the swimming pool water circulating through it

Note 1 to entry: The pump may be placed before or after the filter.

Note 2 to entry: The filter may be closed or open, out of the water or submerged.

[SOURCE: EN 16713-1:2016, 3.16]

3.27
solar collector
exchange device exposed to solar radiation, through which the swimming pool water circulates, and in which the solar radiation directly transfers its heat to the water

Note 1 to entry: The device may be connected to the hydraulic filtration circuit of the swimming pool, or installed separately from it.

Note 2 to entry: If the device is connected, the swimming pool pump may be powerful enough to pump the water through the device, or it may be assisted by an auxiliary pump.

3.28
booster pump
pump dedicated to pressure cleaners, designed to deliver high pressure with low flow

4 Design, evaluation and operational requirements for swimming pool equipment / functions

4.1 General

4.1.1 Objectives

This document guides manufacturers in the design and evaluation of equipment for domestic swimming pools, in order to improve their environmental performance efficiency. It also enables distributors / installers to promote this same equipment, which is more environmentally virtuous, through a comprehensive evaluation of the basin that allows buyers to compare several solutions, in terms of each equipment item as well as the complete basin.

Manufacturers / installers that do not provide all of the environmental performance characteristics required by this document for the type of product concerned, cannot claim to comply with this document.

4.1.2 Electrical consumption of equipment not connected to the mains

4.1.2.1 Battery-powered equipment

The environmental performance efficiency evaluation (absorbed power, electrical consumption, etc.) of battery-powered electrical equipment that is recharged from the mains is to be considered in the same way as a device connected directly to the mains. Only the electrical characteristics of the accumulator(s) are to be taken into consideration to determine the environmental performance efficiency.

4.1.2.2 Renewable self-powered equipment

Electrical equipment powered by standalone and renewable energy sources (not connected to the mains) shall also be taken into consideration, because their environmental performance efficiency from an energy conservation perspective is more desirable.

The supply of power to this equipment from a standalone renewable source is indicated by a special pictogram that shall appear in the various communication materials (see Clause 6).

NOTE Only standalone power sources using renewable energies are taken into consideration. Standalone power sources using fuels are excluded.

4.2 Measurement of electric power

4.2.1 Absorbed power in active mode

The electric power absorbed by the equipment concerned is measured using a wattmeter on the mains power supply of the equipment during a phase of maximum absorbed power under stable thermal and functional conditions.

If the equipment is covered by a European reference standard defining specific conditions of absorbed power measurements, these specific conditions should apply.

The designer / manufacturer shall determine and declare the maximum absorbed power with reading the continuous power in a typical complete operating cycle, with all functions activated and, in the configuration, resulting in maximum absorbed power. Transient phenomena, in particular when starting up the equipment, are excluded from the maximum absorbed power cycle to be taken into consideration.

In order to avoid false readings or interpretations, adapted measurement equipment shall be used, depending on the physical magnitudes and the product technology (e.g. true RMS for variable speed drive).

The maximum absorbed power in active mode of any additional equipment shall be considered. Measurements are taken using apparatus with an accuracy classification of at least 1,5.

The announced value is the average of eight of a series of ten measurements lasting at least 10 s, from which the two extremes are eliminated.

The announced value is rounded to 1 % of the measured value.

4.2.2 Absorbed power in standby mode

4.2.2.1 General

Where appropriate, the consumption in standby mode of each electrical equipment item applicable to the basin shall be evaluated by measuring the electric power absorbed by the equipment in this mode.

The electrical equipment concerned may be:

— heating equipment;

— water treatment equipment;

— basin covers;

— lighting;

— filtration pumps (e.g. with electronic variators, built-in programmers, etc.).

Between the stop and standby modes defined by the manufacturer, the mode in which the electrical consumption is higher shall be taken into consideration in the evaluation of the power in standby mode, according to this document.

No evaluations are made of the energy performance in standby mode and stop mode.

4.2.2.2 Evaluation of power in standby mode

The power absorbed in standby mode shall be measured according to EN 50564.

4.2.2.3 Information for users

The manufacturer shall publish the power absorbed in standby mode, as measured in 4.2.2 (see Clause 5).

4.3 Water consumption

4.3.1 General

This chapter covers the following aspects:

— filling and / or refilling waters;

— the impact of the operation of the pool on water consumption (treatment, backwashing);

— taking into account natural phenomena on water consumption.

To improve environmental performance efficiency on water consumption, it is recommended to use systems that allow to:

— minimize the evaporation phenomenon;

— maximize natural water inputs (e.g. rainwater).

4.3.2 Filling / topping up the basin

The water used to fill or top up the basin shall meet the recommendations in EN 16713-3:2016, 4.2.

It is allowed to use sources other than the public water network (rainwater, well water, etc.), provided that this water complies with the limits set**,** has not been polluted by external elements beyond the limits laid down in EN 16713-3:2016, 4.2.

A specific collection system shall be used to collect rainwater properly.

The water balance (pH, TA, TH, TDS) in the basin should be measured and corrected, following any water addition and in particular when large amounts of rainwater are involved.

The pool decks shall be designed so that run-off water does not flow into the basin.

If the basin is equipped with an automatic filling system, the following requirements apply: