



SLOVENSKI STANDARD
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Vodni tobogani - 1. del: Varnostne zahteve in preskusne metode

Water slides - Part 1: Safety requirements and test methods

Wasserrutschen - Teil 1: Sicherheitstechnische Anforderungen und Prüfverfahren

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ICS:

97.220.40	Oprema za športe na prostem in vodne športe	Outdoor and water sports equipment
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EUROPEAN STANDARD

EN 1069-1

NORME EUROPÉENNE

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August 2010

ICS 97.220.40

Supersedes EN 1069-1:2000

English Version

Water slides - Part 1: Safety requirements and test methods

Toboggans aquatiques - Partie 1 : Exigences de sécurité et méthodes d'essai

Wasserrutschen - Teil 1: Sicherheitstechnische Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 16 July 2010.

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 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 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

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Foreword

This document (EN 1069-1:2010) has been prepared by Technical Committee CEN/TC 136 "Sports, playground and other recreational facilities and equipment", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by February 2011, and conflicting national standards shall be withdrawn at the latest by August 2011.

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.

This document supersedes EN 1069-1:2000.

EN 1069, *Water slides*, consists of the following parts:

- *Part 1: Safety requirements and test methods*
- *Part 2: Instructions*

In relation to EN 1069-1:2000 the following main amendments have been made:

- a) title and scope have been modified to include all water slides;
- b) new definitions have been added, some existing ones have been improved;
- c) classifications of Type 1 and Type 2 have been modified;
- d) Types 8, 9 and 10 have been added;
- e) Clause 5 "Material and constructions" has been enlarged;
- f) title of Clause 6 has been modified from "Design loads" to "Design"; this clause now includes not only loads but guidelines for design, including requirements for design analysis and examination as e.g. preliminary risk assessments. Design load have been foreseen also for the new types;
- g) requirements of entrapment prevention has been modified to recall a new standard (see 7.2);
- h) requirements of the access to water slides have been enlarged to detail various means of access (see 7.5);
- i) requirements for the protection against falling has been modified to detail requirements for handrails (see 7.5.5);
- j) requirements for the slip resistance have been added (see 7.5.6);
- k) requirements for the sliding path have been added (see 7.7.2);
- l) requirements for the slowing down units have been added (see 7.9.2.2);
- m) requirements for the surf landing area have been added (see 7.9.2.4);
- n) requirements for the ride enhancement devices have been partly rewritten (see 7.11.2);

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- o) Clause 8 "Additional safety requirements", requirements for Type 1 and Type 2 have been modified, some requirements for Types 3 to 7 have been modified and requirements for Types 8, 9 and 10 have been added;
- p) requirements for splashdown areas of specific and generic pools have been moved to a normative Annex A;
- q) requirements for landing have been modified (see 8.2.3);
- r) requirements for the clearance zones have been better detailed, some requirements modified (see 8.4);
- s) requirements for the practical test have been rewritten, detailing the body characteristics of the slide tester and the conditions of the test (see 9.3);
- t) requirements for the designation were amended, so that the possibility of slides constituted by two types joined has been foreseen (see 10.1);
- u) Figure 6 has been amended;
- v) Annex B (normative) for the use of stainless steel has been added;
- w) Annex C (normative) for design loads for accesses and platforms has been added;
- x) Annex D (normative) "Acceleration and speed measurements" has been added.

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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

The market for water slides is extremely wide and specific and still developing. It is impossible to define an all-embracing safety specification, including dimensions and design requirements as required by a standard, without limiting the design possibilities and preventing innovative and new but safe products.

This European Standard is intended to establish safety requirements and design guidance rules to serve anyone involved with water slides, especially designers, manufacturers, operators and users, to ensure safe and more efficient products. Its basic approach is the consciousness that the sliding action usually implies for the users a higher risk level than using a pool. For certain aspects of design, manufacturing, installation, operation and use only specific guidelines, without any technical specification, are given, which should be taken into consideration and be fulfilled in order to ensure safety for operators and users.

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EN 1069-1:2010 (E)**1 Scope**

This European Standard is applicable to all water slides installed in swimming pools of public use.

This standard specifies general safety requirements for water slides in swimming pools of public use and specific requirements for defined types of water slides. These specific safety requirements are applicable also to not defined types as far as possible.

These requirements concern safety and the technical rules for design, calculation and testing.

2 Normative references

The following referenced documents are indispensable for the application 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 287-1, *Qualification test of welders — Fusion welding — Part 1: Steels*

EN 1069-2:2010, *Water slides — Part 2: Instructions*

EN 1991-1-4, *Eurocode 1: Actions on structures — Part 1-4: General actions — Wind actions*

EN 10088-1, *Stainless steels — Part 1: List of stainless steels*

EN 10088-2, *Stainless steels — Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*

EN 10204:2004, *Metallic products — Types of inspection documents*

EN 13451-1, *Swimming pool equipment — Part 1: General safety requirements and test methods*

EN 13451-2:2001, *Swimming pool equipment — Part 2: Additional specific safety requirements and test methods for ladders, stepladders and handle bends*

EN 13451-3, *Swimming pool equipment — Part 3: Additional specific safety requirements and test methods for pool fittings for water treatment purposes*

EN 15288-1:2008, *Swimming pools — Part 1: Safety requirements for design*

EN 15288-2, *Swimming pools — Part 2: Safety requirements for operation*

EN 22768-1, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications (ISO 2768-1:1989)*

EN ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)*

3 Terms and definitions

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

3.1

pool/swimming pool

facility, with one or more water areas, intended for swimming, leisure or other water based physical activities

[EN 15288-1:2008, 3.1]

3.2

public use

use of an installation open to everyone or to a defined group of users, not designated solely for the owner's/proprietor's/operator's family and guests independently from paying an entrance fee

[EN 15288-1:2008, 3.5]

NOTE Pools serving houses rented for private use are not of public use.

3.3

water slide

piece of equipment or installation with a sliding surface on which the user slides with water as friction-reducing medium; the user slides freely or with the use of a ride enhancement device

NOTE 1 On some water slides the user can also be pushed e.g. by a water stream.

NOTE 2 For classification see Clause 4.

3.4

platform

area providing access to the start section

3.5

start section

area where the user enters the slide proper and takes the sliding position

3.6

slide proper

area intended for sliding

3.7

final part

part of the slide proper designed to prepare the user for landing plus the subsequent parts/areas which allow landing

NOTE Subsequent parts can be splashdown area, catch unit, sofa, etc.

3.8

landing

conclusion of sliding action

NOTE Types of conclusion can be fall, surf landing into water, being slowed down and stopped in a catch unit or sofa.

3.9

surf landing

kind of landing which implies the action of being projected from the end of the final part, independently from its design, to intentionally surf on the water surface of the pool as a design feature

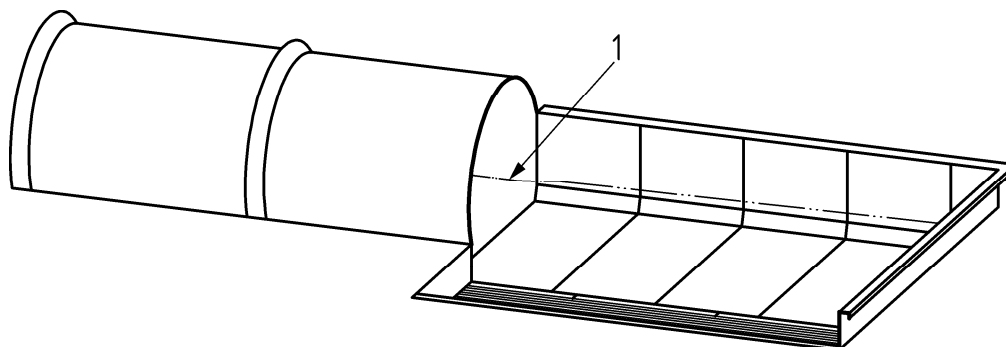
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**3.10
catch unit**

integral part of a water slide, which brings the rider to a halt in his sliding position

NOTE See Figure 1.

EXAMPLE

**Key**

1 water line

Figure 1 — Example of typical catch unit

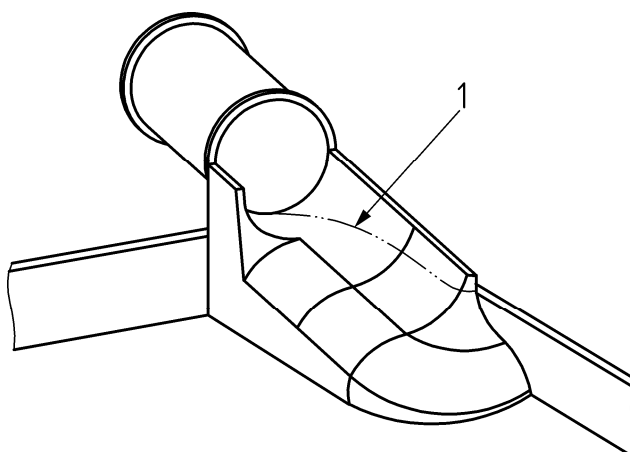
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**3.11
sofa unit**

integral part of a water slide, which slows down the rider on the sliding surface and moves him additionally sideways out of the sliding path of the following users

NOTE See Figure 2. <https://standards.iteh.ai/catalog/standards/sist/8aba489e-5ae5-4e6d-8296-c579eeca9f79/sist-en-1069-1-2010>

EXAMPLE

**Key**

1 water line

Figure 2 — Example of typical sofa unit

3.12**splashdown area**

specific pool or area which is part of a general purpose pool, in which the user lands from the end of the slide, and is brought to a halt in the water

3.13**water level**

static water level corresponding:

- for overflow pools, with overflow edge of the basin;
- for skimmer pools, nominally with the centre of the skimmer opening

3.14**drop**

section of the slide proper, tilted with an inclination greater than those of adjacent sections

3.15**tube**

closed section, not necessarily circular in cross section, of a water slide, with a fully utilisable sliding surface

3.16**cover**

device to enclose an open slide, not intended for sliding

3.17**riser**

extension for the slide proper, intended for sliding

3.18**wave screen**

device, placed within the clearance zone, to control spilling water

3.19**ride enhancement device**

device to slide on or in, designed for a particular water slide

3.20**barrier**

device to restrict users from falling over, under or through it

3.21**average inclination**

inclination x in percent (%) calculated with the formula:

$$x = (h \times 100) / l$$

where

h is the height between start section and beginning of final part, in metres;

l is the developed length of the slide proper excluding the final part, in metres

3.22**clearance zone**

controlled space around the user on the slide proper and of the final part, designed to prevent the impact of the users with obstacles

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EN 1069-1:2010 (E)**4 Classification****4.1 Type 1****4.1.1 Type 1.1**

Straight slides for children not exceeding 1,0 m in height from start section to water level and with an average inclination $\leq 70\%$, may be designed in form of single slide or wide slide (more than one user at the same time).

4.1.2 Type 1.2

Straight single-track slide for children with an average inclination $\leq 70\%$ and a height $1\ 000\ \text{mm} < h \leq 3\ 000\ \text{mm}$ from start section to water level.

4.2 Type 2**4.2.1 Type 2.1**

Curved single-track slide for children with an average inclination $\leq 70\%$ and a height $\leq 3\ 000\ \text{mm}$ from start section to water level.

4.2.2 Type 2.2

Helical single-track slide for children with an average inclination $\leq 70\%$ and a height $\leq 3\ 000\ \text{mm}$ from start section to water level, where the radius of the slide is constant and in the same direction.

4.3 Type 3

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Single-track slide, with an average inclination of maximum 13 %, excluding the final part. The average speed of the users shall be $\leq 5\ \text{m/s}$. The maximum speed of the users shall be $\leq 8\ \text{m/s}$.

4.4 Type 4

Speed single-track slide with an average inclination between 13 % and 20 %, excluding the final part. The average speed of the users shall be $\leq 10\ \text{m/s}$. The maximum speed of the users shall be $\leq 14\ \text{m/s}$.

4.5 Type 5

High speed single-track slide with an average inclination of at least 20 %, excluding the final part. The maximum speed of the users may be $> 14\ \text{m/s}$.

4.6 Type 6**4.6.1 Type 6.1**

Multi-track slide with separate parallel tracks (straight or curved) with an average inclination of maximum 13 %, one beside the other over full length. The average speed of the users shall be $\leq 5\ \text{m/s}$. The maximum speed of the users shall be $\leq 8\ \text{m/s}$.

4.6.2 Type 6.2

Multi-track slide with separate parallel tracks (straight or curved), with an average inclination of between 13 % and 20 %, excluding the final part. The average speed of the users shall be $\leq 10\ \text{m/s}$. The maximum speed of the users shall be $\leq 14\ \text{m/s}$.

4.7 Type 7

Wide straight slide with a maximum inclination of 35 %, not exceeding 8 m in height above water level and 7,7 m above the ground. The maximum speed of the users shall be ≤ 8 m/s.

4.8 Type 8

Single-track slide with longitudinal descending and ascending gradients where the user also slides upwards, sometimes helped by a jet of water or by a specific device.

4.9 Type 9

Wide straight single-track slide providing a free transversal oscillating sliding path while sliding in direction to the end of the slide. The maximum speed of the users shall be ≤ 14 m/s.

4.10 Type 10

A combination slide where the user exits from a slide of another type into a circular bowl and descends in a spiral path, before either free falling through a hole at the bottom into the splashdown area or entering an additional slide.

5 Materials and construction

5.1 General

Any material may be used for the construction of water slides, supports and ride enhancement devices provided it fulfils the requirements of this standard.

5.2 Selection of materials

All materials and finishes used shall be:

- a) suitable for the selected use, the respective surroundings and conditions;
- b) in accordance with the relevant standards/regulations;
- c) able to withstand conditions of high humidity with occasional saturation and/or corrosiveness;
- d) not encouraging the growth of bacteria.

The use of stressed stainless steel which could be subjected to stress corrosion shall be avoided, unless it can be inspected and regularly cleaned. Where stainless steel is used the grade used shall be in accordance with Annex B.

The materials shall not contain substances which are assigned the following Risk-phrase at concentrations exceeding 0,1 % (see European Directive 67/548/EEC):

- R43 can cause sensitisation by skin contact.

5.3 Certificates

Certificates for safety critical building materials (e.g. load bearing materials) shall:

- be in accordance with the relevant standards/regulations;

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- comply at least with EN 10204:2004, test report "Type 2.2".

5.4 Manufacturer and installer

The manufacturer and the installer shall ensure that persons engaged in the construction and the installation of the water slide are competent to carry out the work, and that welders are suitably qualified and accepted according to EN 287-1. Any assembling, modification, adjustment or alteration of parts shall only be done by persons with appropriate experience and skills.

5.5 Durability

The designer shall specify the method of protection or frequency of inspection. All components shall be protected to minimize degradation caused by corrosion or rot by an approved method. The quality of protection shall depend on the use of the components. Where hollow section structural steel is used, internal corrosion shall be considered.

5.6 Electrical installations

The relevant national and European regulations for electrical installations in and at buildings shall be complied with.

6 Design**6.1 Design guidelines**

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The design of a water slide, as a standard model or a one-off installation conforming to the client's specifications, shall consider:

- EN 15288-1, especially the preliminary risk assessment, and EN 15288-2;
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- the users the slide is destined to;
- users with special needs.

In the design documents possible/allowed user groups, their characteristics and limits shall be indicated.

NOTE Various risks can be involved in using a water slide, e.g. ejection from the slide, impacts, falls, burns, entrapment. For a guidance to a risk assessment, see EN 15288-2 and EN 1069-2.

6.2 Common requirements for design analysis and examination**6.2.1 General**

Water slides shall be treated as structures, water slides Type 1 and Type 2 only when applicable. Attention is drawn to the statutory requirements e.g. with regard to means of access and means of support.

6.2.2 Preliminary risk assessment

A preliminary risk assessment shall be performed at the design stage for every water slide, with the purpose of identifying possible hazards and hazardous situations that could occur by its use, paying attention to the fact that the riding of water slides can be a vigorous physical activity and the risks associated are greater than those usually encountered in a swimming pool. Furthermore, water slides may not be safe to be used by people with reduced ability, be it temporary or permanent. The risk assessment shall also take into account the balance between risks and prevention costs and ensure the conformity of the design to this standard and to all valid national regulations.

Some typical issues to be considered are:

- type of water slide;
- intended users;
- implementation of the slide into a new swimming pool complex; or
- integration of the slide into an existing facility;
- distance control (e.g. interference between users);
- access control (e.g. interference between users and non users);
- hazards related to the slide proper including those coming from possible vandalism especially parts freely accessible;
- hazards related to the landing;
- risky behaviours of the users;
- surroundings;
- traffic to and from the slide;
- influence of the use of the water slide on the regular operation of the whole facility.

The risks shall be assessed against the safety of user groups, especially of those with special needs.

This assessment is even more important for water slides not yet classified in this standard, and shall also consider the specific safety requirements given in Clause 8, to comply with them as far as possible.

The results of the preliminary risk assessment shall be made available to the slide tester who will perform the practical test, see 9.3.

6.2.3 Construction documents

Construction documents shall be provided to the costumer which shall include all the documents required for the assessment of stability and operational safety of the water slide, and complying with this standard.

The construction documents for Type 3 to Type 10 shall include as a minimum:

- type of water slide;
- declaration of conformity to this European Standard for the construction;
- full design and fabrication drawings;
- statement about intended use;
- construction method statement;
- comprehensive stress and stability analysis as required by the Eurocodes;
- description of special features of the water slide;
- description and dimensions of any clearance zones;