BS EN 16899:2016

BSI Standards Publication

Sports and recreational equipment — Parkour equipment — Safety requirements and test methods

bsi.

National foreword

This British Standard is the UK implementation of EN 16899:2016. It supersedes BS 10075:2013 which is withdrawn.

BSI, as a member of CEN, is obliged to publish EN 16899 as a British Standard. However, attention is drawn to the fact that during the development of this European Standard, the UK committee voted against its approval due to the following:

The UK committee objected to IAS being required to comply with the 'Critical Height' in EN 1177 that is ⅔ the actual height of the equipment (see Clause 6.2, paragraphs 2 & 3). The UK committee strongly recommends that the principles of IAS, as set out for other recreation product types, are maintained and the impact absorbing properties are equal to the fall height where Parkour Equipment is concerned.

Additionally, the UK committee is concerned that this standard does not adequately make users aware of the potential health and safety risks associated with the use of Parkour equipment and so the following additional information is provided for UK users:

– The UK committee noted that the falling height at which an IAS is required is determined at 1600 mm (see Clause 6.2, paragraph 1). This is higher than the national recommendation of 1200 mm in the previous standard, BS 10075. The consequences of falling from 1600 mm may be greater than a fall from 1200 mm.

– Parkour equipment is primarily for sporting activities and forms no part of children's play equipment. Whilst this is mentioned in this standard, managing site control access and that Parkour equipment may be mistaken for children's play equipment are not. It is recommended that Parkour equipment providers take further precautions to limit access by young or less competent users.

– In the UK, a legal requirement exists for risk assessment. Users should be aware of this when utilizing the principle of risk-benefit assessment given in this standard.

Note Parkour UK, the National Governing Body (NGB), can provide additional information.

The UK participation in its preparation was entrusted by Technical Committee SW/65, Children's playground equipment, to Subcommittee SW/65/1, Parkour.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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Sport- und Freizeitanlagen - Parkoureinrichtungen - Sicherheitstechnische Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 17 September 2016.

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European foreword

This document (EN 16899:2016) 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 May 2017, and conflicting national standards shall be withdrawn at the latest by May 2017.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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

Introduction

This document is primarily intended for manufacturers of parkour equipment, operators and designers of parkour parks and supervisors of parkour lessons who are appropriately qualified and experienced and have sufficient knowledge on parkour as sports.

It is not expected that every scenario has been addressed. Where new designs or concepts are delivered, a risk-benefit assessment should be completed by a competent person.

The design and layout of parkour facilities requires a good understanding of the sport and the interrelationship of equipment and "flow" routes. To ensure the safety of equipment it is recommended that design advice is obtained from a competent person and that appropriate risk-benefit assessments are carried out.

NOTE National federations/governing bodies, if exist, can provide advice on suitable competent persons.

Compliance with this European Standard cannot confer immunity from legal obligations.

Parkour as sports

Parkour, also known as "freerunning" and "Art du Déplacement", is the non-competitive sport of training to move freely over and through any terrain using only the abilities of the body, principally through running, jumping, climbing and quadrupedal movement. In practice, it focuses on developing the fundamental attributes required for such movement, which include functional strength and fitness, balance, spatial awareness, agility, coordination, precision, control and creative vision.

It is a sport that encourages self-improvement on all levels, revealing one's physical and mental limits, while simultaneously offering ways to overcome them. It is a method of training one's body and mind in order to be as completely functional, effective and liberated as possible in any environment.

The sport aims to build confidence, determination, self-discipline and self-reliance, and responsibility for one's actions. It encourages humility, respect for others and for one's environment, self-expression and community spirit, and emphasizes the importance of discovery and safety at all times.

Founding of parkour

The sport, originally termed l'Art du Déplacement, was founded in France in the 1980s by a group of nine young men who called themselves "The Yamakasi". "Yamakasi" is a Lingala word loosely meaning "strong man, strong spirit", and summed up the core aim of the sport: to be a strong individual: physically, mentally and ethically.

The Yamakasi founders are Yann Hnautra, Chau Belle, David Belle, Laurent Piemontesi, Sebastien Foucan, Guylain N'Guba Boyeke, Charles Perriere, Malik Diouf and Williams Belle.

The term "parkour" was first introduced by David Belle in 1998. "Parkour" derives from the French word "parcours" meaning "route" or "course".

The term "freerunning" was coined by Guillaume Pelletier, a representative of a group of French practitioners involved in the production of the 2003 Channel 4 documentary, Jump London, to communicate this new sport to an English-speaking audience.

Grounds for requirements of this European Standard

According to national product safety laws, products complying with standards are assumed to be safe. However operators, manufacturers, designers and the working group of this European Standard need to make observations and implement necessary changes to products as well as to the future revisions of this standard in order to provide safe environments for users.

This European Standard covers the design of equipment for the practice and development of the principle techniques/movements of the sport of parkour by those new to parkour and by experienced practitioners, known as traceurs (or freerunners).

Parkour facilities can comprise a combination of items of equipment permitting flowing movement of the user. Equipment is usually installed permanently, but for temporary use, equipment may also be portable.

The use of facilities as parkour equipment is connected with sporting risks. Sporting skills and the use of appropriate equipment can reduce the risk of accident, but it is important to recognize that traceurs and/or users are not required to wear personal protective equipment. Because parkour movements are self-controlled, it is expected that injuries resulting from falls/misjudgement can occur, just like in any sport.

It is not the intention of this European Standard to specify every possible shape and construction of facilities for traceurs and/or users. Parkour is a new, developing sport and the standard does not specify requirements that affect the design of the overall parkour facility.

It is also anticipated that sites might be used by/for non-parkour activities.

1 Scope

This European Standard specifies requirements for parkour equipment for use mainly by users starting from 8 years of age. This European Standard recognizes that parkour movement is personally determined by users, using controlled physical exertion from, to and through equipment elements and structures; both permanently installed and portable.

The requirements are intended to protect users from hazards that they might be unable to foresee when using the equipment as intended, or in a manner that can be reasonably anticipated.

This European Standard also specifies requirements for the installation and maintenance of parkour equipment, including area, height, flow, location and separation from other facilities, including children's playgrounds and multi-use games areas (free access multi-sports equipment).

NOTE As listed above, this European Standard is only applicable to parkour equipment, installation and maintenance, but not for example to parkour activities.

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 206, *Concrete - Specification, performance, production and conformity*

EN 335:2013, *Durability of wood and wood-based products - Use classes: definitions, application to solid wood and wood-based products*

EN 350-2:1994, *Durability of wood and wood-based products - Natural durability of solid wood - Part 2: Guide to natural durability and treatability of selected wood species of importance in Europe*

EN 351-1:2007, *Durability of wood and wood-based products - Preservative-treated solid wood - Part 1: Classification of preservative penetration and retention*

EN 636, *Plywood — Specifications*

EN 1177, *Impact attenuating playground surfacing - Determination of critical fall height*

3 Terms and definitions

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

3.1
clearance
dimension that allows the opportunity of passing from, to and through equipment elements and structures and during a flow of movements

3.2
competent person
individual with sufficient training, experience or knowledge of this standard and understanding parkour as sports and/or particular qualifications, who is able to carry out a task properly

Note 1 to entry: The required level of competence is dependent upon the task involved whether it is assessing the layout, safety, materials or separation from other activities.

3.3
critical fall height
maximum free height of fall for which a surface will provide an acceptable level of impact attenuation

3.4
enclosed passage way
tunnel through or under an equipment, enclosed except for entrance and exit, commonly at each end

3.5
entrapment
situation in which the user becomes trapped or is unable to continue movement without risking a serious injury

3.6
falling space
space in, on or around the equipment through which a user can pass or fall from an elevated part of the equipment

Note 1 to entry: Landing, rail or bar may be in the falling space (see 6.5).

3.7
flow
move smoothly with unbroken continuity

3.8
free height of fall
greatest vertical distance from the body support to the impact area below

Note 1 to entry: The body support is standing, running, hanging etc.

3.9
groove
gap that does not pass through the material

Note 1 to entry: See Figure 1 for an example groove.

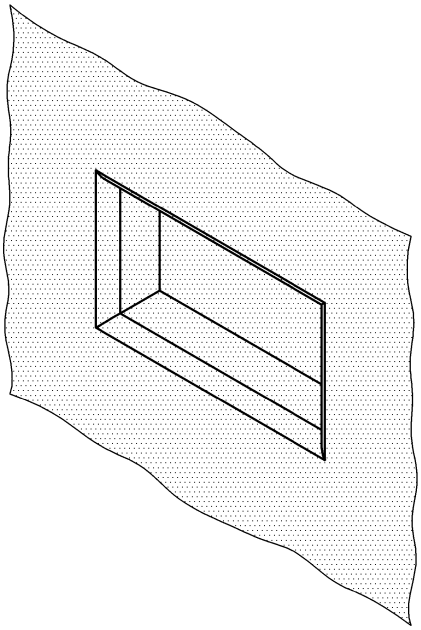


Figure 1 —Example groove

3.10
impact area
area that can be hit by a user after falling through the falling space

3.11
impact attenuating surface
IAS
material on the ground that has a property to attenuate some of the impact energy of a falling user

3.12
landing
regular and inflexible surface in any plane

3.13
mechanical movement
movement to which a user is committed by the equipment

3.14
movement
method of travelling from and to equipment

Note 1 to entry: See 3.7.

3.15
opening
gap that passes through the material

Note 1 to entry: See Figure 2 for an example opening.

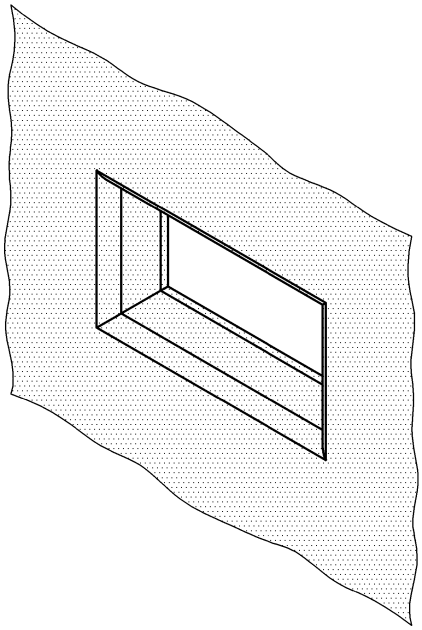


Figure 2 —Example opening

3.16
parkour
non-competitive sport of training to move freely over and through any terrain using only the abilities of the body, principally through running, jumping, climbing and quadrupedal movement

Note 1 to entry: See also Introduction.

Note 2 to entry: Movements such as somersaults, flips or tricks are gymnastic/acrobatic movements. Gymnastics/acrobatics is an entirely separate sport in its own right and has been practised much longer than the sport of parkour. However, traceurs/freerunners (practitioners) sometimes include acrobatics as part of their movement for fun and as a method of improving coordination, flight, balance and spatial awareness.

3.17
parkour equipment
product or a combination of products intended to be used to practice a sport of parkour

3.18
portable
property of an item that can be moved when needed and is not fixed to one place, position or posture

3.19
rails and bars
rails are typically of a square or rectangular section; bars are typically of a circular or oval section

3.20
supervision
condition where a competent person personally attends and oversees the setting and takes care of the user's safety

Note 1 to entry: In some countries, national sports associations and/or governing bodies may have rules and/or advice for proper supervision and the level of supervisor's competence.

3.21
traceur
freerunner
competent practitioner in the sport of parkour

3.22
user
person who is able to access the equipment, including but not restricted to a traceur

4 Materials and structural integrity

4.1 Requirements for materials

4.1.1 General

European and national regulations on chemical safety of products shall be taken into consideration.

Materials shall be selected and protected such that the structural integrity of the equipment is not affected before the next relevant maintenance inspection.

Special care shall be drawn to brick and block structures and fibreglass products, since they are more susceptible to repeated impacts by users.

NOTE Brick structures and fibreglass products do not necessarily hold against the impact test method nor repeated impacts from users.

Parkour equipment reliant on bolted connections shall incorporate a secondary proven system to prevent loosening caused by the vibrations of repeated user impact e.g. nuts with locking system.

4.1.2 Concrete

Concrete shall be at least hardness of C25/30 and shall comply with EN 206.

4.1.3 Wood

Wooden parts shall be designed in such a way that precipitation can drain off freely so that water does not accumulate.

In cases of ground contact, one or more of the following methods shall be used:

a) use of species of wood with sufficient natural resistance in accordance with classes 1 and 2 of the natural resistance classification given in EN 350-2:1994, 4.2.2;

b) appropriate construction methods, e.g. post shoe, that protect the wood;

c) use of wood treated with wood preservatives in accordance with EN 351-1:2007, Figure A.1, and EN 335:2013, class 4.

Consideration should also be given to other issues, such as the potential for splintering or poisoning.

All components made of wood and associated products, other than those species conforming to a) that affect the stability of the structure and are in constant contact with the ground, shall be treated in accordance with c).

When selecting metal fastenings, consideration should be given to the species of wood and chemical treatments used as some accelerate corrosion of metals if there is contact between them.

Any plywood used in construction shall conform to EN 636 and shall be weatherproofed.

4.1.4 Metals

Metals that produce oxides that scale or flake shall be protected by a durable, non-toxic coating.

Metal parts shall be protected against atmospheric conditions and cathodic corrosion.

4.1.5 Rubbers and synthetics

An indication of the time period after which a part or item of equipment shall be replaced shall be provided if it could be difficult to determine during maintenance the point at which the material becomes brittle.

All structural plastic components shall have appropriate substances to reduce the influences of ultraviolet radiation and oxygen.

If rubber is used in structural components, deterioration due to ozone shall be prevented or reduced either by:

a) using considerably thicker material;

b) leaving rubber parts visible for inspection; or

c) making a notification to product or to maintenance instruction to check their conditions.

4.2 Requirements for structural integrity and loading

Due to the dynamic loads applied by parkour activities, the structural integrity of equipment shall be verified by the calculations and/or physical test. The test method is in Annex A and the appropriate number of users is calculated according to Annex B. During the physical test (see A.5), the equipment shall show no cracks, damage or excessive permanent deformation and no connections shall be loosened.

Parkour equipment for standing, walking, jumping or climbing upon, or any flat surface ≥ 0,1 m wide, and which has less than a 30° angle from the horizontal, shall be able to carry the load caused by at least one user.

NOTE 1 This also applies to rungs or steps for supporting a user's feet.

Additional measures shall be taken for equipment in which the stability depends on only one cross section. When parkour equipment relies on one post for its stability, the construction shall be carried out such as to:

a) minimize rotting or corrosion in parts contributing to stability;

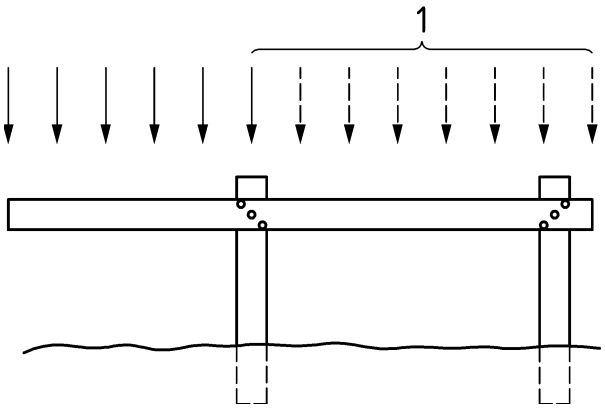
b) allow for controlling degradation and the need for decommissioning; and

c) be used without collapse within the foreseen inspection period when maintained correctly.

NOTE 2 No allowance for accidental loads, i.e. loads produced by fire, collision by vehicles or earthquake, needs to be made.

NOTE 3 The loads associated with fatigue are generally much smaller than the loads in combination with the appropriate load factors when calculated in accordance with A.2. Therefore, equipment in general doesn't need to be verified for fatigue.

Structural parts shall resist the worst-case loading condition, as demonstrated by, for example, that part of the user load causing favourable effects, as shown in Figure 3.



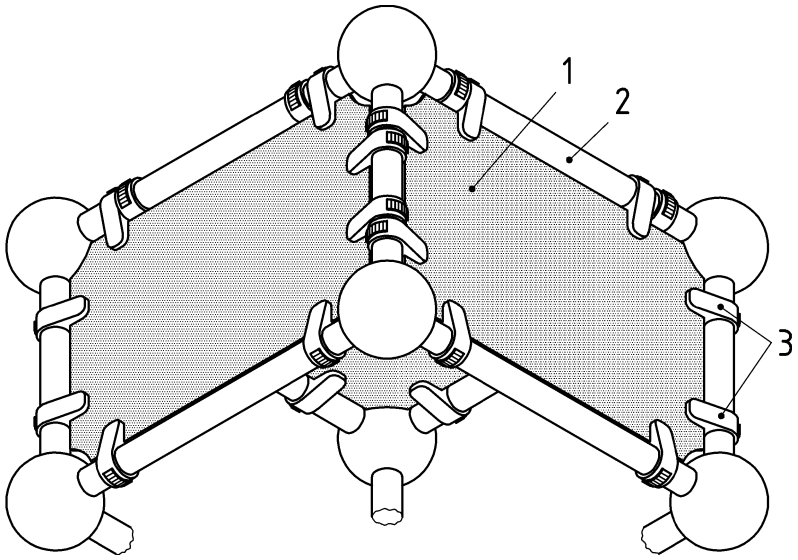
Key

1 part of load to be removed

Figure 3 — Example of removal of that part of the user load which causes a favourable effect

Landings shall be designed to withstand repeated shock from users, including occasional heavy impacts, from more than one user landing at the same time. The manufacturer can choose either a physical test done according to Annex C or provide static calculations performed by appropriate methods.

For combined structures, when tested in accordance with Annex C, surround, panel and fixing points shall show no signs of cracks or deformation, loosening of connecting parts, or any other failure of structural integrity (see Figure 4).



Key

1 panel

2 surround

3 fixing points

Figure 4 — Example of a combined structure

4.3 Requirements for foundations and groundwork

Products shall not fall down, move during use or sink in a way that it affects to using the product.

NOTE When components are embedded in concrete the corrosion or rotting of the element is harder to inspect.

Where loose fill is used, sharp and non-vertical parts of the foundations shall be under the loose fill layer or in depth greater than 400 mm.

5 Safety requirements

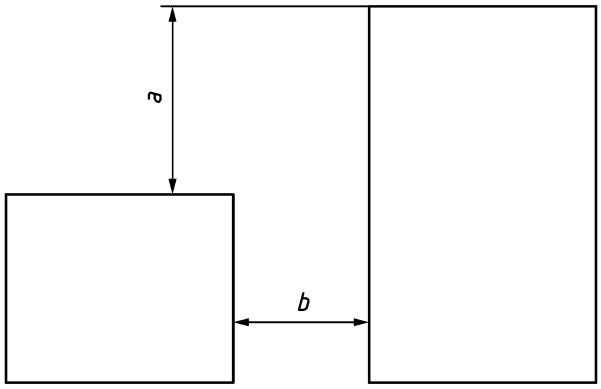
5.1 Sporting ability

Access to equipment shall be possible only through the user's own sporting ability.

NOTE The intention is to allow users to develop their skills to access equipment. They determine their ability to access the equipment.

5.2 Access restrictions

Due to potential for access by children, equipment shall be designed to make access difficult for young children. Consideration shall be given to the combined dimensions of the step (a + b), which is measured as a combination of horizontal and vertical dimensions (see Figure 5).



Key

a vertical dimension

b horizontal dimension

NOTE Step = a + b.

Figure 5 — Measuring the step

Rails and bars:

Access to rails and bars in higher position than 1 000 mm from the impact area shall require at least one step that is minimum of 700 mm.

See Figures 5 and 6.

Landings:

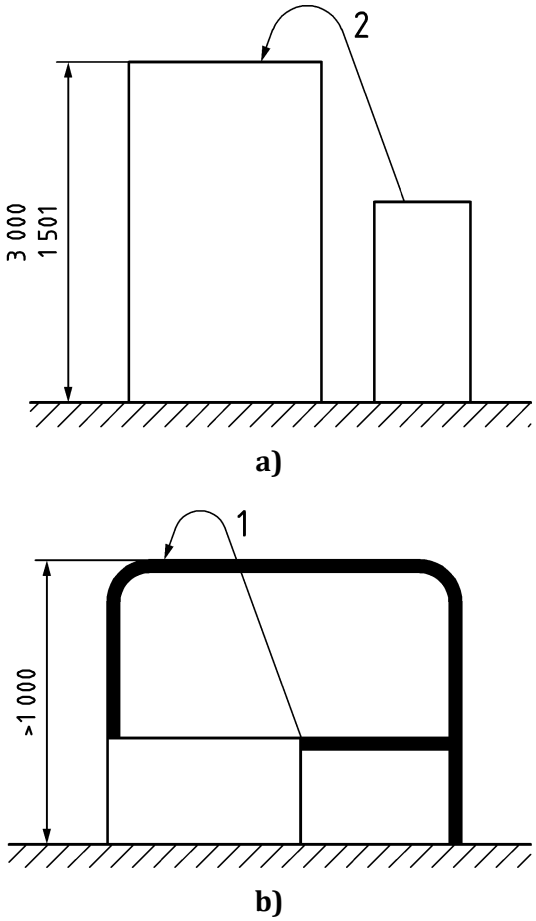
— Access to landings in height less than 1 000 mm may be as easy access as needed. However steps or very easy means of access shall be avoided.

— Access to landings in height of 1 001 mm to 1 500 mm shall require at least one step that is minimum of 700 mm.

— Access to landings in height of 1 501 mm to 3 000 mm shall require at least one step that is minimum of 1 000 mm.

See Figures 5 and 6.

Dimensions in millimetres



Key

1 Step ≥ 700 mm

2 Step ≥ 1 000 mm

NOTE See Figures 5 and 6.

Figure 6 — Easiest allowed access to landings and bars

5.3 Accessible surfaces, profiles and edge chamfers

All accessible materials shall be treated to maintain the minimum slip resistance in conditions other than persistent precipitation, frost and snow. Surfaces shall not be too slippery and not overly abrasive.

NOTE 1 Examples of slip resistance test methods:

— British BS 7188+A2:2009, Clause 5;

— German BGR 181 class R9.

Equipment surface should not mislead user to think it has better friction than it really has.

NOTE 2 As an example, brick pattern on HPL would mislead users to think that the friction is much better than it is, whereas concrete stone performs similarly to real stones.

There shall be no protruding nails or pointed or sharp-edged components. Overly rough surfaces shall not present unnecessary risk, e.g. cuts in skin or tripping over. Protruding bolt threads within any accessible part of the equipment shall be permanently covered, e.g. by dome-headed nuts.

Finishes shall be free from sharps and galvanizing spru.

The edges shall have at least rounding with a radius of 3 mm or a chamfer with dimensions of 3 mm × 3 mm.

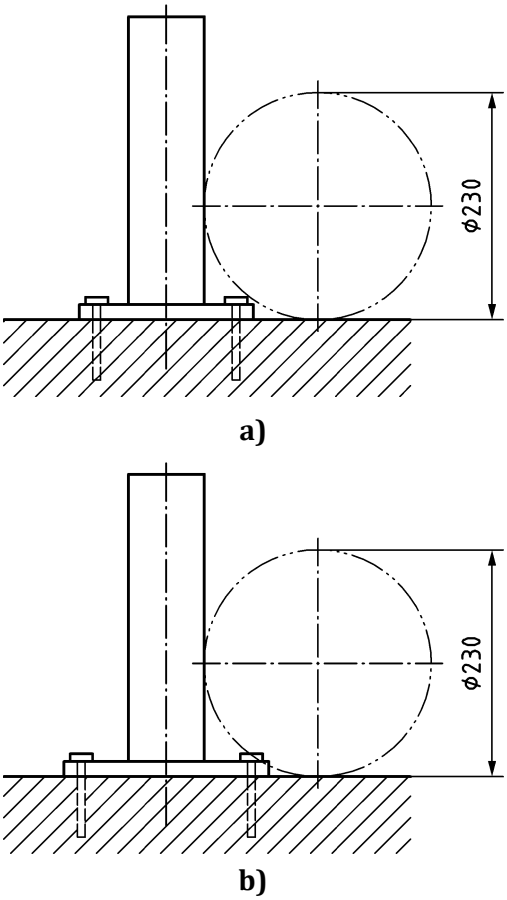
NOTE 3 Radius of the rounding can be as big as the manufacturer wants but if it is bigger that 10 mm the user can lose some of the sensation of the edge.

Corners, edges and projecting parts that protrude more than 8 mm, and which are not shielded by adjacent areas that are not more than 25 mm from the end of a projecting part, shall be rounded off. The minimum radius of the curve shall be 3 mm.

NOTE 4 This requirement is intended only to prevent injuries caused by unintended contact with components.

In order to minimize a risk from falling on foundation fixings, flanges or such, they shall not meet a circular element with a diameter of 230 mm when it is placed as shown in Figure 7.

Dimensions in millimetres



Key
a) Pass
b) Fail

Figure 7 — Protrusion of fixings

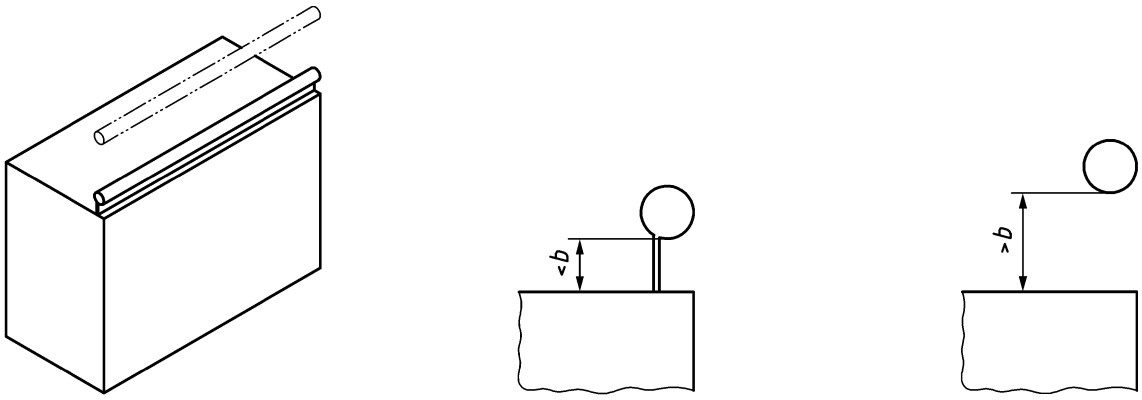
5.4 Parkour bars and rails

Parkour bars shall conform to 5.3. The minimum opening between any two bars shall conform to 5.7. The minimum and maximum heights for bars on an elevated landing shall be in accordance with Figure 8.

Bars shall have a diameter greater than 16 mm. If the bar or rail has a diameter of 100 mm or bigger, it is considered a landing.

When a bar or a rail is installed on the landing wider than 200 mm and inclined less than 30°, the foot shall be prevented from going through the gap between the bar (or rail) and landing by filling it, unless the gap is greater than body clearance. See Figure 8.

Dimensions in millimetres



a) **b)** **c)**

Key

b body clearance 350 mm × 550 mm

Figure 8 — Acceptable heights of bar or rail on landing

5.5 Enclosed passage ways

Enclosed passage ways shall not accumulate water.

Minimum internal clearance:

— for length up to 1 000 mm, the clearance shall be at least 350 mm x 550 mm;

— for lengths greater than 1 000 mm, the clearance shall be at least Ø 750 mm.

When only one side is open, the maximum declination shall be 5°.

5.6 Protection against injuries during movement and falling

Objects in the falling space shall be restricted to landings, bars and rails.

All elements of the parkour area are inspected as one cluster. They shall fulfil requirements given in 5.7 regarding clearances and requirements given in 6.5 regarding falling space.

5.7 Clearances

Grooves shall be ≥ 45 mm in width and depth.

Openings shall be:

a) in minimum or greater than oval shape sized 350 mm x 550 mm; or

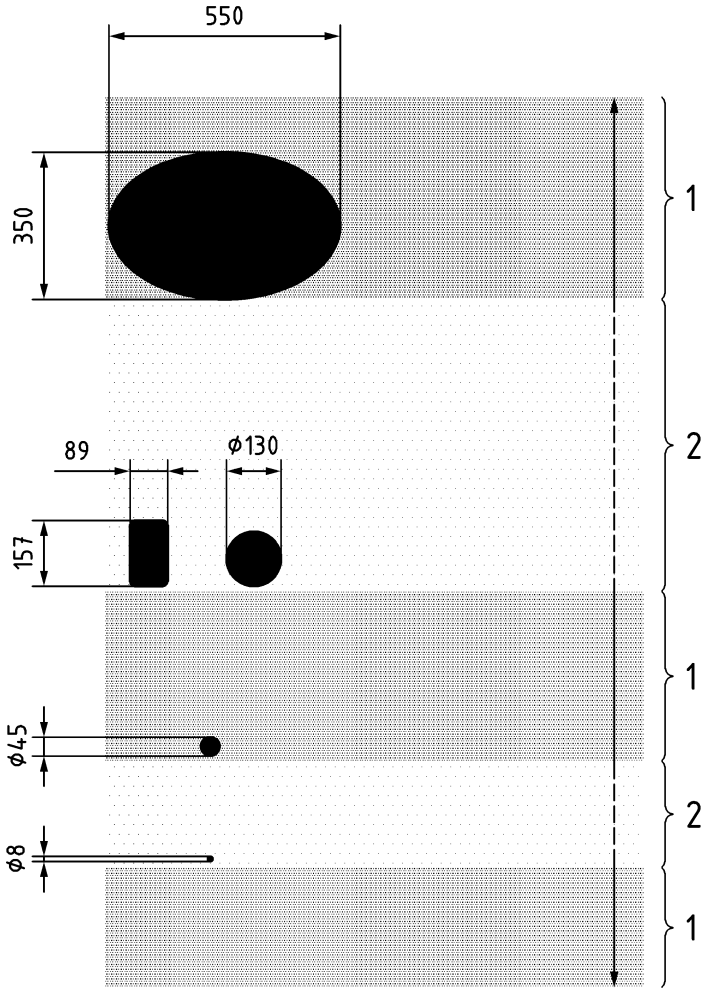
b) in minimum or greater than 45 mm in diameter, but not permitting test probes E and C (see Annex E) to enter; or

c) smaller than 8 mm in diameter.

See Figure 9.

NOTE Drainage lids in the ground are excluded from finger entrapment requirements.

Dimensions in millimetres



Key

1 pass

2 fail

Figure 9 — Dimensions of grooves, openings, gaps and holes

5.8 Entrapment

5.8.1 Entrapment of hair and clothing

Equipment shall be constructed such that hair or cloth entrapment does not occur. V-shaped openings converging downwards and which may result in cloth entrapment shall be wider than 60°.

5.8.2 Entrapment of the head and neck

Equipment shall be constructed so that any openings do not create head and neck entrapment hazards, either by head first or feet first passage.

5.8.3 Completely bound openings

When accessible completely bound openings with a lower edge of more than 600 mm above the impact area are tested in accordance with E.2.1, Probe C or E shall not pass through any opening unless it also allows sufficient clearance for the body (oval shape 350 mm × 550 mm).

5.8.4 Partially bound and V-shaped openings

When accessible, partially bound and V-shaped openings with an entrance at 600 mm or more above the impact area shall be constructed so that either:

a) any opening is not accessible when tested in accordance with E.2.2; or

b) if accessible at a position of 600 mm or more above impact area, when tested in accordance with E.2.2 the angular orientation range of any opening (see Figure E.4) shall conform to the following:

   1) Range 1 (template centre line ± 45° from vertical): when the template apex contacts the base of the opening, the depth of the opening shall be less than the length of the template to the underside of the shoulder section.

   2) Range 2 (template centre line from horizontal to +45°): when the template apex contacts the base of the opening, the depth of the opening shall be less than the "A" portion of the template. If the depth of the opening is greater than the "A" portion of the template all parts of the opening above the "A" portion shall also allow insertion of the shoulder section of the template.

   3) Range 3: No template test requirements.

5.8.5 Body and finger clearances

The minimum body clearance shall be 350 mm x 550 mm. Body clearance shall be tested according to E.3.

The minimum finger clearance shall be Ø 45 mm. Finger clearance shall be tested according to E.3.

The pass/fail criteria for body and finger clearances are introduced in E.3.

5.9 Separation from other facilities and activities

Parkour equipment shall be separated from children's play facilities.

The level of separation from other sporting activities shall reflect the difference in risk level between activities.

NOTE For more information about the risks and means of separation, see CEN/TR 16879 [4].

6 Dimensions

6.1 Landings

Landings shall have a surface area with a minimum inscribed circular diameter of 100 mm. When tested in accordance with Annex D, any projection beyond the inscribed circle shall not protrude beyond the end of the test probe appendage offering an insufficient area of surface to land upon.

Level variations in/between landings shall not cause trip points.

IAS shall not be installed on landings.

The nature of parkour is such that all components and elements of equipment are deemed accessible and can be used by the user. Therefore, traditional protection against falling in the form of guard rails and barriers is not specified or encouraged by this standard. It needs to be recognized that any underbar/laché (swinging) provision at the perimeter is likely to be used for parkour activities and should not be considered a barrier or guard rail. IAS is excluded from landings to ensure that users of the equipment have a realistic experience of parkour, which is essential for gaining an understanding of their environment, e.g. it is imperative that users are able to get a sensation of the edge of a landing and that landings do not desensitize users from their environment.

6.2 Impact attenuating surface (IAS) and critical fall height

When the falling height is less than 1 600 mm, there is no requirement for IAS.

When the falling height is greater than 1 600 mm, IAS is required. The critical fall height of IAS determined according to EN 1177 shall be 2/3 of the product's falling height. When IAS is provided, there shall be impact attenuating surfacing over the entire impact area of that item.

For example, when the product is 2,7 m high, the critical falling height of the surfacing shall be at least 1,8 m.

6.3 Maximum height of any element or part of equipment

The free height of fall shall be determined from the top of the equipment. The height of any element or part of equipment shall not exceed 3 000 mm, measured from the lowest point within its falling space.

6.4 Maximum free height of fall

The maximum free height of fall to impact area shall not exceed 3 000 mm (see Figure 10, value a).

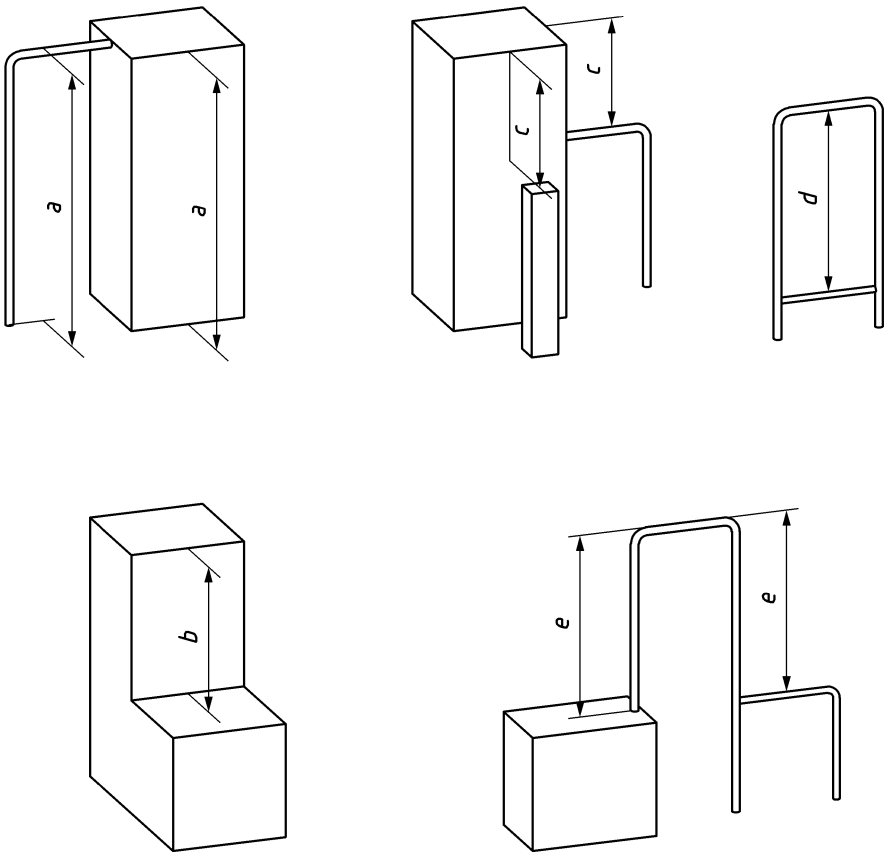
The falling height from a landing to a landing larger than 500 mm x 500 mm shall not exceed 1 600 mm (see Figure 10, value b).

The falling height from landing on rail, bar or small landing shall not exceed 1 200 mm (see Figure 10, value c).

Between bars and rails, the falling height shall not exceed 1 600 mm while the body clearance of 350 mm x 550 mm being as minimum (Figure 10, value d).

The maximum free height of fall from rail or bar onto another object within falling space shall not exceed 1 600 mm (Figure 10, value e).

NOTE Falling height comes from highest point as every part of the equipment is accessible. Basic examples of how the free height of fall is measured are given in Figure 10.



Key

a max 3 000 mm

b max 1 600 mm on landing larger than 500 mm × 500 mm

c max 1 200 mm from landing on rail, bar or smaller landing than 500 × 500 mm

d body clearance - 1 600 mm between bars and rails

e 1 600 mm from rail or bar to another rail or bar or landing

Figure 10 — Examples of determination of falling height

6.5 Extent of the falling space

The extent of the falling space is 1 500 mm when the falling height is less than 1 500 mm. When the falling height is 1 500 mm to 3 000 mm, the extent comes from the formula

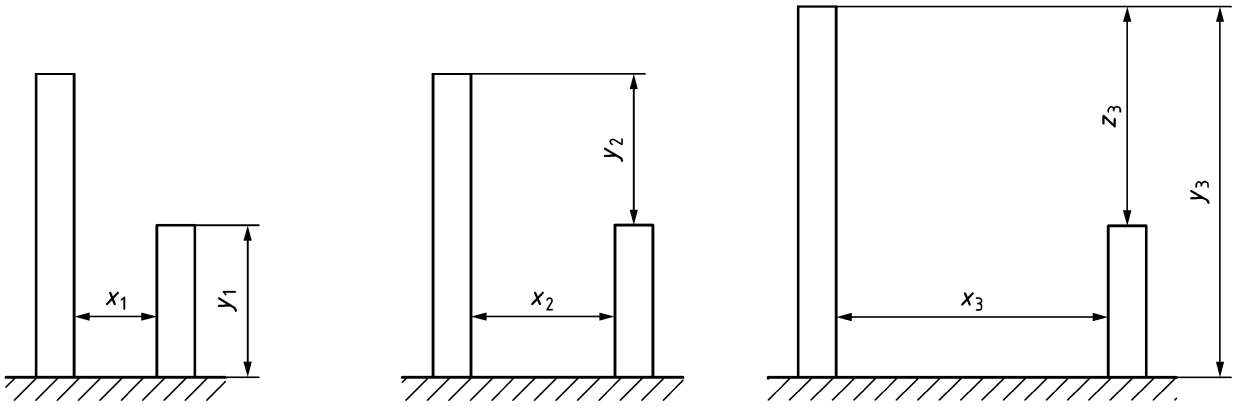
$$x = 2/3\ y + 500\ \text{mm} \quad (1)$$

where

x is extent of falling space;

y is the free height of fall.

Distance between two solid objects such as blocks, when both are higher than 1 200 mm shall be greater than 550 mm, see Figure 11.



Key

y_1 > 1 200 mm

x_1 > 550 mm

x_2 > extent of the falling space calculated from measure y_2

y_2 < 1 500 mm

x_3 > extent of the falling space calculated from measure y_3

y_3 < 3 000 mm

z_3 > 1 500 mm

Figure 11 — Examples of acceptable falling spaces

7 Installation, inspection and maintenance

7.1 Installation

7.1.1 General

Equipment and surfacing shall be installed in a safe way, also to meet, for example, national or local building and safety regulations.

Equipment and surfacing shall be installed in accordance with the manufacturer's or designer's instructions (see 10.3).

On completion of a new parkour facility or after modifications on facilities and/or surfacing, a post-installation inspection shall be carried out to assess compliance with this standard by a competent person who was not directly involved in the installation and is not responsible for possible correction works or expenses.

If equipment is not safe, access by the public, including traceurs/users, shall be prevented.

NOTE Examples of situations where the equipment is not safe are as follows:

— safe installation of equipment is not complete;

— impact attenuating surface (if required) is not yet installed.

7.1.2 Information sign/board

A sign containing the following minimum information shall be placed visibly within the parkour facility:

a) general emergency telephone number;

b) address of the facility;

c) following kind of text: “This is a sports area, designed specifically for parkour use at [name of location]”;

d) the name of the operator and a contact number;

e) optionally any desired safety and operational information, preferably through the use of pictograms, for example: “This is not a children's playground” or “This area is intended for users starting from xx years of age” or “Users must conform to the supervisor's instructions”.

7.1.3 Level mark

Equipment shall be marked clearly and permanently with the basic level mark that indicates the finished surface level.

7.2 Inspection

7.2.1 General

Equipment and its components and surfacing shall be inspected and maintained by competent persons in accordance with the manufacturer's or designer’s instructions.

NOTE The level of competence required will vary with the task (see 8.2.1).

If defects occur that could cause serious risk during inspection, these shall be corrected without delay. If this is not possible, the equipment and surfacing shall be appropriately secured, e.g. by removing damaged part of the product or by fencing.

When a piece of equipment is removed from the site, for example for maintenance, any anchorages or foundations left in the ground shall be removed or safeguarded and the site shall be appropriately secured.

7.2.2 Inspection of impact attenuating surfacing

Attention shall be paid to the loss of impact attenuating properties and possible reduction in the critical fall height, e.g. from heavy use, vandalism, coastal location, air pollution, or by the effects of ageing (exposure to ozone, UV, heat, cold).

7.2.3 Inspection schedule

To prevent accidents, the owner or operator shall ensure that an appropriate inspection schedule is established and maintained for the parkour facility, equipment and also surfacing. This shall take into account local conditions and the manufacturer’s or designer's instructions that can affect the necessary inspection frequency. The schedule shall list the components to be inspected at the various inspections and the methods of inspection.

7.2.4 Frequency of inspections

7.2.4.1 Routine visual inspection

Routine visual inspection enables the identification of obvious hazards that can result from vandalism, use or weather conditions, e.g. hazards such as broken parts or broken bottles. For parkour facilities subject to heavy use or vandalism, daily inspection of this type might be necessary.

NOTE Examples of visual inspection points are cleanliness, surfacing finishes, exposed foundations, sharp edges and missing parts.

7.2.4.2 Operational inspection

The operational inspection is a more detailed inspection to check the operation and stability of the equipment, especially for any wear. This inspection shall be every 1 month to 3 months during the period of usage, or as indicated by the manufacturer’s or designer's instructions.

NOTE Examples of visual and operational inspection points are equipment ground clearances, excessive wear, algae and moss growth, tightness of fixings and moving parts.

7.2.4.3 Annual main inspection

The annual main inspection is carried out to establish the overall level of safety of equipment, foundations and surfacing. This includes any changes made as a result of the assessment of safety measures, effects of weather, presence of rotting or corrosion, and any change in the level of safety of the equipment as a result of repairs made, or of added or replaced components.

NOTE The annual main inspection may involve excavation or dismantling of certain parts of equipment and/or surfacing. Additional measures might be necessary to detect other possible deterioration of the structure and impact attenuation of the surfacing.

The operator of a parkour facility shall, at least once a year, systematically assess the effectiveness of all safety measures. The assessment is based on for example on national or local building and safety regulations, this European Standard and experience.

7.3 Maintenance

7.3.1 General

The manufacturer/supplier shall provide instructions for maintenance, including the frequency of inspection and maintenance and a statement that the frequency varies with the type of equipment and surfacing.

The manufacturer/supplier shall also provide drawings and figures necessary for maintenance, inspection and checking of correct operation and, when appropriate, repair of the equipment and surfacing.

Equipment and its components and surfacing shall be inspected and maintained in accordance with the manufacturer’s instructions at frequency not less than that given by the manufacturer.

NOTE The level of competence required varies with the task (see 8.2.1).

Where the growth of moss and algae can cause surfaces to become slippery, the operator shall monitor and remove them when necessary.

7.3.2 Routine maintenance

To reduce accidents, the owner or operator shall ensure that an appropriate routine maintenance schedule is established, implemented and maintained. This shall take into account local conditions and

the manufacturer's or designer's instructions that can affect the necessary inspection frequency. The schedule shall list the components of equipment as well how the surfacing shall be maintained and shall also give procedures for dealing with complaints and breakdowns.

The routine maintenance of parkour equipment and surfacing shall consist of preventative measures to maintain their level of safety, performance and compliance with this standard. Such measures shall include:

a) tightening of fastenings;

b) re-painting and re-treatment of surfaces;

c) maintenance of any impact attenuating surfaces and if necessary retesting;

d) cleaning;

e) removal of broken glass and other debris or contaminants;

f) restoring loose fills to the correct level as indicated by level marks.

7.3.3 Corrective maintenance

Corrective maintenance shall include measures to correct defects, or to re-establish the necessary levels of safety of the parkour equipment and surfacing. Such measures shall include:

a) replacement of fastenings;

b) welding or welding repairs;

c) replacement of worn or defective parts and structural components;

d) repairing and/or replacing of defective surfacing.

8 Operation

8.1 General

In all steps of the design, installation, inspection, maintenance and operation of the parkour area, the operator or owner shall take into account the manufacturer's or designer's information, e.g. pre-information/catalogue, installation instructions and maintenance instructions, together with the requirements of this standard and any other appropriate information.

The operator shall set up an appropriate system for the safety management of the parkour facility. A record of inspections and maintenance shall be maintained by the operator in charge of the parkour facility.

8.2 Specific requirements

8.2.1 Personnel

Only competent personnel shall perform inspections, tests, repair and maintenance, etc. The personnel shall have adequate information about their tasks, their responsibilities and authority. Only qualified personnel shall carry out safety related heavy works, such as welding structural components or testing of surfacing.

8.2.2 Documentation

Records shall be kept of all actions taken.

The documents relating to parkour facility, equipment and surfacing shall include:

a) the reports of inspection and testing;

b) inspection and maintenance instructions;

c) operating instructions of equipment, if applicable;

d) operator's records, all inspection and maintenance records, e.g. log book; and

e) specific design and tender documents.

These documents shall be accessible when needed for maintenance, inspection, repair and in the event of an accident.

8.2.3 Procedures

If defects that could cause serious risk occur during operation, these shall be corrected without delay. If this is not possible, the equipment shall be appropriately secured, e.g. by removing damaged part of the product or by fencing. Until unsafe equipment or surfacing is repaired and released for use, access by the public shall be prevented.

There shall be written operational procedures covering the measures to be taken in the event of incidents and accidents.

Information about accidents shall be recorded on a form that includes the following details:

a) date and time of accident;

b) age and gender of the person involved;

c) clothing worn, including footwear;

d) equipment and/or surfacing involved;

e) number of people on site at the time of the accident;

f) description of accident;

g) injury sustained including part(s) of body affected;

h) action taken;

i) witness statements;

j) any subsequent equipment modification;

k) weather conditions;

l) any other relevant information.

This information shall be used to improve the safety of the parkour facility, equipment and surfacing and be retained for reference purposes.

8.2.4 Personnel and public safety

Repairs during operation, that could put the safety of maintenance personnel or of the public at risk, shall be avoided.

NOTE Other safety regulations could also apply.

8.2.5 Equipment alterations

Alterations to parkour facility, equipment or surfacing that could affect safety features shall only be carried out after consultation with the manufacturer or a competent person. The person/organization carrying out the alteration is responsible of the equipment conformity in line with the requirements of the standard. Any alterations shall be documented. Labelling/marking, as well as all the documentation included into Clause 10, need to be updated accordingly.

8.2.6 Supervised settings

In supervised conditions, the use of equipment is supervised by a competent person. The supervisor's responsibility is to ensure sufficient safety and the proper use of equipment.

Portable equipment can only be used in supervised conditions. Portable equipment is fairly common in a supervised training environment. Portable equipment shall either be manufactured in a way that it only moves in a foreseeable way or can be temporarily fixed securely.

Exceptions to the standard can be made in supervised use for example as specified below:

— dimensions of steps given in 5.2 *Access restrictions*;

— height of any element or part of equipment given in 6.3 *Maximum height of any element or part of equipment*;

— elements in falling space as determined in 6.4 *Maximum free height of fall*;

— body clearance as determined in 5.8.5 *Body and finger clearances* (while being mindful of head entrapment);

— use of IAS as determined in 6.2 *Impact attenuating surface (IAS) and critical fall height*;

— horizontal stability as determined in A.6 *Horizontal stability*.

9 Labelling/marking

The following information shall be marked legibly and permanently on parkour equipment (including one or several items), in a position visible from ground level:

a) the name and address of the manufacturer or the authorized representative;

b) the equipment reference and year of manufacture;

c) the number and date of this standard, i.e. EN 16899:2016.

10 Information to be provided by the manufacturer/supplier

10.1 General product information

The manufacturer/supplier shall provide instructions in the appropriate language(s) of the country in which the equipment and surfacing are to be sold.

The instructions shall:

a) be printed legibly and in a simple form;

b) contain illustrations wherever possible; and

c) include at least the following information:

   1) details of the installation, operation, inspection and maintenance of the equipment;

   2) advice to the operator about the need to increase inspection/maintenance if the equipment is subject to heavy use and/or the stability of the equipment relies on one post; and

   3) advice to take care in relation to specific hazards to users from incomplete installation or dismantling or during maintenance.

The manufacturer/supplier should make copies of test reports available to purchaser upon request.

10.2 Pre-information

The manufacturer/supplier shall provide information concerning the safety of the installation prior to the acceptance of the order, e.g. a catalogue data sheet.

This information shall include the following, where relevant:

a) minimum space;

b) surfacing requirements (including free height of fall and extent of surfacing);

c) overall dimensions of the largest part(s);

d) mass of the heaviest part/section in kilograms;

e) guidance regarding the target user group for the equipment;

f) if the equipment is intended for indoor/outdoor use or under supervised conditions;

g) availability of spare parts;

h) any certification of conformity with this European Standard.

10.3 Installation information

The manufacturer/supplier shall supply an equipment delivery parts list with the equipment.

The manufacturer/supplier shall supply installation instructions for the correct assembly, erection and placing of the equipment.

This information shall include the following, where relevant:

a) minimum space requirements and safety clearances;

b) equipment and parts identification;

c) erection sequence (assembly instruction and installation details);

d) matching aids where necessary, e.g. signs on parts accompanied by appropriate instructions;

e) the need for any special tools, lifting devices, templates or other assembly aids to be used and any precautionary measures to be taken. Where necessary, torque values shall be given;

f) constructional space required to install the item of equipment;

g) details of the required foundation, under normal conditions, anchorage in the ground and the design and location of the foundation (with a note that care should be taken concerning abnormal conditions);

h) specific instructions if a particular landscape profile is necessary for safe operation, e.g. falling height;

i) free height of fall (for impact attenuation surfacing needs);

j) the need for and details of the application of any painting or treatment;

k) removal of assembly aids before the equipment is used.

Drawings and figures shall clearly specify the principal dimensions of the equipment and the relevant space, heights and areas required for installation.

The manufacturer/supplier shall supply the details necessary for inspection of the equipment and surfacing prior to its first use.

When the manufacturer makes the installation, some of this information may not be necessary. However, if the customer asks for this information, manufacturer has to be prepared to provide it.

Annex A
(normative)

Method of determining structural integrity

A.1 General principle

This test considers product's structural integrity against vertical loads.

Calculate the number of users for each structural component in accordance of Annex B.

Calculate the test load using the Formula (B.1).

$$Q = M \times \gamma Q + m \quad \text{(A.1)}$$

where

M is the appropriate user load taken from Table A.1;

γQ is the applicable safety factor (see A.3);

m is the self-weight of the structure.

Table A.1 — User loads M by number of users n 1 to 100

n	M kg		n	M kg		n	M kg		n	M kg
1	227		26	2 240		51	4 231		76	6 213
2	306		27	2 320		52	4 310		77	6 292
3	387		28	2 400		53	4 390		78	6 371
4	468		29	2 480		54	4 469		79	6 450
5	550		30	2 559		55	4 548		80	6 529
6	631		31	2 639		56	4 628		81	6 608
7	712		32	2 719		57	4 707		82	6 687
8	793		33	2 799		58	4 786		83	6 767
9	874		34	2 878		59	4 866		84	6 846
10	955		35	2 958		60	4 945		85	6 925
11	1 036		36	3 038		61	5 024		86	7 004
12	1 117		37	3 118		62	5 104		87	7 083
13	1 197		38	3 197		63	5 183		88	7 162
14	1 278		39	3 277		64	5 262		89	7 241
15	1 358		40	3 356		65	5 341		90	7 320
16	1 439		41	3 436		66	5 421		91	7 399
17	1 519		42	3 515		67	5 500		92	7 478

n	M kg		n	M kg		n	M kg		n	M kg
18	1 599		43	3 595		68	5 579		93	7 557
19	1 680		44	3 675		69	5 658		94	7 637
20	1 760		45	3 754		70	5 737		95	7 716
21	1 840		46	3 834		71	5 817		96	7 795
22	1 920		47	3 913		72	5 896		97	7 874
23	2 000		48	3 992		73	5 975		98	7 953
24	2 080		49	4 072		74	6 054		99	8 032
25	2 160		50	4 151		75	6 133		100	8 111

A.2 User load

User load M is calculated from Formula (B.2).

$$M = (n \times 78 + 1{,}64 \times \sigma \sqrt{n}) \times (1 + 1{,}3/n) \quad \text{(A.2)}$$

where

n is a number of users;

78 kg is a mean mass of adult male;

1,64 is a statistical factor;

σ is a standard deviation of adult males (12,6 kg);

1 + 1,3/n is a factor that takes into account movement of users.

A.3 Safety factors

Apply the safety factor (γQ) of 1,35.

A.4 Self-weight

Calculate the self-weight m of the structure and assemblies and add this to the test weight when calculations only are carried out.

For physical testing, self-weight m of the structure is the structure itself, so this need not be calculated and added to the test weight.

A.5 Physical testing

Apply the test weights evenly on or under the structure so that the entire weight rests on the component or structure that is tested.

Subject the specimen to the load for 5 min.

A.6 Horizontal stability

The total horizontal user load is 30 % of the total vertical user load.

Apply the load to the weakest point of the structure to ensure that equipment withholds the stress without collapsing.

Annex B
(normative)

Number of users on the equipment

B.1 General

Calculate the number of users for each structural element likely to be loaded by users. Round the calculated number up to the next whole number, e.g. 3,13 becomes 4,0.

B.2 Number of users on a point

Unless stated differently elsewhere in this standard, the number of users n on a point is 1 (n = 1).

B.3 Number of users on line type elements

NOTE Line type elements are e.g. bars and rails.

Calculate the number of users n on a line as follows:

a) line elements with an inclination up to and including 60°: n = Lpr/0,7;

b) line elements with an inclination greater than 60°: n = L/1,40;

where

L is the length of the element in metres;

Lpr is the length of the element projected down to a horizontal plane, in metres.

B.4 Number of users on an area

Calculate the number of users n on a surface area from the following:

a) planes with inclination up to and including 60°: n = Apr/0,49;

b) planes with inclination greater than 60°: n = A/0,98;

where

A is the area, in metres squared;

Apr is the area projected down to a horizontal plane, in metres squared.

If the width of the plane is smaller than 0,7 m, treat it as a line type element.

Annex C
(normative)

Impact test method

C.1 Principle

The impact resistance is tested by dropping weights onto the structure.

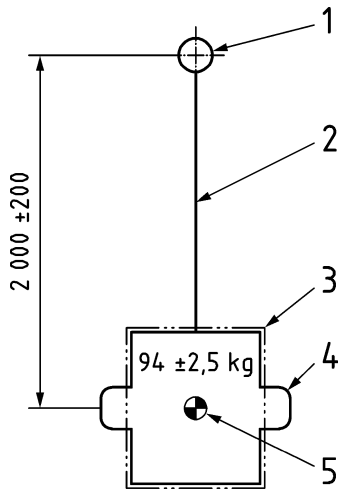
C.2 Apparatus

C.2.1 **Test specimen**, any piece of structure that can be subjected to user impact.

C.2.2 **Mass**, M, of (94 ± 2,5) kg.

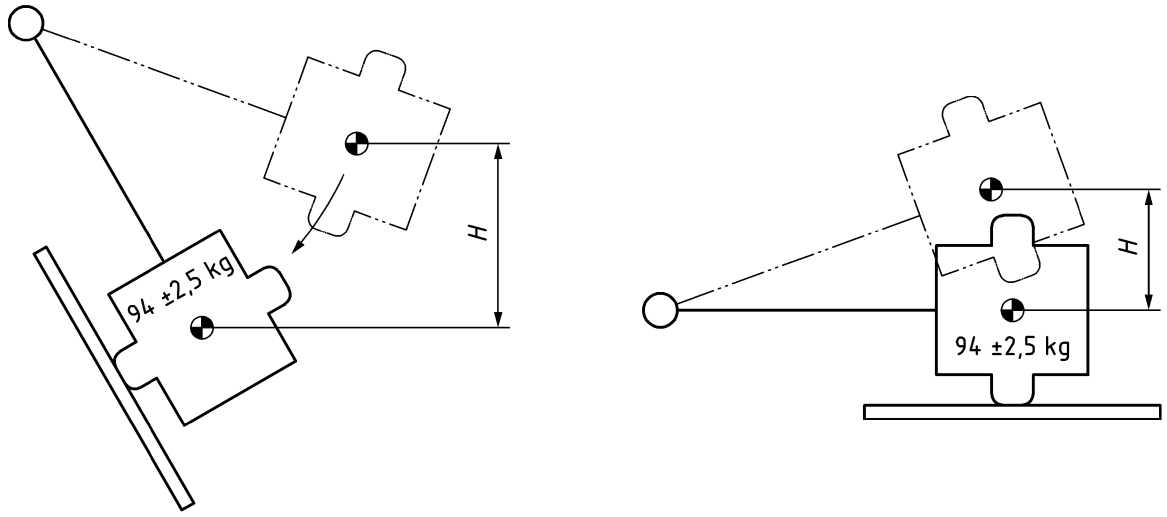
C.2.3 **Test apparatus** conforming to Figures C.1 and C.2.

Dimensions in millimetres



Key
1 rotating point
2 stiff arm
3 mass (i.e. steel)
4 car tyre with 2 bar pressure
5 mass gravity centre point

Figure C.1 — Apparatus for testing structural integrity



a) Testing of inclined surface **b) Testing of horizontal surface**

Key

H drop height

Figure C.2 — Test apparatus for an inclined surface and a horizontal surface

C.3 Procedure

Fix the specimen according to manufacturer's instructions as it would be installed for use. Suspend the mass M (see C.2.2) 500 mm above the test specimen, as measured from the mass gravity centre point, and drop it (see Figure C.1). Let the weight come to standstill without interfering while the weight rebounds.

Check for visible signs of deterioration as a result of the impact.

Annex D
(normative)

Assessment of surface area of a landing

D.1 Principle

The assessment method determines whether a landing is large enough (larger than the body section of the test template) (Phase 1) and whether the grip section of the form of the landing has corners that are too sharp to be used for landing (Phase 2).

D.2 Apparatus

Test template, conforming to Figure D.1 and Figure D.2.

Dimensions in millimetres

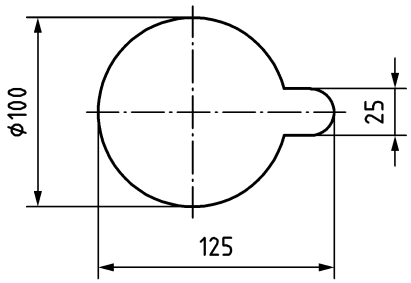
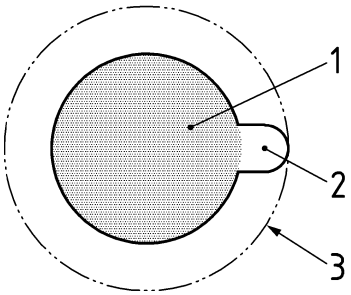


Figure D.1 — Dimensions of test template



Key

1 body section
2 grip section
3 imaginary perimeter that is covered by grip section, while body section does not move

Figure D.2 — Sections of test template

D.3 Procedure

D.3.1 Phase 1

Place the test template on the landing.

Check if the landing is large enough to support whole surface area of the body section of the template (see Figures D.3 to D.6 for examples of testing).

D.3.2 Phase 2

Move the template to extremities of the landing.

Check whether the imaginary perimeter of the grip section covers all corners of the landing (see Figures D.3 to D.6 for examples of testing).

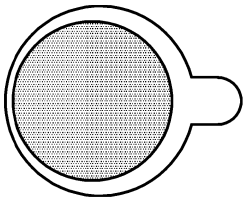


Figure D.3 — Example 1 – Fail - Body section of the template does not fully fit on the landing

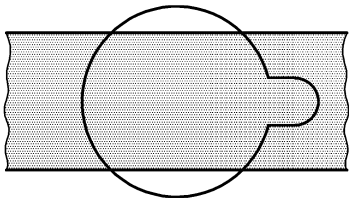
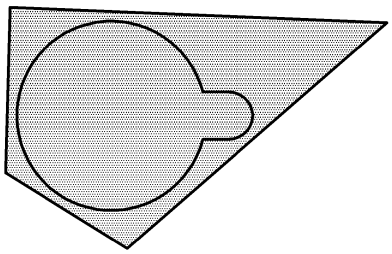
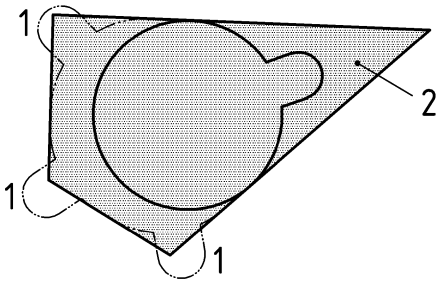


Figure D.4 — Example 2 – Fail - Body section of the template does not fully fit on the landing



a) Phase 1 – Pass [proceed to phase 2 in Figure D.5b)] - Body section of the template fully fits on the landing



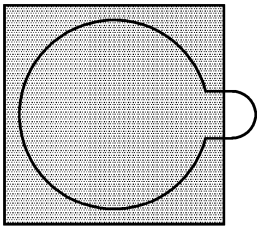
b) Phase 2 – Fail of the whole test - Grip section covers only 3 corners of the landing out of 4

Key

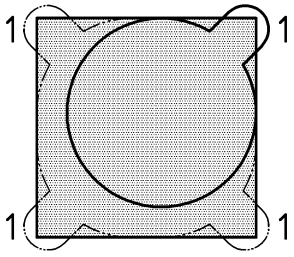
1 pass

2 fail

Figure D.5 — Example 3, phases 1 and 2



a) Phase 1 - Pass [proceed to phase 2 in Figure D6b)] - Body section of the template fully fits on the landing



b) Phase 2 – Pass of the whole test - Grip section covers all corners of the landing.

Key

1 pass

Figure D.6 — Example 4, phases 1 and 2

Annex E
(normative)

Test method for entrapment

E.1 General

Unless stated otherwise, tolerances of the probes in this annex are:

a) ± 1 mm for dimensions; and

b) ± 1° for angles.

In situations of doubt about the tolerance, an accurate measurement shall be made to ensure the opening is in accordance with the nominal dimension of the probe.

E.2 Head and neck entrapment

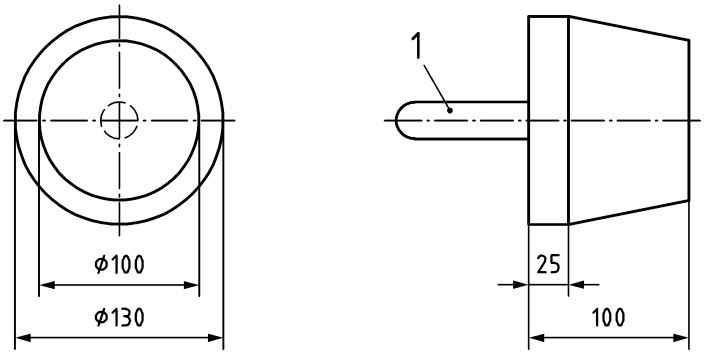
E.2.1 Completely bound openings

NOTE These entrapment tests are taken from EN 1176–1 because it is recognized that, although the equipment is intended primarily for youths and adults, children might choose to use the equipment.

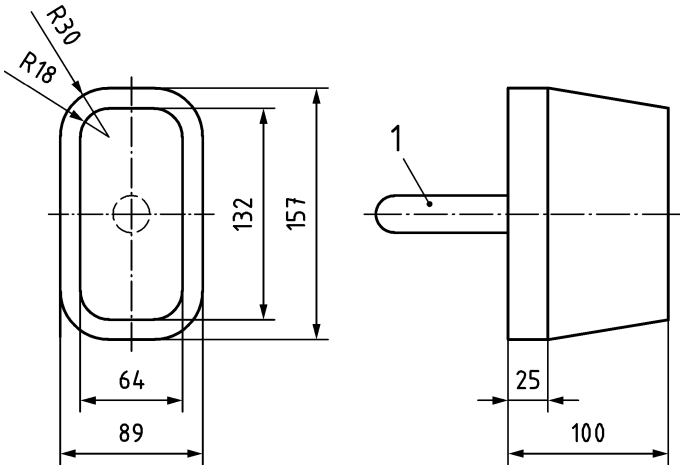
E.2.1.1 Apparatus

Probes, as illustrated in Figure E.1.

Dimensions in millimetres



a) Probe E (small head)



b) Probe C (torso)

Key

1 handle

NOTE Probes taken from EN 1176.

Figure E.1 — Probes for determination of head and neck entrapment in completely bound openings

E.2.1.2 Procedure

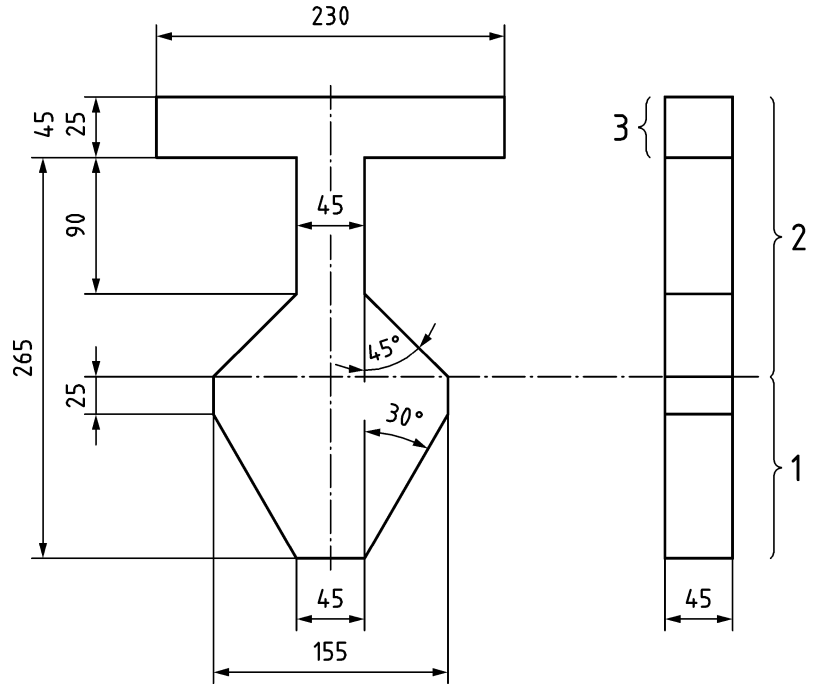
Apply successively the probes as illustrated in Figure E.1 to each relevant opening. Apply each probe with the axis perpendicular to the plane of the opening. Record and report the passage of any probe through the opening. If any of the probes are not freely passing through the opening apply a force of (222 ± 5) N to the probe. If the probe passes, the item fails unless the opening passes the body clearance test.

E.2.2 Partially bound and V-shaped openings

E.2.2.1 Apparatus

Test template, as illustrated in Figure E.2.

Dimensions in millimetres



Key

1 "A" portion of probe

2 "B" portion of probe

3 shoulder section

Figure E.2 — Test template for assessment of head and neck entrapment in partially bound and V-shaped openings

E.2.2.2 Procedure

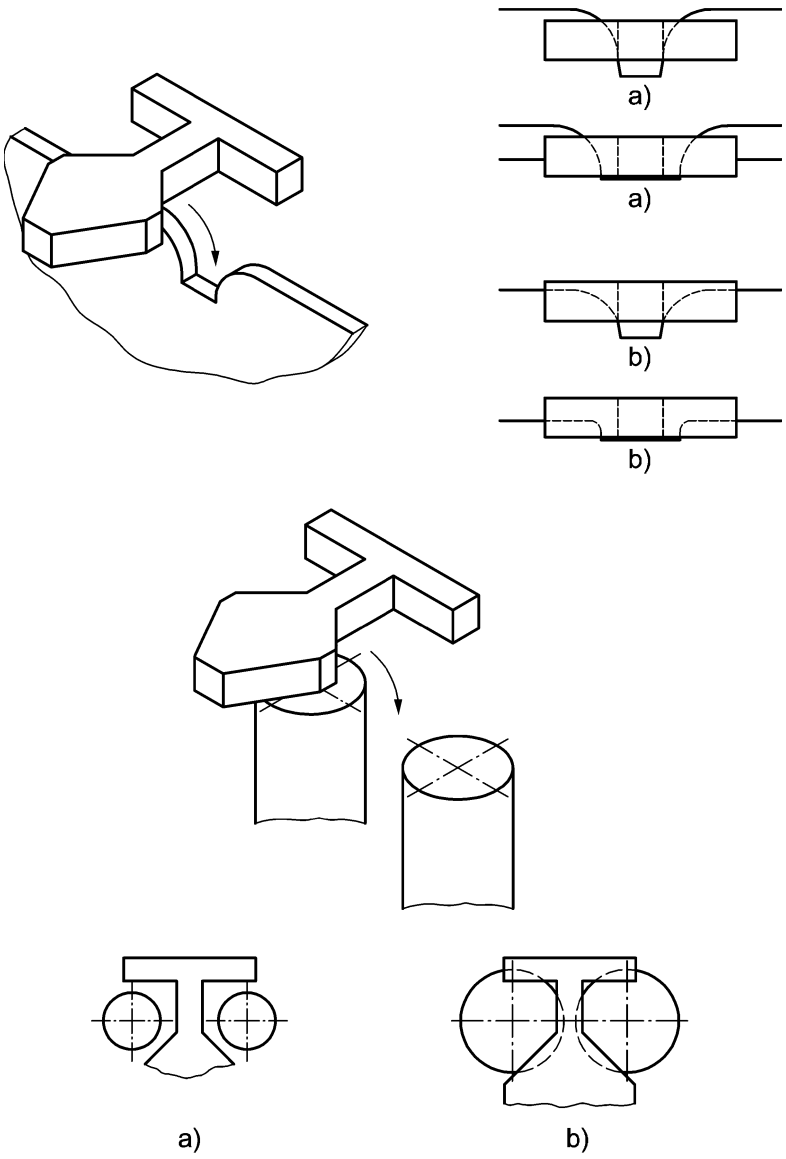
Position the "B" portion of the test template between and perpendicular to the boundaries of the opening, as shown in Figure E.3. Record and report whether the template fits within the boundaries of the opening or if it cannot be inserted to its full thickness.

If the test template can be inserted to a depth greater than the thickness of the template (45 mm), apply the "A" portion of the test template so that its centre line is orientated to check the extremities of the opening as well as the centreline.

Ensure that the plane of the test template is parallel and applied in line with the opening, as shown in Figure E.4.

Insert the test template along the opening until its motion is arrested by contact with the boundaries of the opening. Record and report the results, including the angle of the template centreline relative to the vertical and horizontal axes (see Figure E.4) as this determines the pass/fail requirements given in 5.8.4.

NOTE See Figure E.5 and Figure E.6 for examples of the assessment for the different angular ranges.

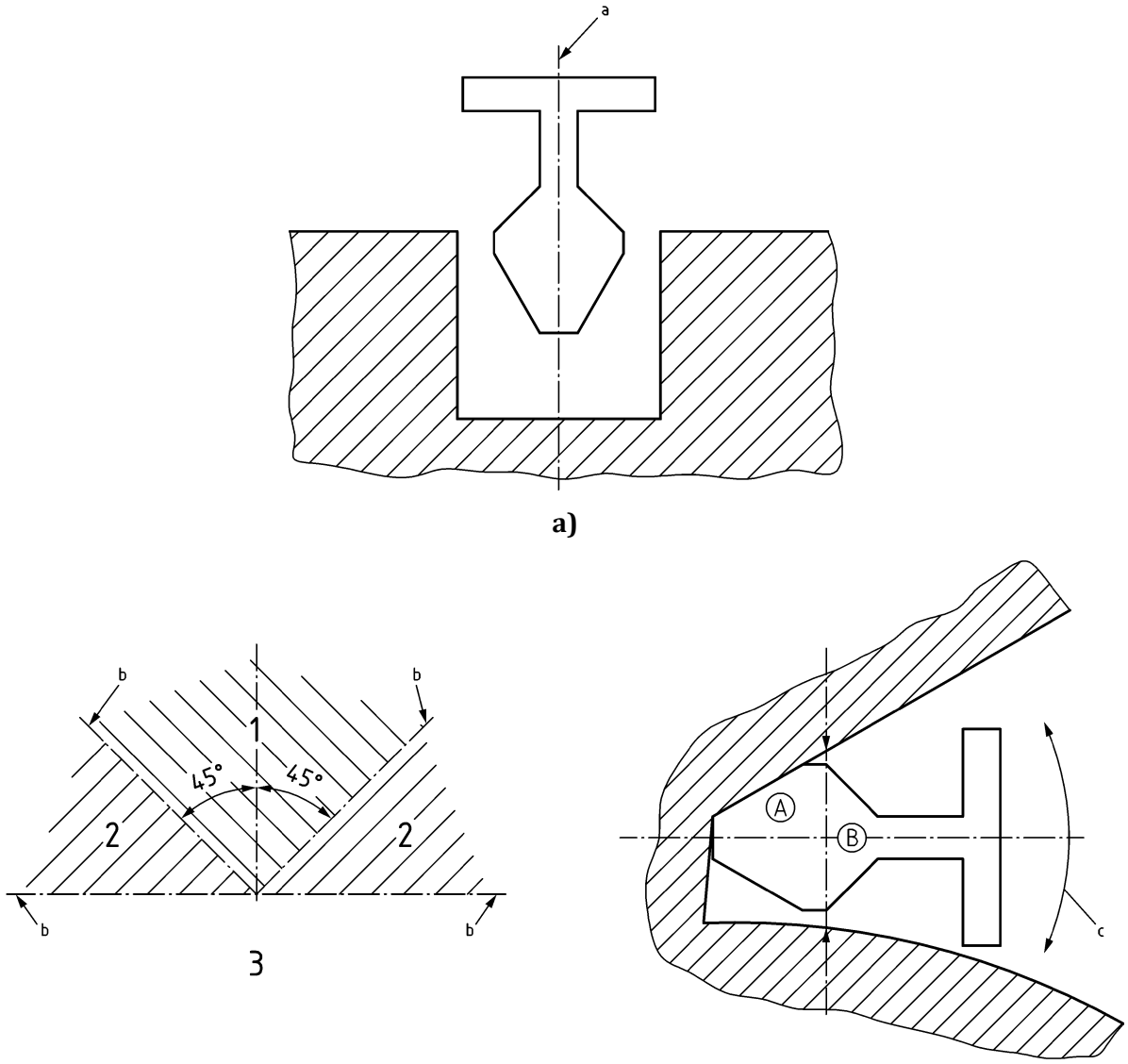


Key

a) accessible

b) not accessible

Figure E.3 — Method of insertion of the "B" portion of the test template

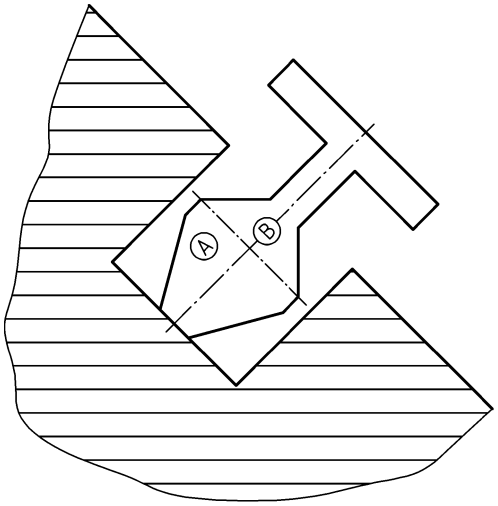


Key

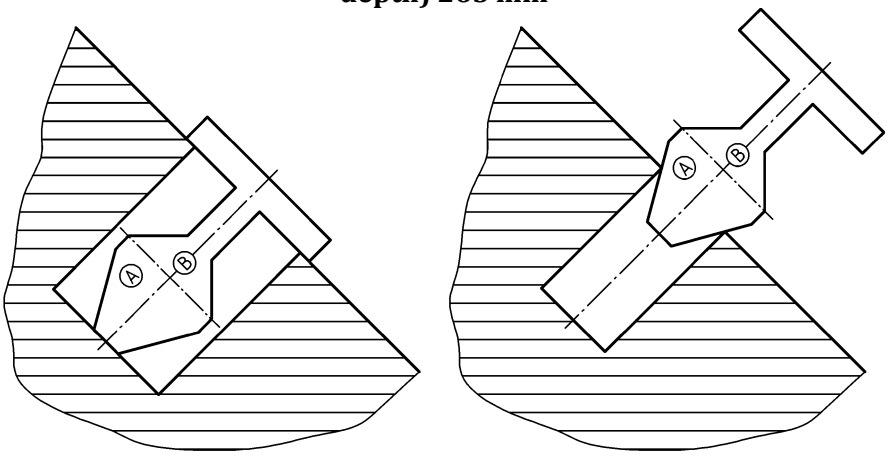
1 range 1
2 range 2
3 range 3
a insertion angle for assessing the range
b template centre line
c check all insertion angles

Figure E.4 — Checking all insertion angles to determine range

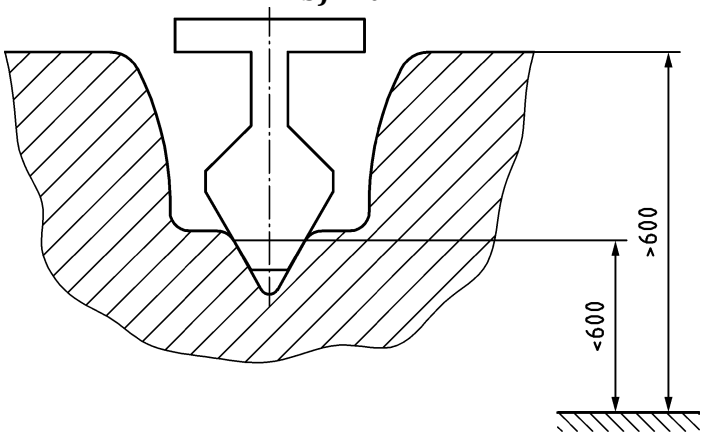
Dimensions in millimetres



a) Passes if front section fully enters aperture to a maximum depth of (template shoulder depth) 265 mm



b) Fail



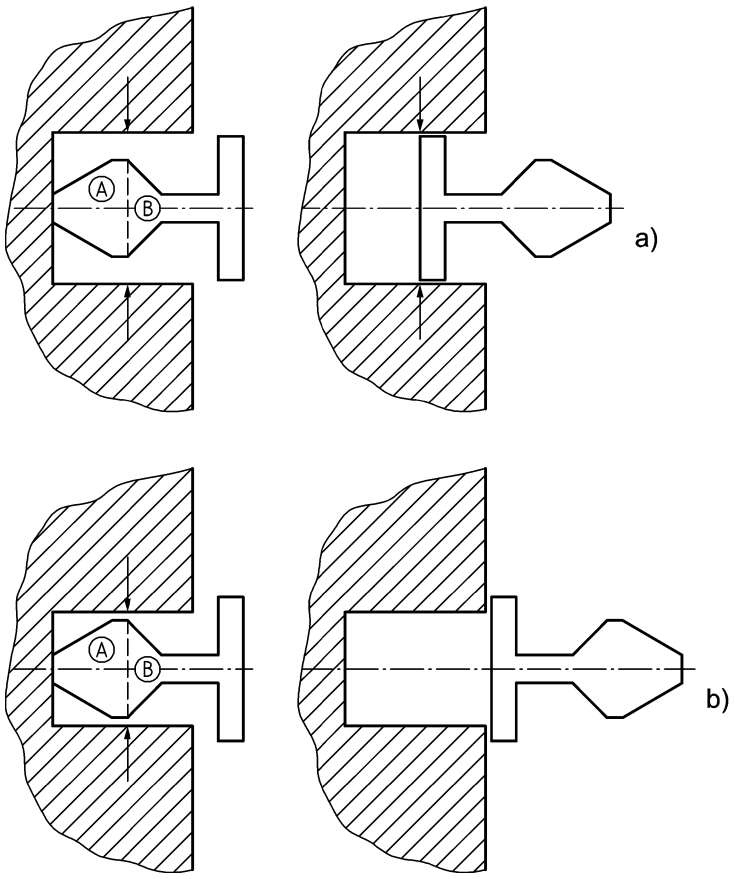
c) Pass

Key

> 600 mm = more than 600 mm above the playing surface

< 600 mm = less than 600 mm above the playing surface

Figure E.5 — Range 1 method of insertion of the "A" portion of the test template



Key

a) pass

b) fail

Figure E.6 — Range 2 method of insertion of the "A" portion of the test template followed by insertion of the shoulder of the template

E.3 Body and finger clearances

E.3.1 Apparatus

Probes, as illustrated in Figures E.7 and E.8.

Dimensions in millimetres

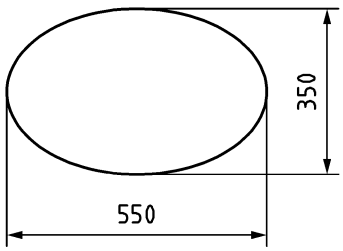


Figure E.7 — Test template for assessment of body clearance

Dimensions in millimetres

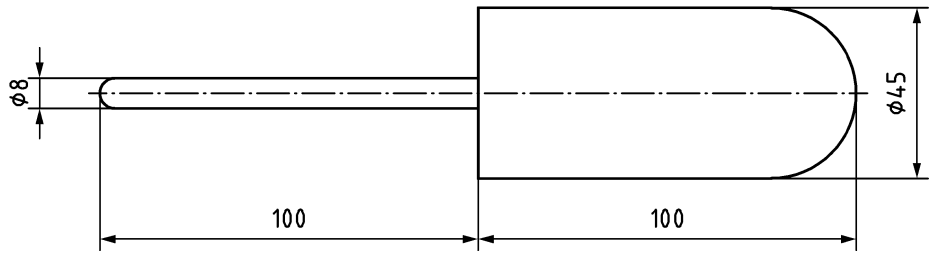


Figure E.8 — Test probe for assessment of finger clearance

E.3.2 Procedure for finger clearance

Find small openings and test that the large end of the finger clearance test probe fits through the opening. If not, test if the small end of the test probe fits through the opening.

The test fails, if only the small end fits through. Test passes if both or none of the ends fit through.

E.3.3 Procedure for body clearance

Find large openings that have failed the head entrapment test for completely bound openings and test that the body clearance test probe fits through the opening in any orientation. If not, the test fails.

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[1] BS 7188:1998+A2:2009, *Impact absorbing playground surfacing – Performance requirements and test methods*

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[3] EN 1176-1:2008, *Playground equipment and surfacing - Part 1: General safety requirements and test methods*

[4] CEN/TR 16879:2016, *Siting of Playground and other recreational facilities - Advice on methods for positioning and separation*

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