

Water slides over 2 m height

Part 1. Safety requirements and test methods

The European Standard EN 1069-1 : 1996 has the status of a British Standard

ICS 97.220.40

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee SW/136, Sports, playground, and other recreational equipment, upon which the following bodies were represented:

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Health and Safety Executive
Home Office
Sports Council

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Institute of Leisure and Amenity Management
Institute of Sport and Recreation Management
Royal Society for the Prevention of Accidents
Swimming Pool and Allied Trades Association Limited
West Glamorgan Institute of Higher Education
World Water Park Association

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National foreword

This British Standard has been prepared by Technical Committee SW/136 and is the English language version of EN 1069-1 : 1996 *Water slides over 2 m height — Part 1: Safety requirements and test methods*, published by the European Committee for Standardization (CEN).

Cross-references

Publication referred to	Corresponding British Standard
EN 294 : 1992	BS EN 294 : 1992 <i>Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs</i>

prEN 1176-1, to which normative reference has been made in the text, has not yet been published but has been issued for public comment as 93/306165 DC.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

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English version

Water slides over 2 m height — Part 1: Safety requirements and test methods

Toboggans aquatiques d'une hauteur à partir
de 2 m —
Partie 1: Prescriptions de sécurité et méthodes
d'essai

Wasserrutschen ab 2 m Höhe —
Teil 1: Sicherheitstechnische Anforderungen und
Prüfverfahren

This European Standard was approved by CEN on 1996-01-01. 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 Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

This European Standard has been prepared by the Technical Committee CEN/TC 136, Sports, playground and other recreational equipment, the secretariat of which is held by DIN.

This standard consists of 2 parts: *Water slides over 2 m height* —

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

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 July 1996, and conflicting national standards shall be withdrawn at the latest by July 1996.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and 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. This means that for certain aspects of design, manufacturing, installation, operation and use only specific guidelines are given, without any technical specification. These safety guidelines should be taken into consideration and fulfilled in order to ensure safety for operators and end users.

1 Scope

This European Standard is applicable to all water slides over 2 m in height from water level.

This standard may also be applicable to other types, not described in this standard, provided the safety requirements are fulfilled.

This standard specifies general requirements to all types of water slides and accessories and specific requirements to defined types of water slides. These requirements concern safety and the technical rules for design, calculation and testing of water slides.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

EN 294 *Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs*

prEN 1176-1 *Playground equipment — Part 1: General safety requirements and test methods*

3 Definitions

For the purposes of this standard, the following definitions apply:

3.1 water slide

Piece of equipment with an inclined sliding surface, down which the user descends by sliding usually under the influence of gravity, and with water as the friction-reducing medium, either freely or with the use of ride enhancement devices, if so designed.

3.1.1 type 1

Straight individual slide with an average inclination of max. 70 %, not exceeding 3 m in height above water level and 2,70 m above ground.

3.1.2 type 2

Individual slide with an average inclination between 11 % and 18 %, excluding the final part, not exceeding 3 m in height above water level and 2,70 m above ground.

3.1.3 type 3

Individual slide, not restricted in height with an average inclination of max. 13 %, excluding the final part. The user can achieve an average speed of 5 m/s and a maximum speed of 7 m/s.

3.1.4 type 4

Speed individual slide with an average inclination between 13 % and 20 %, excluding the final part. The user can achieve an average speed of 10 m/s and a maximum speed of 14 m/s.

3.1.5 type 5

High speed individual slide with an average inclination of at least 20 %, excluding the final part. The user can achieve a maximum speed of more than 14 m/s.

3.1.6 type 6

Multi-track slide with separate parallel tracks (straight or curved), one beside the other over full length. The user can achieve an average speed of 8 m/s and a maximum speed of 14 m/s.

3.1.6.1 type 6.1

Multi-track slide in the form of type 3.

3.1.6.2 type 6.2

Multi-track slide in the form of type 4.

3.2 platform

Area providing access to the start section.

3.3 start section

Area at which the user enters the slide proper.

3.4 slide proper

Area intended for sliding.

3.5 final part

Part of the slide proper with an downward inclination of less than 5 %, designed to prepare the user for landing.

3.6 catch unit

Integral part of a water slide, not part of the slide proper, which brings the rider to a halt on the sliding surface.

3.7 splashdown area

Either a specific pool, or an area which is part of a general purpose pool, in which the rider is brought to a halt in the water.

3.8 drop

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

3.9 tube

Closed section, not necessarily circular in cross-section, of a water slide, with a fully utilizable sliding surface.

3.10 cover

Device to enclose an open slide, not intended for sliding.

3.11 riser

Extension for the slide proper, intended for sliding.

3.12 wave screen

Device, placed within the clearance zone, to control spilling water.

3.13 ride enhancement device

Device to slide on or in, designed for a particular water slide.

3.14 guardrail

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

3.15 average inclination

Inclination calculated with the formula.

$$x = \frac{h \times 100}{l} \%$$

where:

- h is the height between start section and beginning of final part, in metres;
 l is the actual length of the slide proper excluding the final part, in metres.

3.16 clearance zone

Space around the slide proper, free from obstacles.

4 General

Water slides should be treated as structures and attention is drawn to the statutory requirements, e.g. with regard to means of access and means of support.

The shape of a water slide does not need to be the same as in the figures.

5 Materials

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

6 Design loads

6.1 General

Proof of structural integrity/stability shall be obtained by the use of calculation, component tests or by a combination of both methods signed by an engineering expert.

NOTE. In some European countries, a certificate on the correct construction of the water slide by a technical expert can be required to certify that the entire construction of the water slide and the way it is erected complies with all relevant standards and laws.

The component tests should be carried out on slide sections of the same dimensions and design, with comparable supporting conditions and joints. In addition to the relevant single component test, a test on a minimum of two adjacent elements joined together shall be made.

6.2 Dead load

For every component of the slide, the dead load shall be determined by an engineering expert, by calculation and/or testing of the material/component used to construct the water slide.

6.3 Water load

For the purpose of calculation, the water load shall be twice the designed amount of water flowing on the slide. For the defined types, taking into consideration the flow rate as given in 8.4, the water load where the inclination is bigger than 5 % shall conventionally be as follows:

- type 1: the water load is too small to be taken into account;
- type 2: 0,1 kN/m;
- types 3 to 5: 0,2 kN/m;
- type 6: 0,1 kN/m per track.

If the inclination is less than 5 %, the real load of the water contained in the slide shall be used.

6.4 Sliding person load

Measurements shall be as given in table 1.

6.5 Effects of impact

The effects of impact shall be considered, e.g. in the start section, or where a drop is fitted.

6.6 Stationary persons

The load of stationary persons shall only be taken into account where the inclination is less than 20 %. In this case, the load shall be 0,8 kN/m for types 1 and 2 and 1,5 kN/m for other types.

6.7 Wind load

The wind load for all types of water slides shall be calculated in accordance with the relevant standards until a specific European Standard is available.

If an open slide is used during windy weather, an action of centrifugal force plus 30 % of the maximum wind load shall be taken into account.