

## SLOVENSKI STANDARD SIST EN 1069-1:2017+A1:2019

01-september-2019

Nadomešča:

SIST EN 1069-1:2017

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

Toboggans aquatiques - Partie 1: Exigences de sécurité et méthodes d'essai (standards.iteh.ai)

Ta slovenski standard je istoveten za 1069 EN 1069-1:2017+A1:2019

https://standards.iteh.ai/catalog/standards/sist/e6f15886-aebb-425e-a199-

cbf9b0c501af/sist-cn-1069-1-2017a1-2019

ICS:

97.220.40 Oprema za športe na

prostem in vodne športe

Outdoor and water sports

equipment

SIST EN 1069-1:2017+A1:2019

en,fr,de

SIST EN 1069-1:2017+A1:2019

# iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>SIST EN 1069-1:2017+A1:2019</u> https://standards.iteh.ai/catalog/standards/sist/e6f15886-aebb-425e-a199-ebf9b0e501af/sist-en-1069-1-2017a1-2019 EUROPEAN STANDARD NORME EUROPÉENNE EUROPÄISCHE NORM EN 1069-1:2017+A1

June 2019

ICS 97.220.40

Supersedes EN 1069-1:2017

**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 14 May 2017 and includes Amendment 1 approved by CEN on 29 April 2019.

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.

CEN members are the national standards bodies of 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

https://standards.iteh.ai/catalog/standards/sist/e6f15886-aebb-425e-a199-

://standards.iten.avcatalog/standards/sist/e6f15886-ae6b-425e-a199ebf9b0e501af/sist-en-1069-1-2017a1-2019



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

## **Contents**

Page

Europ	oean foreword	5
Intro	duction	<i>6</i>
1	Scope	7
2	Normative references	7
3	Terms and definitions	8
4	Classification	
4.1	Type 1	
4.1.1	Type 1.1	
4.1.2	Type 1.2	
4.2	Type 2	
4.2.1	Type 2.1	
4.2.2	Type 2.2	
4.3		
4.4	Type 3 Type 4	12
4.5	Type 5	12
4.6	Type 5 (Standards.iteh.ai)	12
4.6.1	Type 6.1	12
4.6.2	Type 6.2 SIST EN 1069-1:2017+A1:2019	12
4.7	Type 7         https://standards.iteh.ai/catalog/standards/sist/e6f15886-aebb-425e-a199-           Type 8         ebf9b0e501af/sist-en-1069-1-2017a1-2019	12
4.8	Type 8	12
4.9	Type 9	
4.10	Type 10	
5	Materials and construction	
5.1	General	13
<b>5.2</b>	Selection of materials	13
5.3	Certificates	
5.4	Manufacturer and installer	
5.5	Durability	
5.6	Electrical installations	
6	Design	
6.1	Design guidelines	
6.2	Design analysis	
6.2.1	General	
6.2.2	Preliminary risk analysis	
6.2.3	Construction documents	
6.3	Static calculations	
6.3.1	GeneralActions in the slide area	
6.3.2 6.3.3		
6.3.4	Actions on Access, Platforms and Railings  Combination of actions and verification	
7	Safety requirements for water slides	
7.1	General	<b>2</b> 1

7.2	Entrapment	21
7.3	Surfaces	21
7.3.1	General	21
7.3.2	Surface of the slide proper	
7.4	Corners and edges	
7.5	Access to water slides	
7.5.1	General	
7.5.2	Stairs	
7.5.3	Stepladders	
7.5.4	Platform	
7.5. <del>4</del>	Protection against falling	
7.5.6	Slip resistance	
7.5.0 7.6	Start section for Types 2 to 10	
7.0 7.7	Slide proper	
7.7.1	General	
7.7.1 7.7.2	Sliding path	
7.7.3	Maximum acceleration on a sliding person	
7.8	Tubes and covered sections	
7.9	Final part	
7.9.1	General	
7.9.2	Landing device/Landing area	
7.10	Splashdown areas	
7.11	Accessories Covers 11eh STANDARD PREVIEW	27
7.11.1	Covers 11 Cl S1 AND AND 1 NEVY PV	27
7.11.2	Ride enhancement devices and arcts: itch: ai) Other constituent parts	27
7.11.3	Other constituent parts	28
7.12	Water supply	29
7.12.1	Water supply  General  https://standards.iteh.avcatalog/standards/sist/e6f15886-aebb-425e-a199-  Water flow rate  ebi9b0e501at/sist-en-1069-1-201/a1-2019  Interference between users	29
7.12.2	Water flow rate	30
7.13	Interference between users	30
7.14	Interference between users and non-users	30
8	Additional safety requirements for Types 1 to 10	21
8.1		
	Slide proper	
8.1.1	Type 1	
8.1.2	Type 2	
8.1.3	Type 3	
8.1.4	Type 4	
8.1.5	Type 5	
8.1.6	Type 6	
8.1.7	Type 7	
8.1.8	Type 8	
8.1.9	Type 9	
	Type 10	
8.2	Splashdown area	35
8.2.1	Acceleration	
8.2.2	General and specific pools	35
8.2.3	Requirements for landing	36
8.3	Clearance zones	38
9	Check and test runs	20
9 9.1		
	General	39
	Tachnical and physical charles	20
9.2 9.3	Technical and physical checksPractical test	

9.3.1	General	
9.3.2 9.3.3	Slide testerSliding conditions	
9.3.4	Acceleration and speed measurements	
9.4	Test report	40
10	Designation and marking	
10.1 10.2	Designation Marking	
_		
	A (normative) Splashdown areas B (normative) Use of stainless steels for water slides	
B.1	General	
<b>B.2</b>	Indoor swimming pools with disinfection with chlorine	
<b>B.2.1</b>	General	
B.2.2	Materials without regular cleaning	49
B.2.3	Materials with regular cleaning	50
<b>B.2.3.</b> 1	l General	50
B.2.3.2	2 Cleaning concept	50
<b>B.2.3.</b> 3	Execution of the regular cleaning	50
<b>B.2.3.</b> 4	Regular inspection	50
<b>B.2.4</b>	Regular inspection	50
<b>B.3</b>	Coatings and paintings SIST.EN.1069-1:2017+A1:2019	51
Annex	C (normative) Design loads, accesses and platforms  celly bues of loads, accesses and platforms	52
<b>C.1</b>	Vertical imposed loads	52
<b>C.2</b>	Horizontal imposed loads	52
<b>C.3</b>	Stiffness	53
<b>C.4</b>	Stairs	53
Annex	D (informative) Acceleration and speed measurements	55
D.1	Test devices	55
D.1.1	General	55
D.1.2	Acceleration measuring device	55
D.1.3	Maximum speed measuring device	55
<b>D.2</b>	Description of the acceleration test method	55
Biblio	graphy	56

#### **European foreword**

This document (EN 1069-1:2017+A1:2019) 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 December 2019, and conflicting national standards shall be withdrawn at the latest by December 2019.

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 includes Amendment 1 approved by CEN on 2019-03-29.

This document supersedes A EN 1069-1:2017 (A).

The start and finish of text introduced or altered by amendment is indicated in the text by tags  $\boxed{\mathbb{A}}$   $\boxed{\mathbb{A}}$ .

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

- Part 1: Safety requirements and test methods (standards.iteh.ai)
- Part 2: Instructions

A) deleted text (A) SIST EN 1069-1:2017+A1:2019 https://standards.iteh.ai/catalog/standards/sist/e6f15886-aebb-425e-a199-

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

SIST EN 1069-1:2017+A1:2019

EN 1069-1:2017+A1:2019 (E)

#### 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.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>SIST EN 1069-1:2017+A1:2019</u> https://standards.iteh.ai/catalog/standards/sist/e6f15886-aebb-425e-a199-ebf9b0e501af/sist-en-1069-1-2017a1-2019

#### 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 also applicable to undefined types as far as possible.

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

#### 2 Normative references

A) 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. (A)

EN 1069-2:2017, Water slides — Part 2: Instructions

EN 1990, Eurocode - Basis of structural design

EN 1991-1-1, Eurocode 1: Actions on structures - Part 1-1: General actions - Densities, self-weight, imposed loads for buildings

iTeh STANDARD PREVIEW

EN 1991-1-3:2003, Eurocode 1 - Actions on structures - Part 1-3: General actions - Snow loads (Standards.iteh.al)

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

SIST EN 1069-1:2017+A1:2019

EN 10088-1, Stainless steels & Part 1: List of stainless steels 15886-aebb-425e-a199-ebf9b0e501af/sist-en-1069-1-2017a1-2019

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 13451-1:2011+A1:2016, Swimming pool equipment - Part 1: General safety requirements and test methods

EN 13451-2, 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 inlets and outlets and water/air based water leisure features

EN 15288-1:2008+A1:2010, 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)

EN ISO 9606-1, Qualification testing of welders - Fusion welding - Part 1: Steels (ISO 9606-1)

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)

#### 3 Terms and definitions

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

(A) ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <a href="http://www.electropedia.org/">http://www.electropedia.org/</a>
- ISO Online browsing platform: available at <a href="http://www.iso.org/obp">http://www.iso.org/obp</a> <a href="http://www.iso.org/obp">http://www.iso.org/obp</a>

#### 3.1

#### pool/swimming pool

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

[SOURCE: EN 15288-1:2008+A1:2010, 3.1]

## 3.2 public use

### iTeh STANDARD PREVIEW

use of an installation open to everyone of 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

SIST EN 1069-1:2017+A1:2019

[SOURCE: EN 15288-1:2008+A1:2010;3t5] ai/catalog/standards/sist/e6f15886-aebb-425e-a199-

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

ebf9b0e501af/sist-en-1069-1-2017a1-2019

3.3

#### water slide

Note 1 to entry:

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

Note 1 to entry: On some water slides the user can also be pushed e.g. by a water stream.

Note 2 to entry: 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 1 to entry: Subsequent parts can be splashdown area, catch unit, sofa, etc.

#### 3.8

#### landing

conclusion of sliding action

Note 1 to entry: 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 guided 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

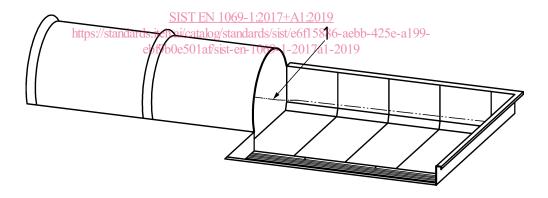
#### 3.10

#### catch unit

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

Note 1 to entry: See Figure 1 STANDARD PREVIEW

EXAMPLE (standards.iteh.ai)



#### Key

1 water line

Figure 1 — Example of typical catch unit

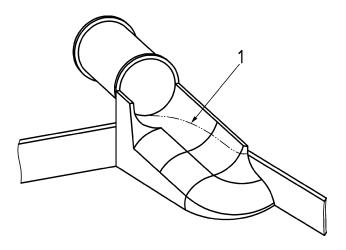
#### 3.11

#### 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 1 to entry: See Figure 2.

**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 TANDARD PREVIEW

#### 3.13

#### (standards.iteh.ai) water level

defined operating water surface in the landing area

https://standards.iteh.ai/catalog/standards/sist/e6f15886-aebb-425e-a199-

3.14 ebf9b0e501af/sist-en-1069-1-2017a1-2019 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

#### 4 Classification

## iTeh STANDARD PREVIEW (standards.iteh.ai)

#### 4.1.1 Type 1.1

4.1 Type 1

#### SIST EN 1069-1:2017+A1:2019

Straight slides for children not exceeding 1.0 m in height from start section to water level and with an average inclination ≤ 70 % may be designed in the form of a single slide or a 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 of  $\leq 70 \,\%$  and a height of  $1\,000\,\text{mm} < h \leq 3\,000\,\text{mm}$  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 of  $\leq 70$  % and a height of  $\leq 3$  000 mm from start section to water level.

#### 4.2.2 Type 2.2

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

#### **4.3 Type 3**

Single-track slide, with an average inclination of maximum 13 %, excluding the final part. The average speed of the users shall be  $\leq$  5 m/s. The maximum speed of the users shall be  $\leq$  8 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 m/s. The maximum speed of the users shall be  $\leq$  14 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 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 the full length. The average speed of the users shall be  $\leq 5$  m/s. The maximum speed of the users shall be  $\leq 8$  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 25 %, excluding the final part. The average speed of the users shall be  $\leq$  10 m/s. The maximum speed of the users shall be  $\leq$  14 m/s.

## 4.7 Type 7 iTeh STANDARD PREVIEW

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  $\leq$  8 m/s.

#### 4.8 Type 8

SIST EN 1069-1:2017+A1:2019 https://standards.iteh.ai/catalog/standards/sist/e6f15886-aebb-425e-a199-

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  $\leq 14$  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 that 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 Regulation (EU) Nr. 1272/2008):

N317 may cause an allergic skin reaction.

#### **5.3 Certificates**

SIST EN 1069-1:2017+A1:2019

https://standards.iteh.ai/catalog/standards/sist/e6f15886-aebb-425e-a199-

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

- be in accordance with the relevant standards/regulations;
- 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 ISO 9606-1. 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 (e.g. swimming pool, swimming pool surround) apply.

NOTE See HD 60364-7-702.