Zhejiang Baihe Industrial Co., Ltd.
Building 32, No. 1, Xu'ao Industrial Zone, Pengkuo Village, Youzhu Street, Qingtian County, Lishui City, Zhejiang Province

The following sample(s) was/were submitted and identified by/on behalf of the client as:

Sample Description	:	playground equipment
Sample Quantity	:	1 SET
Manufacturer	:	Zhejiang Baihe Industrial Co., Ltd.
Supplier	:	Zhejiang Baihe Industrial Co., Ltd.
Country of Origin	:	China
Country of Destination	:	Europe
Requested Age Grading	:	3-12
		**********
Sample Receiving Date	:	MAR. 23, 2026
Testing Period	:	MAR. 23, 2026 T0 APR.10, 2026
Testing Performed	:	SELECTED TEST(S) AS REQUESTED BY APPLICANT

No	Test Requirement	Conclusion
1	EN 1176-1:2017:A1-2023 Playground Equipment and surfacing Part 1 General safety requirements and test methods	Pass See remark
2	EN 1176-3:2017 Playground Equipment and surfacing Part 3 Additional specific safety requirements and test methods for slides	Pass See remark

*** FOR FURTHER DETAILS, PLEASE REFER TO THE FOLLOWING PAGE(S) ***

Signed for and on behalf of
SGS-CSTC Standards Technical Services (Changzhou) Co., Ltd.

Nature Di

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Test Conducted:

1. EN 1176-1:2017+A1:2023 Playground Equipment and surfacing Part 1: General safety requirements and test methods

Scope:

1. This part of EN 1176 specifies general safety requirements for permanently installed public playground equipment and surfacing. Additional safety requirements for specific pieces of playground equipment are specified in subsequent parts of this standard.
2. This part of EN 1176 covers playground equipment for all children. It has been prepared with full recognition of the need for supervision of young children and of less able or less competent children.
3. The purpose of this part of EN 1176 is to ensure a proper level of safety when playing in, on or around playground equipment, and at the same time to promote activities and features known to benefit children because they provide valuable experiences that will enable them to cope with situations outside the playground.
4. This part of EN 1176 is applicable to playground equipment intended for individual and collective use by children. It is also applicable to equipment and units installed as children's playground equipment although they are not manufactured as such, but exclude those items defined as toys in EN 71 and the Toys Safety Directive.
5. It is not applicable to adventure playgrounds with the exception of those items which have been commercially sourced.
   NOTE Adventure playgrounds are fenced, secured playgrounds, run and staffed in accordance with the widely accepted principles that encourage children's development and often use self-built equipment.
6. This part of EN 1176 specifies the requirements that will protect the child from hazards that they might be unable to foresee when using the equipment as intended, or in a manner that can be reasonably anticipated.
7. The use of electricity in play equipment, either as a play activity or as a motive force, is outside the scope of this standard. The attention of users is drawn to European and local national standards and regulations which are to be complied with when using electricity.
8. Play equipment placed in water and where water can be seen as impact attenuating surfacing is not fully covered by this standard and additional risks are associated with wet environments.
9. The risk of exposure to excessive levels of UV radiation is not covered in this standard.

Sample size/weight::	2500 x 1800 x 3400 mm / 225 kg (claimed by client)	Total number of users:	5
Age range:	3-12	Number of tested samples:	1

Clause	Test Method & Test Requirement	Rating
2	Normative references	
3	Terms and definitions	
4	Safety requirements	P
4.1	Materials	NC
4.1.1	General Materials shall conform to 4.1.2 to 4.1.6.	See following details

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	Materials shall be selected and protected such that the structural integrity of the equipment or impact attenuating surfacing manufactured from them is not affected before the next relevant inspection and maintenance. NOTE EN 1176-7 gives recommendations on inspections and maintenance. The provisions relating to certain materials in this standard do not imply that other equivalent materials are unsuitable in the manufacture of playground equipment. The selection of materials and their use should be in accordance with appropriate European Standards. Special attention should be given to surface coatings to avoid potential toxic hazards. The choice of materials should be appropriate where extreme climatic or atmospheric conditions are to be expected. Care should be taken where direct skin contact is to be expected. In the choice of a material or substance for playground equipment or impact attenuating surfacing, consideration should be given to the eventual disposal of the material or substance having regard to any possible environmental toxic hazard.	
4.1.2	Flammability To avoid the risk of fire and associated hazards, materials known to produce surface flash shall not be used. Particular attention should be given to newly developed products whose properties might not be fully known. NOTE 1 Requirements for adequate exits to ensure escape in cases of fire are given in 4.2.3. NOTE 2 Attention is drawn to national and local building regulations regarding flammability for equipment installed both indoors and outdoors.	NC
4.1.3	Timber and associated products Timber parts shall be designed in such a way that precipitation can drain off freely and water accumulation shall be avoided. In cases of ground contact, one or more of the following methods shall be used: a) use of timber species with sufficient natural resistance in accordance with classes 1 and 2 of the natural resistance classification given in EN 350:2016, 5.2; b) construction methods, e.g. post shoe; c) use of timber treated with wood preservatives in accordance with EN 351-1:2007, Figure A.1, and in accordance with EN 335, use class 4. NOTE It is advised to also consider other factors which can be unsuitable, such as splintering, poisoning etc. All components made of timber 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 timber and chemical treatments used as some will accelerate corrosion of metals if there is contact between them. Plywood shall be in accordance with EN 636 and shall be weatherproofed.	NA

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4.1.4	Metals Metal parts should be protected against atmospheric conditions and cathodic corrosion. Metals that produce toxic oxides that scale or flake shall be protected by a non-toxic coating.	NC
4.1.5	Synthetics If, during maintenance, it is difficult to determine at what point material becomes brittle, manufacturers shall give an indication of the time period after which the part or equipment or impact attenuating surfacing should be replaced. It should be possible for the operator of the playground to visually identify excessive wear of the gelcoat of GRP (glass-reinforced plastics) products intended for sliding before the user becomes exposed to the glass fibres. NOTE This can be achieved for example by the use of different coloured layers in the sliding surface. Consideration should also be given to degradation of structural components or impact attenuating surfacing through ultraviolet influences.	NC
4.1.6	Dangerous substances Dangerous substances shall not be used in playground equipment or impact attenuating surfacing in such a way that they can cause adverse health effects to the user of the equipment. NOTE Attention is drawn to the provisions of the REACH Regulation (EC) 1907/2006 and its successive modifications. Restricted materials include, but are not limited to, asbestos, lead, formaldehyde, coal tar oils, carbolineums, polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAH compounds).	NC
4.2	Design and manufacture	P
4.2.1	General Equipment where the primary play function is augmented by a secondary motion, e.g. rocking and/or rotating, shall conform to the additional parts of EN 1176 relating to both play functions, as appropriate, unless the equipment is specifically covered in just one of the additional parts of EN 1176. The dimensions and degree of difficulty of the equipment should be suitable for the intended user group. The equipment should be designed so that the risk involved in play is apparent and foreseeable by the child. NOTE For additional safety of equipment that is easily accessible, specific requirements have been included for the following: — protection against falling: a) guardrails (4.2.4.3); b) barriers (4.2.4.4);	P

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	— steep elements (4.2.9.4); — easily accessible playground equipment (4.2.9.5). Except when intended for water play, all parts of playground equipment should be designed so that they do not accumulate water e.g. space beneath bouncing facility or carousel flush with the ground.	
4.2.2	Structural integrity For playground equipment, the structural integrity for the worst case of the intended combinations shall be proved. Structural integrity, including stability of the equipment shall be assessed by one of the following: a) calculation, in accordance with Annexes A and B; b) physical testing, in accordance with Annex C; or c) a combination of a) and b). When calculations are carried out in accordance with Annex B no limit states shall be exceeded at combinations of loads as given in B.2. When tested in accordance with Annex C, the equipment shall not show any cracks, damage or excessive permanent deformation (see C.1.2). Each structure shall resist both the permanent and variable loads acting on equipment and parts of equipment as described in Annex C. When playground equipment relies on one post for its stability, the construction should be carried out in order to: — minimize rotting or corrosion in parts relevant for stability; — allow for controlling degradation and the need for decommission; — be used without collapse within the foreseen inspection period when maintained correctly. NOTE 1 No allowance for accidental loads, i.e. loads produced by fire, collision by vehicles or earthquake, need to be made for playground equipment. NOTE 2 The loads associated with fatigue are in general much smaller than the loads in combination with the appropriate load factors when calculated in accordance with B.2. Therefore, playground equipment in general need not be verified for fatigue. NOTE 3 For one post equipment at installation stage, it is advised to consider access to foundations to control rotting or degradation; the choice of impact attenuating surfacing material can have implications on inspections to foundations. Structural parts shall resist the worst case loading condition. NOTE 4 To achieve this, it might be necessary to remove that part of the user load causing favourable effects, as shown in Figure 7.	P After loaded 252 kg, no cracks, damage or excessive permanent deformation was found.

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	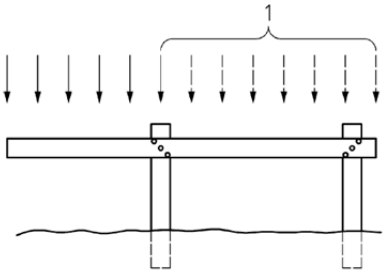 **Key** 1 remove this part of the load because of favourable effects **Figure 7 — Example of removal of that part of the user load which causes a favourable effect**	
4.2.3	Accessibility for adults Playground equipment shall be designed to ensure that adults are able to gain access to assist children within the equipment. Enclosed parts of the equipment such as tunnels and playhouses, with an internal distance greater than 2 000 mm from an entry point shall have at least two access openings that are independent of one another and situated on different sides of the equipment. These openings shall not be capable of being locked and shall be accessible without any additional aids (e.g. a ladder that is not an integral part of the equipment). These access openings shall have no dimension less than 500 mm. Because of the risk of fire, these two openings shall allow the user to leave the equipment by different routes.	P
4.2.4	Protection against falling	P
4.2.4.1	General Different types of protection against falling from elevated platforms are required. The type of protection required will depend on the free height of fall and on the type of equipment, whether it is easily accessible or not (see 4.2.4.3 and 4.2.4.4). See Figure 8 and Annex F. When installed on ramps or stairs, handrails, guardrails or barriers shall commence at the lowest position on the ramp or stairs.	See following details

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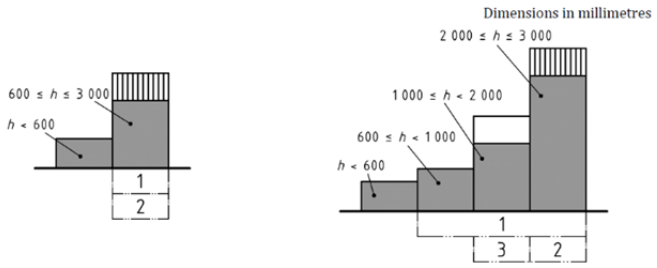
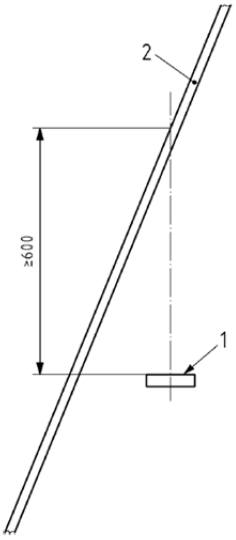
	 **a) Protection against falling for easily accessible equipment** **b) Protection against falling for not easily accessible equipment** **Key** 1 impact attenuating surfacing in accordance with 4.2.8.5 2 barriers required 3 guardrail required **Figure 8 — General protection against falling where there is no forced movement**	
4.2.4.2	Handrails Handrails shall be not less than 600 mm and not more than 850 mm above the foot position (see Figure 9). As a minimum, handrails shall conform to the requirements for grasp (see 4.2.4.7). Dimensions in millimetres  **Key** 1 foot position 2 handrail **Figure 9 — Guidance on measurement of height of handrail above foot position**	P Height: 780 mm
4.2.4.3	Guardrails	P

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	For equipment other than that which is easily accessible, guardrails shall be provided when the platform is 1 000 mm to 2 000 mm above the playing surface (see Figure 8b)). The height to the top of the guardrail shall be not less than 600 mm and not more than 850 mm measured from the surface of the platform, stairs or ramp. Guardrails shall completely surround the platform except for entrance and exit openings necessary for each play element. The width of entrance and exit openings in guardrails, with the exception of stairs, ramps and bridges, shall have a maximum clear opening of 500 mm, when measured horizontally at a position, with a height between 600 mm to 850 mm from the platform. For stairs, ramps and bridges the width of the exit opening in the guardrail shall be no greater than the width of these elements	
4.2.4.4	Barriers Except for entrance and exit openings necessary for each play element, barriers shall completely surround the platform. The width of entrance and exit openings in barriers shall have a clear opening of 500 mm maximum, when measured horizontally at any point (see Figure 10a)), unless a guardrail is provided across the opening (see Figure 10b) and Figure 10c)). For stairs, ramps, bridges, etc. that have additional barriers as part of their structure, the width of the exit opening in the barrier shall be no greater than the width of these elements. There shall be no intermediate horizontal or near horizontal rails or bars that can be used as steps by children attempting to climb. The design of the top of the barriers should not encourage children to stand or sit on them, nor should any infilling encourage climbing. Openings between the platform surface and the lower edge of the barrier and between any infilling elements shall not allow passage of the probe C. For easily accessible equipment, barriers shall be provided when the platform is more than 600 mm above the playing surface (see Figure 8a)). For equipment other than easily accessible, barriers shall be provided when the platform is more than 2 000 mm above the playing surface (see Figure 8b)). The height to the top of the barrier shall be at least 700 mm measured from the surface of the platform, stairs or ramp. Openings in the barrier of easily accessible equipment/parts of equipment that give access to steep play elements shall conform to the requirements of 4.2.9.4. For all other equipment, openings in the barrier provided with a guardrail, which give access to steep play elements, shall not be greater than 1 200 mm (see Figure 10c)).	P

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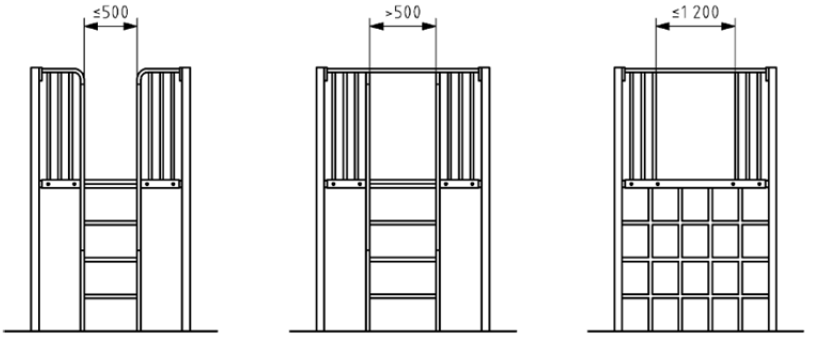
	Dimensions in millimetres  a) any narrow element b) steep play element is at least as wide as the opening c) steep play element is wider than the opening **Figure 10 — Entrance and exit openings in barriers for steep play elements**	
4.2.4.5	Strength requirements Barriers and guardrails shall conform to 4.2.2.	P
4.2.4.6	Grip requirements The cross-section of any support designed to be gripped for support of full body weight (see 3.16 and Figure 5) shall have a dimension of not less than 16 mm or more than 45 mm in any direction, when measured across its centre.	P
4.2.4.7	Grasp requirements The cross-section of any support designed to be grasped (see 3.17 and Figure 6) shall have a width not exceeding 60 mm.	P
4.2.5	Finish of equipment Wooden equipment shall be made of wood with a low susceptibility to splintering. The surface finish of equipment made of other materials (e.g. glass fibre) shall be non-splintering. There shall be no protruding nails, projecting wire rope terminations or pointed or sharp-edged components. Rough surfaces should not present any risk of injury. Protruding bolt threads within any accessible part of the equipment shall be permanently covered, e.g. dome headed nuts. Nuts and bolt heads that project less than 8 mm shall be free from burrs. NOTE 1 Figure 11 shows examples of protection for nuts and bolts. Corners, edges and projecting parts within the space occupied by the user 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 the projecting part, shall be rounded off. The minimum radius of the curve shall be 3 mm. NOTE 2 This requirement is intended only to prevent injuries caused by unintended contact with components.	P

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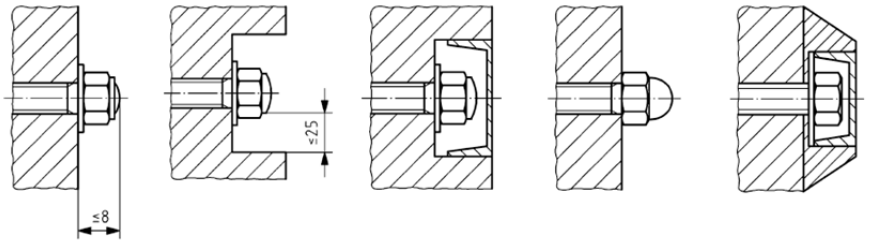
Clause	Test Method & Test Requirement	Rating
	Corners, edges and projections with a radius less than 3 mm may be in other accessible parts of the equipment only if they are not sharp Dimensions in millimetres  **Figure 11 — Examples of protection for nuts and bolts**	
4.2.6	Moving parts There shall be no crushing points or shearing points between moving and/or stationary parts of the equipment, in accordance with 4.2.7. Parts from which a high impact force can emanate should have an attenuating construction. If moving parts of the equipment can endanger the body, there shall be a ground clearance of at least 400 mm.	P
4.2.7	Protection again entrapment	P
4.2.7.1	General When choosing materials, the manufacturer should take into account the entrapment hazards that can occur through distortion of materials during use. NOTE 1 Test methods for entrapment are given in Annex D. NOTE 2 Possible entrapment situations are illustrated in Annex E. Openings shall have no parts that converge in the downward direction at an angle of less than 60° taking into consideration the following conditions (4.2.7.2).	P
4.2.7.2	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. Hazardous situations in which this type of entrapment can be encountered include the following: — completely bound openings through which a user can slide feet first or head first; — partially bound or V-shaped openings; — other openings (e.g. shearing or moving openings). a) Completely bound openings: Accessible completely bound openings with a lower edge more than 600 mm above the playing surface (see 3.5) shall be tested in accordance with D.2.1.	P

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Clause	Test Method & Test Requirement	Rating
	Probes C or E shall not pass through any opening unless it also allows the passage of the large head probe D. NOTE 1 Probe C represents a 'feet first' passage to an opening and probe E represents a 'head first' passage. b) Partially bound and V-shaped openings: Partially bound and V-shaped openings with an entrance at 600 mm or more above the ground shall be constructed so that either: 1) opening is not accessible when tested in accordance with D.2.2; or 2) if accessible at a position of 600 mm or more above ground when tested in accordance with D.2.2, depending on the angular orientation range of the opening (see Figure D.4), shall conform to the following: — 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. — 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 or probe D. — Range 3: No template test requirements. c) Other openings (e.g. shearing or moving openings): Non-rigid members (for example ropes) shall not overlap if, by doing so, they create openings that do not conform to the requirements for completely bound openings. Openings between the flexible parts of suspended bridges and any rigid side members shall be not less than 230 mm in diameter under the worst case condition of loading (see 4.2.2). Both loaded and unloaded situations shall be considered. NOTE 2 This requirement relates to the potential change in dimensions as a result of the stretching of bridge flexible supports (e.g. wire) over time. A typical suspended bridge is illustrated in Figure 12.	

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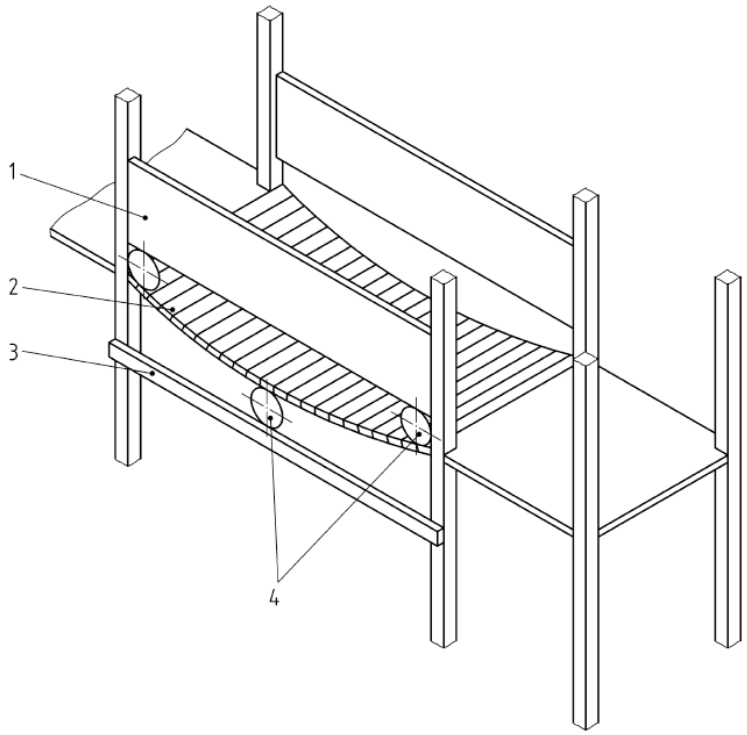
Clause	Test Method & Test Requirement	Rating
	 **Key** 1 rigid side members 2 suspended bridge 3 rigid side members 4 diameter 230 mm minimum **Figure 12 — Suspended bridge**	
4.2.7.3	Entrapment of clothing/hair Equipment should be constructed so that hazardous situations including the following, in which clothing entrapment can be encountered, are not created: a) gaps or V-shaped openings in which a part of clothing can become trapped while or immediately before the user is undergoing a forced movement; b) protrusions; and c) spindles/rotating parts. NOTE 1 The toggle test (see D.3) is restricted to the free space as practical experience has shown that natural materials and connections between different parts can vary over time. The definition of free space (see 3.5) does not include the three-dimensional area in which the falling movement takes place. Special consideration should be given when using elements of circular cross-section, e.g. round tubes or poles, to avoid clothing entanglement within the falling space. NOTE 2 This can be achieved by use of spacers or similar devices.	P

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<table>
<tr><th>Clause</th><th>Test Method & Test Requirement</th><th>Rating</th></tr>
<tr><td></td><td>Slides and fireman's poles shall be constructed so that openings located within the free space do not trap the toggle when tested in accordance with D.3.
Roofs shall be constructed so that they do not trap the toggle when tested in accordance with D.3.
Spindles and rotating parts shall be constructed so as to prevent entanglement of clothing or hair.
NOTE 3 This can be achieved by use of suitable covering or shields.</td><td></td></tr>
<tr><td>4.2.7.4</td><td>Entrapment of the whole body

Equipment should be constructed so that the following hazardous situations, which might cause entrapment, are not created:
a) tunnels into which children can crawl with their whole body; and
b) suspended parts which are heavy or have rigid suspension.
Tunnels shall have a maximum length of 10 000 mm and conform to the requirements given in Table 1.
Dimensions in millimetres
<table><tr><th>Requirements</th><th>Open one end</th><th colspan="3">Open both ends</th></tr><tr><td>Inclination</td><td>≤ 5° and upwards only when entering</td><td colspan="2">≤ 15°</td><td>> 15°</td></tr><tr><td>Minimum internal dimension [a]</td><td>≥ 750</td><td>≥ 400</td><td>≥ 500</td><td>≥ 750</td><td>≥ 750</td></tr><tr><td>Length</td><td>≤ 2 000</td><td>≤ 1 000</td><td>≤ 2 000</td><td>≤ 10 000</td><td>≤ 10 000</td></tr><tr><td>Other requirements</td><td>None</td><td>None</td><td>None</td><td>None</td><td>Provision for climbing e.g. steps or handles</td></tr><tr><td colspan="5">NOTE For tunnel slides, see EN 1176-3.</td></tr><tr><td colspan="5">[a] Measured at the narrowest point.</td></tr></table></td><td>P</td></tr>
<tr><td>4.2.7.5</td><td>Entrapment of the foot or leg

Equipment should be constructed so that the following hazardous situations, which might cause entrapment, are not created:
a) completely bound rigid openings in surfaces on which children can run or climb; and
b) footholds, handholds, etc. extending from these surfaces.
NOTE In the case of b) the entrapped foot or ankle can be severely injured if the user falls.
Surfaces intended for running/walking shall not contain gaps likely to cause foot or leg entrapment.
Gaps in the main direction of travel shall not be greater than 30 mm when measured across the direction of travel (see Figure 13).
This requirement does not apply to surfaces inclined more than 38° from the horizontal</td><td>P</td></tr>
</table>

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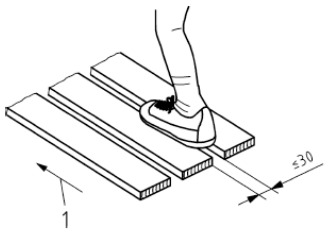
	Dimensions in millimetres  Key 1 direction of travel **Figure 13 — Measurement of gaps limited to 30 mm**	
4.2.7.6	Entrapment of fingers Equipment should be constructed so that the following hazardous situations, which may cause entrapment, are not created: a) gaps in which fingers can be trapped whilst the remainder of the body is moving or continues in forced movement, for example sliding, swinging; and b) variable gaps (excluding chains). Openings within the free space, where the user is subjected to forced movement, and/or holes which have a lower edge more than 1 000 mm above the potential impact area, when tested in accordance with D.4, shall conform to one of the following requirements: NOTE 1 Openings include tubes and pipes. c) the 8 mm finger rod (see Figure D.10a)) shall not pass through the minimum cross-section of the opening and the profile of the opening shall be such that the rod cannot be locked in any position when set in motion as given in D.4.2; or d) if the 8 mm finger rod passes through the opening, the 25 mm finger rod (see Figure D.10b)) shall also pass through the opening, provided that the opening does not permit access to another finger entrapment site. NOTE 2 Only to be used where there is a potential fall to an impact area below. See also adjacent platforms (4.2.8.5.4). NOTE 3 The test process D.4.2 for finger entrapment will only be conducted with the presence of free space and/or falling space. The ends of tubes and pipes shall be closed off to prevent the risk of finger entrapment. The closures shall not be removable without using tools. Gaps whose dimensions change during use of the equipment shall have a minimum dimension in any position of 12 mm. Splits in single pieces of wood shall not be considered as finger entrapment where the gap diminishes towards the centre of the wooden part.	P
4.2.8	Protection against injuries during movement and falling	P
4.2.8.1	Determination of free height of fall	P

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	Unless stated otherwise, determination of free height of fall shall be as given in Table 2. In determining the free height of fall, the possible movements of the equipment and of the user shall be taken into account. In general, this means that the maximum movement of the equipment shall be taken. In the case of roofs, or other features not intended for play, it is not required for them to be included in the free height of fall where access has not been encouraged. EXAMPLE Some examples of features that could encourage access are: — play feature, which can be accessed from the roof; — hand and foot holds for climbing; — arm or leg reach distance; — inclination of the roof; — roughness of the roof surface. The free height of fall (h) shall not exceed 3 000 mm (see Figure 14). For the determination of free height of fall, see Table 2.	

Table 2 — Free height of fall for different types of use

Type of use	Vertical distance
Standing	From foot support to surface below
Sitting	From seat to surface below
Hanging [a] (When full body support is provided by the hands only and the whole body can be lifted up to the hand support)	From hand support height to surface below
Climbing [a] (When body support is a combination of feet/legs and hands, e.g. climbing ropes or sliding/climbing poles)	Maximum hand support: 4 000 mm to the surface below (free height of fall measured from maximum hand support minus 1 000 mm to the surface below)
Bouncing	From suspension bed to the lowest point of falling space plus 900 mm
[a] Such equipment constructed for use as 'climbing' or 'hanging' shall not encourage access to positions for full body support with a free height of fall of more than 3 000 mm e.g. horizontal net (climbing), horizontal ladder intended for arm walking (hanging).	

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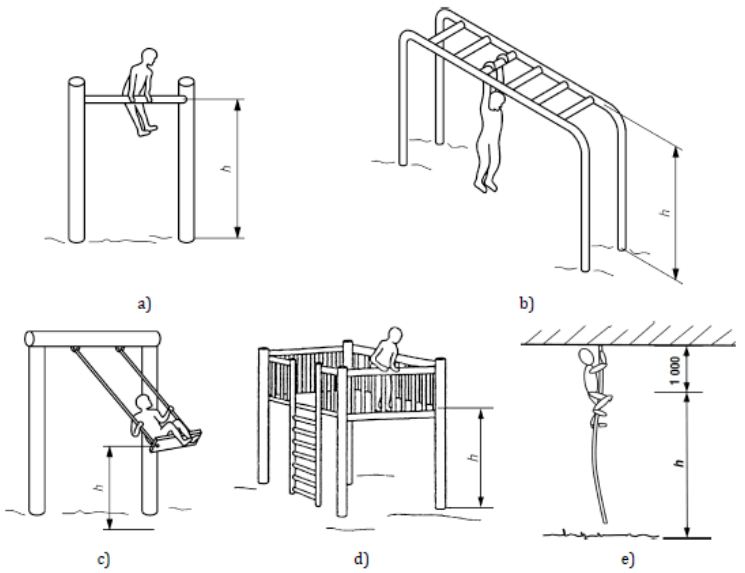
	Dimensions in millimetres  Key *h* free height of fall Figure 14 — Examples showing free height of fall	
4.2.8.2	4.2.8.2.1 General The requirements for falling space and impact area within this standard are intended to offer some protection to users during the first impact of a potential fall. These spaces and areas will also afford some protection to other users who might be circulating around the equipment items, but these requirements should be considered in addition to this standard as they are likely to be site specific and may be subject to national control. In particular the attention of the play area designer is directed to possible hazards associated with the close proximity of play structures intended for users of greatly different age groups and those in highly populated play areas such as those found in some schools. Care should be taken with seated dynamic equipment with significant motion, e.g. swings and certain types of rocking equipment, to discourage users of the surrounding play area from unintentionally coming into contact with the equipment. This can be achieved, for example, by placing the equipment at the perimeter of the play area.	P

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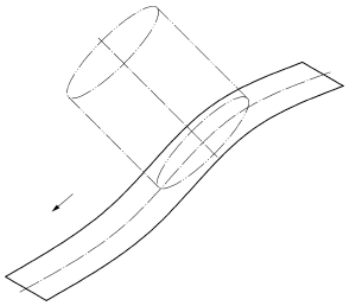
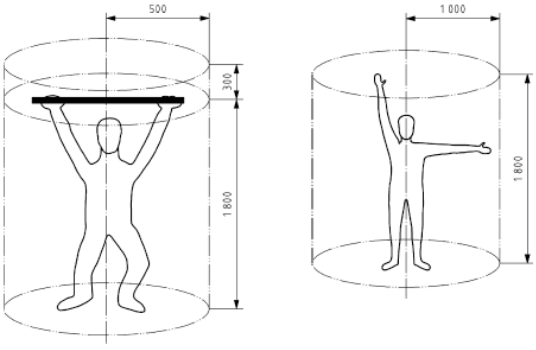
Clause	Test Method & Test Requirement	Rating
	4.2.8.2.2 Minimum space The minimum space shall consist of the following: a) space occupied by the equipment; b) free space, if any; and c) falling space. 4.2.8.2.3 Free space The free space is a series of cylindrical spaces representing the user (see Figure 15), originating from and perpendicular to the body bearing surface, along the forced path of the user. The cylindrical space is shown in Figure 16 and its dimensions are given in Table 3. In determining the free space, the possible movements of the equipment and the user shall be taken into account. Fireman's poles that are accessed via a platform or other starting point shall have a clearance of at least 350 mm from the pole to the edge of the adjacent structure. NOTE 1 This is to allow safe grabbing of the pole while reducing the risk of head impact on the adjacent structure.  Figure 15 — Determination of the free space: example of a slide Dimensions in millimetres  a) Hanging user b) Standing user Figure 16 — Cylindrical space	

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Table 3 — Dimensions of the cylinder for the determination of the free space

Dimensions in millimetres

Type of use	Radius	Height
Standing	1 000	1 800
Sitting	1 000	1 500
Hanging	500	300 above and 1 800 below hanging grip position
NOTE In case of hanging, h = 300 mm because of the possibility that the users pull themselves up [see Figure 16a)].		

NOTE 2 In certain cases, the dimensions of the free space can be altered. In some cases, these will be given in the parts of this standard covering individual types of equipment.

4.2.8.2.4 Extent of the impact area

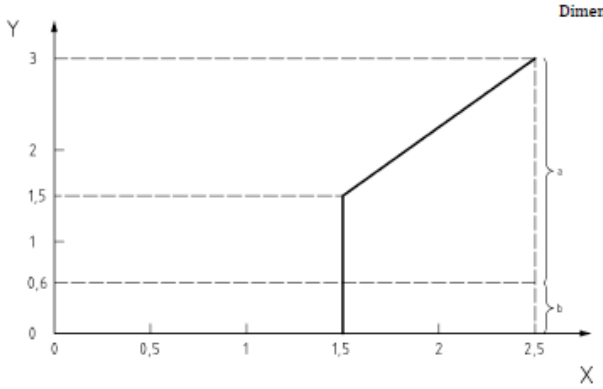
Dimensions of the impact area are shown in Figure 17.

In certain cases, such as a carousel giving the user a horizontal speed, the impact area may be extended to provide adequate protection against falling injuries.

In determining the impact area, the possible movements of the equipment and the user shall be taken into account.

NOTE These cases are also covered in the parts of this standard covering individual types of equipment.

Dimensions in metres



Key

Y free height of fall

X minimum dimension of impact area

a impact attenuating surfacing with requirements (4.2.8.5.2)

b surface with no impact attenuation test requirements, unless there is forced movement (4.2.8.5.3)

If 0 ≤ Y ≤ 1,5 then X = 1,5 (in metres)

If Y > 1,5, then X = 2/3 Y + 0,5

Figure 17 — Extent of the impact area

4.2.8.2.5 Extent of the falling space

Unless otherwise specified, the extent of the falling space shall be at least 1 500 mm around elevated parts of the equipment, measured horizontally and extending from the vertical projection plane below the equipment.

The falling space shall increase for free heights of fall above 1 500 mm together with the extent of the impact area (see 4.2.8.2.4). This requirement can be varied in certain cases, e.g. increased, in the case of forced movement or reduced, in the case of equipment installed on or against a wall or fully enclosed equipment.

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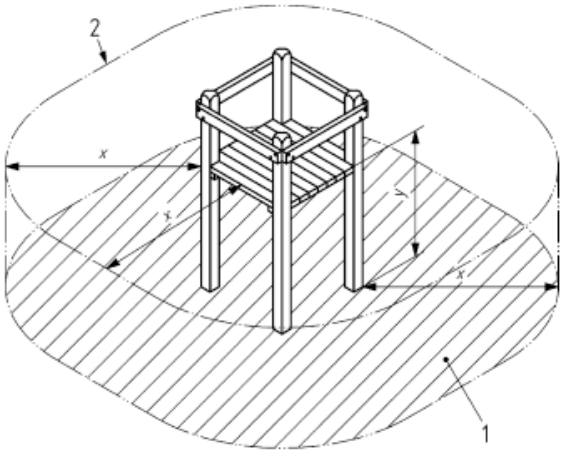
	In most cases there may be overlapping of falling spaces including impact areas. Unless specified in other parts of this standard, overlapping of the falling space where forced movement exists should not occur. Where two items with different fall heights are sited together the larger of the two impact areas will take precedence. Examples of falling space are given in Figures 18 and 19.  **Key** 1 impact area 2 falling space *x* extent of falling space *y* height of falling space **Figure 18 — Example of falling space and impact area of a platform**	

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	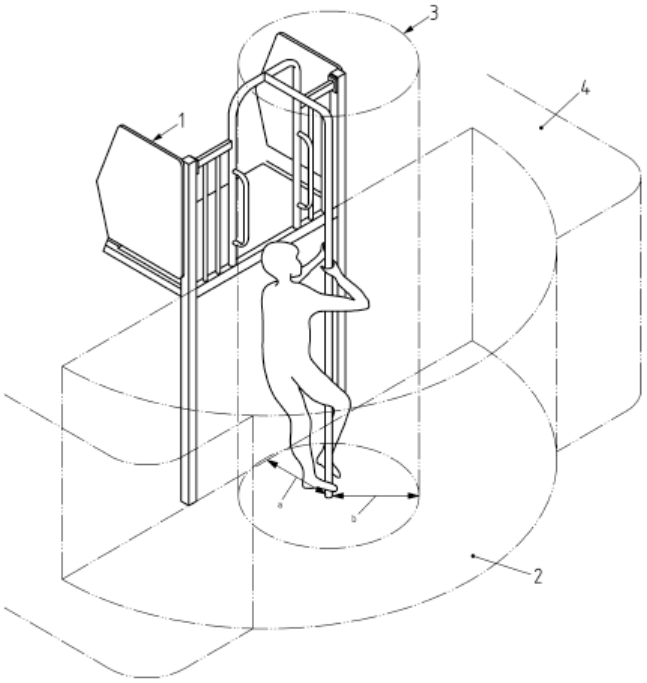 **Key** 1 space occupied by the equipment 2 falling space of the fireman's pole 3 free space of the fireman's pole 4 falling space of platform a fireman's pole minimum clearance (see 4.2.8.3) b free space radius (see 4.2.8.2.3) **Figure 19 — Example of falling space and free space of a fireman's pole**	
4.2.8.3	Protection against injuries in the free space for users undergoing a movement that is forced by the equipment Unless stated otherwise, there shall be no overlapping of adjacent free spaces, or of free space and falling space of two different pieces of equipment. NOTE 1 This requirement does not apply to the common space between pieces of equipment in a cluster. The free space shall not contain any obstacles that interfere with the passage of a user whilst undergoing a forced movement e.g. tree branches, ropes, cross beams etc. Parts of the equipment bearing or containing the user, or helping the user to keep balance, shall be permitted within the free space, e.g. a platform with a fireman's pole (see 4.2.8.2.3). Fireman's poles that are accessed via a platform or other starting point shall have a clearance of at least 350 mm from the pole to the edge of the adjacent structure. (4.2.8.2.3) NOTE 2 Exceptions to this requirement are given in the parts of this standard covering individual types of equipment. The free space shall not be intersected by main travelling routes at, or	P

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	through, the playground (e.g. pedestrian pathway). **Table 3 — Dimensions of the cylinder for the determination of the free space** Dimensions in millimetres **Type of use** / **Radius** / **Height** Standing / 1 000 / 1 800 Sitting / 1 000 / 1 500 Hanging / 500 / 300 above and 1 800 below hanging grip position NOTE In case of hanging, h = 300 mm because of the possibility that the users pull themselves up [see Figure 16a)]. NOTE 2 In certain cases, the dimensions of the free space can be altered. In some cases, these will be given in the parts of this standard covering individual types of equipment.	
4.2.8.4	Protection against injuries in the falling space The falling space shall not contain any obstacles onto which a user could fall and cause injuries, e.g. posts not flush with adjacent parts or exposed foundations (see 4.2.14). The falling space shall increase for free heights of fall above 1 500 mm together with the extent of the impact area In most cases there may be overlapping of falling spaces including impact areas. Unless specified in other parts of this standard, overlapping of the falling space where forced movement exists should not occur. (4.2.8.2.5) NOTE 1 The intention of this requirement is not to protect the user from minor knocks or bumps, that might lead to a bruise or sprain etc., as these types of injuries are possible in all situations. The following parts of play structures may be in the falling space: — adjacent parts of play structures with a difference in free height of fall of less than 600 mm; — parts of the equipment bearing or containing the user, or helping the user to keep balance; — parts of the equipment with an inclination of 60° or more from the horizontal. NOTE 2 In this case a falling user would only make a glancing contact with the equipment part.	P
4.2.8.5	Protection against injuries from the surface of the impact area	P
4.2.8.5.1	General	NC

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	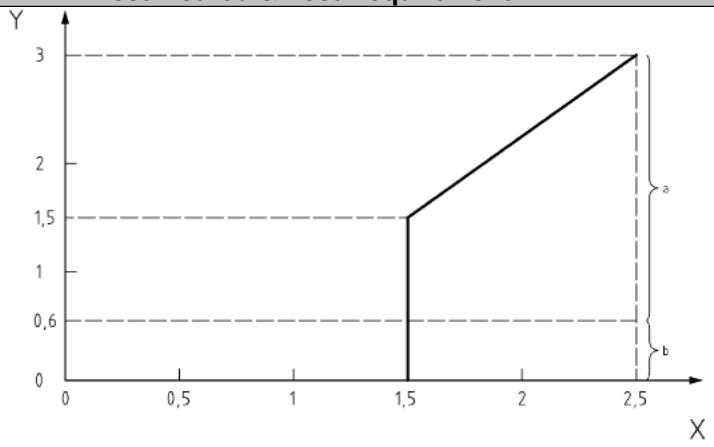 **Key** Y free height of fall X minimum dimension of impact area a impact attenuating surfacing with requirements (4.2.8.5.2) b surface with no impact attenuation test requirements, unless there is forced movement (4.2.8.5.3) If $0 \le Y \le 1,5$ then $X = 1,5$ (in metres) If $Y > 1,5$, then $X = 2/3\ Y + 0,5$ The surface of the impact area shall be free from sharp edged parts or projections and shall be installed without creating any entrapment situation (see 4.2.7). If loose particulate material is used it shall be installed to a layer thickness of 100 mm more than that determined in Table 4 or by testing to EN 1177. NOTE This is to allow for displacement of loose particulate material through use.	
4.2.8.5.2	Equipment with a free height of fall greater than 600 mm or with forced movement Beneath all playground equipment with a free height of fall of more than 600 mm and/or equipment causing a forced movement on the body of the user (e.g. swings, slides, rocking equipment, cableways, carousels, etc.), there shall be impact attenuating surfacing over the entire impact area. NOTE 1 Specific requirements for equipment causing a forced movement on the body of the user (e.g. swings, slides, rocking equipment etc.) are covered in other parts of EN 1176. The critical fall height of the surfacing shall be equal to, or greater than, the free height of fall of the equipment. Examples for commonly used impact attenuating materials are given in Table 4 with the related maximum free heights of fall, tested in accordance with EN 1177 and measured partly on site and partly in the laboratory with different test conditions. Where the installed surfacing can be verified as being in accordance with Table 4, no additional testing is required.	NC

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Clause	Test Method & Test Requirement	Rating

Material[a]	Description	Minimum depth[b]	Maximum free heights of fall
Where the installed surfacing is verified (e.g. sieve test) as being in accordance with this table or carries a test report according to EN 1177, no additional testing is required	mm	mm	mm
Turf/topsoil	—	—	≤ 1 000[d]
Bark	20 to 80 particle size	200	≤ 2 000
		300	≤ 3 000
Woodchip	5 to 30 particle size	200	≤ 2 000
		300	≤ 3 000
Sand or gravel[c]	0,25 to 8 grain size	200	≤ 2 000
		300	≤ 3 000
Other materials and other depths	As tested according to EN 1177		Critical fall height as tested

[a] For further information on specific material properly prepared for use in children's playgrounds see CEN/TR 16598 (Collection of Rationales for EN 1176–1 requirements).

[b] For loose particulate material, add 100 mm to the minimum depth to compensate for displacement (see 4.2.8.5.1).

[c] Sand and gravel shall be well rounded and washed to eliminate most of the silt or clay particles. Washed sand or gravel is considered to be from alluvial (naturally eroded) deposits and free from most silt or clay particles. For gravel this may commonly be described as 'pea shingle'. Uniformity coefficient D60/D10 < 3,0. Grain size can be identified by use of a sieve test, as in EN 933–1 (see Annex G).

[d] See NOTE 2 in 4.2.8.5.2.

The extent of the impact area is given in 4.2.8.2.4.

NOTE 2 Turf as well as having aesthetic appeal also has some useful impact attenuating properties. Experience has shown that, if well maintained, it is normally effective for fall heights up to 1 m and can be used without the need to conduct a test. For fall heights above 1 m, the performance of turf as an impact attenuating surfacing is dependent upon local climatic conditions. Therefore, as there are significant regional variations in climate throughout Europe it is advised that guidelines are given at a national level. Turf/topsoil is not intended to be tested in accordance with EN 1177.

NOTE 3 Impact attenuating materials are tested under specific conditions; therefore the performance of these materials can vary in use (e.g. materials under frozen conditions, rain or extreme heat) – see 6.2 of this standard. Impact attenuating materials should be adequately maintained. Failure to maintain such surfaces will result in the impact attenuation being significantly reduced.

NOTE 4 Loose fill material specifications in Table 4 are examples that can be accepted without further testing in accordance with EN 1177.

4.2.8.5.3	Equipment with a free height of fall not exceeding 600 mm and without forced movement It is not necessary to test the critical fall height of a surface beneath playground equipment having a free fall height of less than 600 mm and which does not cause forced movement on the body of the user	NC
4.2.8.5.4	Adjacent platforms	NC

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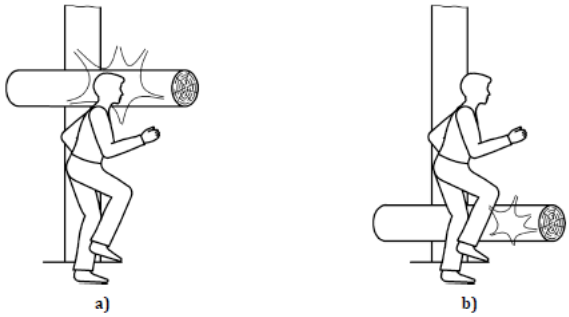
	If the free height of fall between adjacent platforms is more than 1 m, the surface of the lower platform shall present the necessary impact attenuating properties.	
4.2.8.6	Protection against injuries due to other types of movement The space in, on or around the equipment that can be occupied by the user shall not contain any obstacles that the user is not likely to expect and which could cause injuries if hit by the user. NOTE Examples of such obstacles are shown in Figure 20.  a) b) Figure 20 — Unexpected obstacles	NA
4.2.9	Means of access	P
4.2.9.1	Ladders The spacing of the rungs or steps shall conform to the head entrapment requirements given in 4.2.7.2. Rungs and steps shall be non-rotating and equally spaced. Equal spacing is required only between the rungs. It is not required between the highest rung and the platform or the ground and the first rung. The requirement for equal spacing does not apply to rope ladders. NOTE To assist the safe transfer from the ladder to the platform or its summit, the stiles of the ladder without the rungs or steps can continue vertically from the platform to the top of the barrier. Wooden components shall have positive connections that cannot be undone or shifted. Nails or wood screws shall not be used as the only form of connection. To allow for the foot to rest correctly on the rung or step there shall be an unobstructed space at the rear of the ladder of at least 90 mm from the centre of the rung or tread measured at 90° to the ladder. Rungs and steps shall be horizontal to within ± 3°. Ladders shall have rungs and/or stiles or shall have handrails that conform to the requirements for grip according to 4.2.4.6 or for grasp according to 4.2.4.7.	NA
4.2.9.2	Stairs	P

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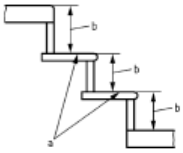
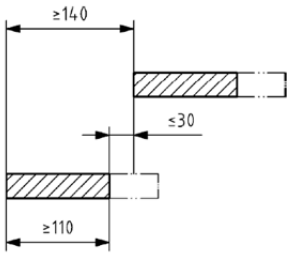
	Stairs with a free height of fall greater than 600 mm shall conform to the requirements of 4.2.4 concerning protection against falling. Guardrails and/or barriers shall be provided from the first step and shall conform to the requirements for grasp (4.2.4.7) or a handrail shall be provided. NOTE 1 This is to ensure that hand support is available for the entire run of the stair. For stairs leading to platforms up to 1 000 mm in height a guardrail may replace the barrier, providing the gap beneath the guardrail is less than 600 mm when measured from the middle of the tread. NOTE 2 For platforms above 1 000 mm, a combination of guardrails and barriers is allowed. NOTE 3 A panel type barrier with a thickness of less than 60 mm is considered in compliance with grasp requirements. The inclination of stairs shall be constant. Openings shall conform to the entrapment requirements given in 4.2.7.2. The treads shall be spaced equally, shall be of uniform construction, and shall be horizontal within ± 3°.  Key a stair tread b stair riser NOTE The risers are not required to be infilled. **Figure 21 — Parts of a stair** To provide adequate space for standing, the minimum projection of tread shall be 140 mm and the minimum depth of tread shall be 110 mm (see Figure 22). Dimensions in millimetres  **Figure 22 — Minimum projection and depth of tread** Where the overall height of the set of stairs is more than 2 000 mm above ground level, intermediate landings shall be provided at height intervals not exceeding 2 000 mm. Intermediate landings shall be at least as wide as the set of stairs and at least 1 000 mm long.	
4.2.9.3	Ramps	NA

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	Ramps shall be inclined at an angle of up to 38° to the horizontal and shall be of a constant angle. NOTE 1 Surfaces with a greater inclination are not regarded as ramps but can be used as a means of access. Ramps shall conform to the requirements of 4.2.4. For ramps leading to platforms up to 1 m in height a guardrail may replace the barrier, providing the gap beneath the guardrail is less than 600 mm. If guardrails are used, they shall be provided from the beginning of the ramp. Ramps shall be level within ± 3° across their width. To reduce the risk of slipping, ramps expected to be used by all children shall include means to improve the grip of the foot. NOTE 2 This can be achieved by use of suitable foot holds.	
4.2.9.4	Steep play elements For steep play elements provided on easily accessible parts of equipment the opening in the barrier shall be 500 mm maximum and the free height of fall of the platform shall be 2 000 mm maximum. NOTE This is to help the carer reach up to the user if necessary. Openings leading from a platform with a free height of fall of > 1 000 mm to a steep play element shall have hand supports that comply with grasp requirements.	NA
4.2.9.5	Easily accessible playground equipment Equipment designed to allow users to move quickly and freely onto it is to be considered as easily accessible. It is not the intention of this standard to give a definitive list of the types of possible access and associated requirements, but to provide guidance on the best way to tackle the issue of easy access. The following is an example of the hierarchy of three easy access possibilities: a) Ramps starting from the ground are the easiest means of access to the equipment. b) Stairs are the next easiest means of access to the equipment. c) Ladders are the least easy means of access to equipment in this example. There are many designs which can delay access to the equipment, thus giving more time for carers to intervene as appropriate. Such design features may include, but are not restricted to, movement, height or dimensional requirements e.g. reach distance or step height. NOTE 1 Carers include adults, responsible siblings and others who are looking after the user (see CEN/CLC Guide 14 for more information on carers). NOTE 2 Examples of access restriction by height or dimension might include but are not limited to ramps where the start is more than 600 mm above the ground or ladders where the lowest rung is more than 400 mm above the ground. The figure of 400 mm is a compromise between the need to limit access and the need to provide a safe means of exit by the same route.	

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4.2.10	Connections Connections shall be secured such that they cannot come loose of their own accord unless specifically designed to do so. Connections shall be safeguarded so that they cannot be undone without tools.	P
4.2.11	Consumable components Replaceable components should be protected against unauthorized intervention and should require little maintenance. Any lubricants leaking out should not soil the equipment or adversely affect its safe use.	P
4.2.12	Ropes	NA
4.2.12.1	Ropes fixed at one end For suspended ropes between 1 m and 2 m in length, the distance between ropes fixed at one end and fixed equipment shall be not less than 600 mm and the distance between ropes fixed at one end and swinging equipment shall be not less than 900 mm. Ropes fixed at one end shall not be combined with swings in the same bay (see EN 1176-2). For suspended ropes of between 2 m and 4 m in length, the distance between ropes fixed at one end and other parts of equipment shall be not less than 1 m. The rope diameter shall be between 25 mm and 45 mm. NOTE A stiffer rope, depending on its diameter and construction, will make it more difficult to create a loop, thus reducing the risk of strangulation. However, it will still allow good grip.	NA
4.2.12.2	Ropes fixed at both ends (climbing ropes) For a rope fixed at both ends, typically for climbing up and not part of a larger net structure, it shall not be possible to make a loop in the rope that is wide enough to let probe C pass through (see Figure D.1) nor probe E (see Figure D.1) pass through. NOTE 1 This requirement is intended to remove the risk of strangulation. The rope diameter shall meet the grip requirements given in 4.2.4.6. NOTE 2 Ropes with sufficient roughness allow for a good grip. This can be achieved, for example, by using outer strands with a diameter of at least 6 mm. When a rope fixed at both ends is used in conjunction with another element, care shall be taken not to create entrapment situations, see 4.2.7.2.	NA
4.2.12.3	Wire ropes Wire ropes shall be unstressed and shall be made from galvanized or corrosion-resistant wire.	NA

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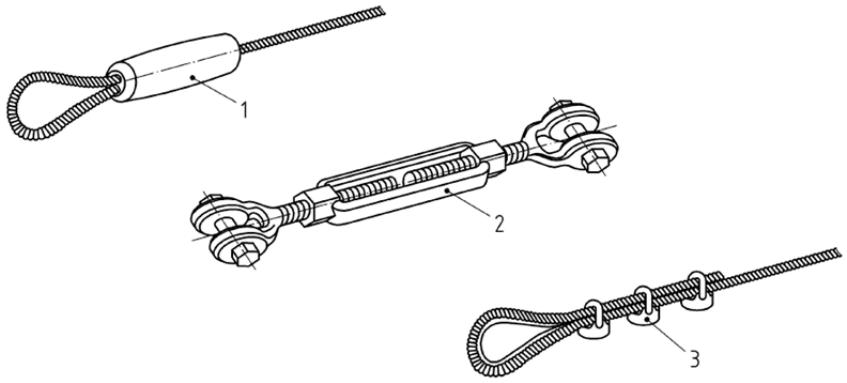
Clause	Test Method & Test Requirement	Rating
	Ferrules shall conform to EN 13411-3 and the rope end shall coincide with the edge of the grip. Wire rope grips shall be utilized in accordance with EN 13411-5. If accessible and the thread ends protrude more than 8 mm, they shall only be used outside the minimum space or shall be covered by suitable means. The ends of the turnbuckles shall be closed (see Figure 23) and shall be made from corrosion-resistant material. It shall not be possible to undo turnbuckles without a tool.  **Key** 1 ferrule 2 turnbuckle 3 wire rope grips **Figure 23 — Example of ferrules, turnbuckles and wire rope grips**	
4.2.12.4	Sheathed wire ropes When sheathed wire ropes are used for climbing ropes, climbing nets, hanging ropes and the like, each strand shall be sheathed with yarn made from synthetic or natural fibres. The sheath shall not contain monofilament. NOTE The wires inside the strands make it more difficult for the ropes to be intentionally damaged and thus reduce any hazards.	NA
4.2.12.5	Fibre ropes (textile type) Fibre ropes shall either: a) conform to EN ISO 9554 or EN ISO 2307; or b) the manufacturer shall supply a work certificate stating the material used and the safe working load. In the case of climbing ropes, climbing nets, hanging ropes and the like, the strands shall have a soft and non-slip covering, e.g. hemp or equivalent material. Monofilament plastic ropes or ropes made from similar materials shall not be used.	NA
4.2.13	Chains	NA

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	Chains for playground equipment shall conform to the dimensional requirements in EN 818-2:1996+A1:2008, Table 2 or EN 818-3:1999+A1:2008, Table 2 as a minimum and, when tested in accordance with D.5, shall conform to one of the following requirements: a) the 8,6 mm rod (see Figure D.13) shall not pass through the minimum cross-section of the chain opening, NOTE When "8-mm-short-link-chains" wear, the openings can increase. If the opening on a worn chain is greater than 8,6 mm, a risk assessment can be carried out to confirm whether replacement is necessary. or where a connection is made b) if the 8,6 mm finger rod passes through the opening, the 12 mm rod (see Figure D.13) shall also pass through the opening.	
4.2.14	Foundations The foundations shall be designed such that they do not present a hazard (tripping, impact). In loose fill surfacing (e.g. sand), foundations shall be installed or laid in accordance with one of the following: a) so that pedestals, footings and fixing elements on the equipment are at least 400 mm below the playing surface or; NOTE 1 Post shoes are not considered foundations. b) if the tops of the foundations are as shown in Figure 24 at least 200 mm below the surfacing; or c) so that they are covered by items of equipment or equipment parts (e.g. central foundation of a roundabout). Any parts that protrude from the foundations such as the ends of screws shall be at least 400 mm below the playing surface unless they are effectively covered and finished as described in 4.2.5. Additional measures should be taken for equipment in which the stability depends on only one cross-section. Foundations of one post equipment shall be accessible for periodic inspection. The choice and installation of impact attenuating surfacing should be carefully planned in order to allow for inspections and if access to the foundations is required. For example, for synthetic surfacing, this may require the surfacing to be cut-back and re-laid. NOTE 2 When components are embedded in concrete there is a risk of corrosion or rotting. The high rate of corrosion or rotting under dynamic loading endangers the stability of the anchorage of units in which the stability depends on only one cross-section, or in which the stability is provided by two-legged members or rows of members. NOTE The basic level mark given by the manufacturer on the equipment shows the level of the playing surface. It is advised to maintain this basic level.	NC

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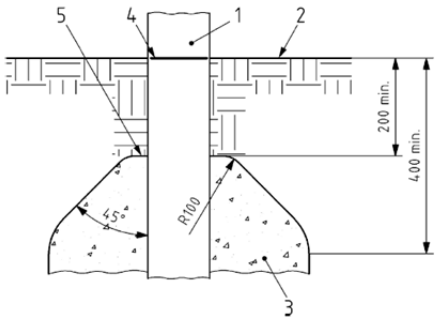
	Dimensions in millimetres  **Key** 1 post 2 playing surface 3 foundation 4 basic level mark 5 top of foundation NOTE The basic level mark given by the manufacturer on the equipment shows the level of the playing surface. It is advised to maintain this basic level. **Figure 24 — Example of foundations**	
4.2.15	Heavy suspended rigid beams Rigid suspended beams are deemed heavy when they have a mass of 25 kg or more. There shall be a ground clearance of at least 400 mm underneath heavy suspended rigid beams, (see Figure 25). The ground clearance is measured as the distance between the lowest point of the lower edge of the heavy suspended rigid beam and the surface below. The heavy suspended rigid beam shall be so constructed that all changes in the profile of the beam shall have a radius of at least 50 mm. The range of movement (a in Figure 25) shall not exceed 300 mm and shall not go beyond the support posts. The distance between the support posts and the heavy suspended rigid beam (b) shall not be less than 230 mm throughout its full range of movement.	NA

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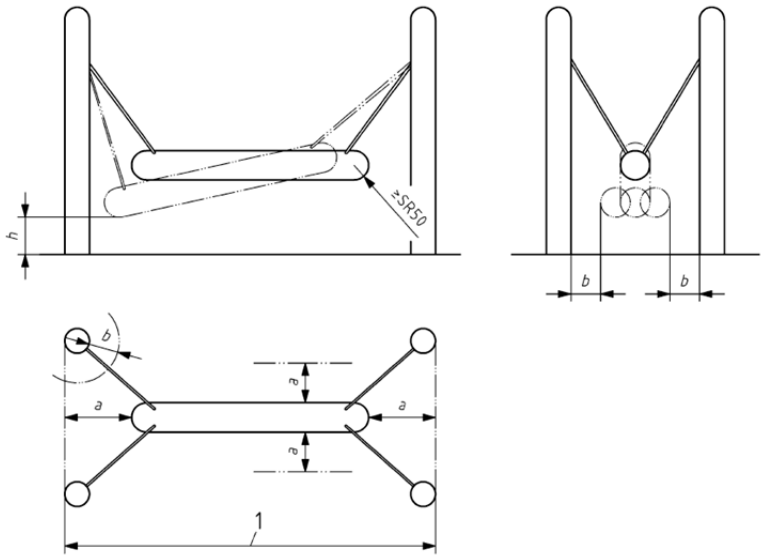
	Dimensions in millimetres  **Key** *a* range of movement *b* free space towards standing construction, ≥ 230 mm *h* ground clearance 1 maximum deflection **Figure 25 — Example of a heavy suspended rigid beam**	
4.2.16	Bouncing facilities	NA
4.2.16.1	General A bouncing facility with a suspension bed smaller than 1,44 m2 is considered as a small bouncing facility. NOTE Bouncing facilities with a suspension bed ≥ 1,44 m2 are considered as large bouncing facilities. The extent of the falling space of a suspension bed of a small bouncing facility shall be 1 500 mm. The extent of the falling space of a suspension bed of a large bouncing facility shall be 2 000 mm. When a suspension bed gives a user a predetermined jumping direction to outside of the suspension bed, the extent of the impact area to that direction shall be at least 3 000 mm. Unprotected edges within the falling space that the user can hit shall be rounded with at least 20 mm radius. The maximum allowed height of any point of the suspension bed is 600 mm measured from the surrounding ground or platform of the playground equipment 1 500 mm away from that specific point (see Figure 26). In case of failure of the suspension bed or its supports (spring, rubber band etc.) the user shall not fall more than 600 mm unless the impact area below has an adequate level of impact attenuation equivalent to the free height of fall of the suspension bed. There shall be no dangerous obstacles under or	NA

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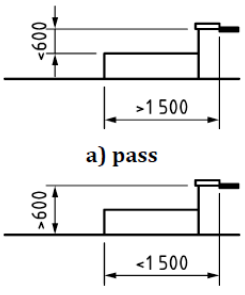
Clause	Test Method & Test Requirement	Rating
	around the suspension bed, onto which a user could fall or otherwise be injured. For a bouncing facility the extent of the free space shall be 1 500 mm measured horizontally from any point at the perimeter and 3 500 mm above the suspension bed. During a physical weight test according to 4.2.2, the minimum ground clearance shall be ≥ 100 mm. NOTE 1 This is to prevent unintended contact with the ground while jumping. During a dynamic physical test according to D.6 the rebound effect of the bouncing facility shall not be more than 700 mm above the suspension bed. NOTE 2 This is to prevent the user bouncing too high and reaching a falling height greater than the adequate level of impact attenuation of the adjacent surface. Consideration shall be given to the design of the equipment and to the layout of the surrounding area in order to avoid jumping from surrounding installations (other than the enclosure) onto the suspension bed. Suspension beds made out of textile shall maintain 80 % of their initial tensile strength according to EN ISO 13934-1 after exposure to light and UV, according to EN ISO 4892-3, for a minimum period of 400 h. Large bouncing facilities shall have a sufficient ground clearance under the suspension bed. During the physical test according to 4.2.2, the clearance below the suspension bed shall remain greater than 230 mm. If this cannot be achieved, access under the suspension bed shall be prevented in a way that the test probe E cannot pass any opening leading under the suspension bed. NOTE 3 This is to protect non-users from getting squeezed between the ground and the suspension bed. Openings in the suspension bed shall not be greater than 30 mm measured in the smallest direction. Under a static weight of 69,5 kg applied to the middle of the suspension bed, any opening shall not allow passage of the test probe E. Access to the space under the suspension bed shall be provided for cleaning. Dimensions in milli  **Figure 26 — Acceptable and not acceptable solutions due to height of the suspension be**	
4.2.16.2	Enclosures of bouncing facilities	NA

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Clause	Test Method & Test Requirement	Rating
	Where enclosures are provided, a risk assessment shall be made before allowing an enclosure for bouncing facilities in unsupervised settings. An enclosure, where climbing is not encouraged and with a minimum height of 1 800 mm, may be introduced to reduce the falling space or to prevent users from falling from the suspension bed. Sections of the enclosure above the height of 2 400 mm shall be unclimbable. The enclosure shall withstand a horizontal force of (800 ± 50) N applied to the centre of each enclosure section. Net yarns shall have a minimum diameter of 2 mm to reduce the risk of cutting fingers of users.	
5	Verification of compliance and reports	
6	Information to be provided by the manufacturer/supplier	NC
6.1	Information to be provided by the manufacturer of playground equipment	NC
6.1.1	General product information	NC
6.1.2	Pre-information	NC
6.1.3	Installation information	NC
6.1.4	Inspection and maintenance information	NC
6.2	Information to be provided by the manufacturer or supplier of impact attenuating surface	NC
6.2.1	Pre-information for impact attenuating surfacing	NC
6.2.2	Installation information for impact attenuating surfacing	NC
6.2.3	Inspection and maintenance information for impact attenuating surfacing	NC
6.2.4	Identification of impact attenuating playground surfacing	NC
7	Marking	NC
7.1	Equipment identification	NC
7.2	Basic level mark	NC
Annex A-H	Details see EN 1176-1:2017+A1:2023	

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2. EN 1176-3:2017 Playground equipment and surfacing Part 3: Additional specific safety requirements and test methods for slides

Scope:

1. This European Standard specifies additional safety requirements for slides intended for permanent installation for use by children. The aim is to provide protection to the user against possible hazards during use. Where the main play function is not sliding, the relevant requirements in this part of EN 1176 may be used, as appropriate.
2. This document is not applicable to waterslides, rollerways or slide installations where auxiliary equipment such as mats or sledges are used. This document is not applicable to inclined surfaces that do not contain and guide the user, e.g. banister rails (inclined parallel bars).

Sample size/weight::	2500 x 1800 x 3400 mm / 225 kg (claimed by client)	Total number of users:	5
Age range:	3-12	Number of tested samples:	1

Clause	Test Method & Test Requirement	Rating
2	Normative references	
3	Terms and definitions	
4	Safety requirements	
4.1	General Slides shall conform to EN 1176-1 unless otherwise specified in this part of EN 1176.	P
4.2	Access Access to the starting section shall be by means of an access ladder, stairs, climbing section or device. In the case of embankment slides, access to the starting section may be gained directly from the mound. For free-standing slides, the maximum vertical height that the first stairs can reach without a change in direction or offset, by a minimum width of the means of access, shall be 2 500 mm. Where the starting section of a slide is easily accessible the free height of fall (h) shall be 1 000 mm maximum unless guarding is provided (see 4.3.2). For all attachment slides with a fall height greater than 1 000 mm, a rail or crossbar across the access opening shall be provided (see Figure 1a)). The rail or crossbar shall be positioned between the platform guard rail or barrier and the start of the sliding section. The height of the rail or crossbar shall be between 600 mm and 900 mm above the starting section.	P

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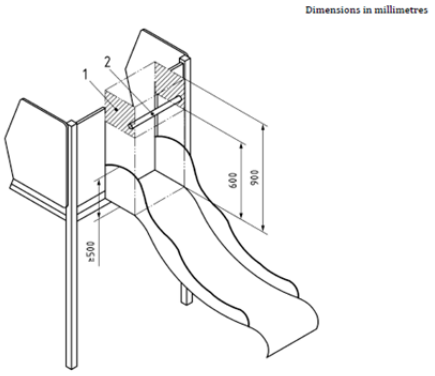
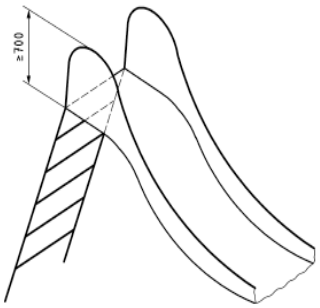
	For attachment slides with a starting section or barrier beyond the edge of the platform, the area of the starting section between the rail or crossbar and the platform shall comply with the same requirements as platforms in EN 1176-1. NOTE Such requirements include the height of guard rail or barrier.  Key 1 zone representing all the possible positions of a rail or crossbar 2 crossbar a) Example of lateral protection of a starting section for attachment slides over 1 000 mm and zone for the possible position of a rail or crossbar  b) Example of lateral protection of a starting section of a free-standing slide Figure 1 — Examples of lateral protection	
4.3	Starting section	P
4.3.1	Length and angle Each slide shall have a starting section of at least 350 mm length. The starting section shall have a downward slope tolerance from 0° to 5° in the direction of the sliding section, the measurement being made at the centreline of the starting section. For attachment slides the platform may be used as a starting section.	P

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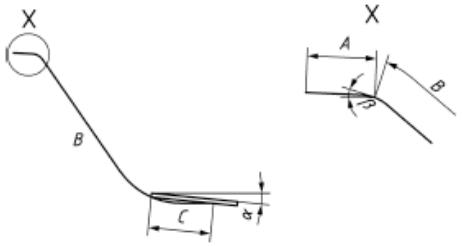
Clause	Test Method & Test Requirement	Rating
	 **Key** A starting section measured along the surface of the slide B sliding section measured along the surface of the slide C run-out section measured along the surface of the slide α maximum declination of the run-out section β maximum declination of the starting section **Figure 2 — Illustration of the position of the sections of a slide**	
4.3.2	Guarding section The starting section shall have a guarding section conforming to the barrier requirements of EN 1176-1 when one of the following applies: — the length of the starting section is more than 400 mm; — the starting section is easily accessible and has a free height of fall of more than 1 000 mm; — the free height of fall of the starting section is more than 2 000 mm. The guarding section shall either be a continuation of the lateral protection or be outside the plane of the lateral protection. When the guarding section is separate from or outside the plane of the lateral protection, the maximum vertical or horizontal offset shall be less than 89 mm. For attachment slides, the opening in the barrier shall be the same as the width of the starting section or guarding section. For attachment slides where all or part of the starting section is beyond the platform edge, the guarding section shall have a height of at least 500 mm at some point (see Figure 1a)). For attachment slides where the platform is used as the entire starting section, the requirements for protection against falling in EN 1176-1:2017, 4.2.4, apply. For free-standing slides, the guarding section shall have a height of at least that required for platforms at one point (see Figure 1b)).	P
4.3.3	Width The width of the starting section shall be equal to that of the sliding section. The starting section shall be designed so that it is aligned with the direction of the initial sliding movement. If the starting section is a platform or the extension of a platform the starting section may be greater in width than the sliding section.	P
4.3.4	Lateral protection (sides)	P

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	The lateral protection of the starting section shall be a continuous unbroken extension of the lateral protection of the sliding section. The construction of the lateral protection may be from multiple components. Any joints should be free from entrapment and not present a hazard to users. Any variations in the angle of declination of the top of the lateral protection in the sliding direction shall be made with a radius of at least 50 mm at some point.	
4.4	Sliding section	P
4.4.1	Length and angle The length of the initial straight sliding section shall not exceed 7 000 mm. The length of the second and subsequent straight sliding sections after a bend shall not exceed 5 000 mm. NOTE 1 Background information and rationale regarding limiting straight sliding sections are given in informative Annex B. The angle of declination to the horizontal of the sliding section shall not exceed 60° at any point and shall not exceed an average of 40°. The declination of the sliding section shall be measured from the centreline. If the changes in angle of declination of slides are greater than 15°, other than for the transitional part between the starting section and the sliding section, the angle shall have a radius as follows: a) for the initial 2 000 mm change in height, at least 450 mm; and b) for the remainder of the slide, at least 1 000 mm. NOTE 2 This to help prevent the user from becoming involuntarily airborne.	P
4.4.2	Width When measured in accordance with Figure 3 and Figure 5b) (for flat bed slides) open and straight, non-tunnel slides with sliding sections exceeding 1 500 mm in length shall have a width (w) of the sliding section of either: a) less than 700 mm; or b) more than 950 mm. Each track of a multi-track slide shall have a width of less than 700 mm. When measured in accordance with Figure 3, helical or curved slides (see Figure 4 for examples) shall have a width (w) of the sliding section of less than 700 mm.	P

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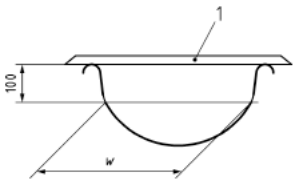
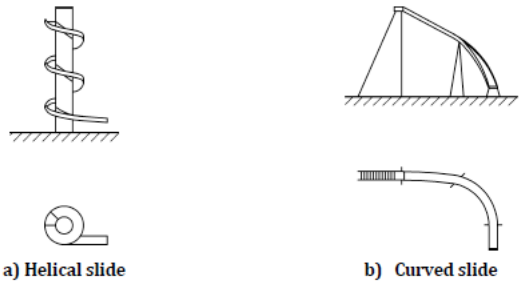
	Dimensions in millimetres  **Key** 1 rule *w* width of sliding section **Figure 3 — Measurement of width of sliding section**  **a) Helical slide** **b) Curved slide** **Figure 4 — Typical examples of helical and curved slides**	
4.4.3	Sides and profile of the slide The sliding section shall have solid lateral protection of heights (p) (see Figure 5a) and Figure 5b)) in accordance with Table 1, when measured perpendicular to the sliding section surface. In the case of flat-sided slides, the sides shall not tip out from the vertical by more than 30° (see Figure 5b)). In the case of curved profile sided slides, the profile of the sliding section shall be designed in such a way that the short arm of the template (see Figure 5c)) remains horizontal when placed with the long arm perpendicular to the sliding surface at the highest internal point of the inner face of the side (see Figures 5d)) and Figure 5e)). **Table 1 — Height of lateral protection** Dimensions in millimetres **Free height of fall *h*** / **Height of lateral protection *p*** ≤ 1 200 / ≥ 100 > 1 200 ≤ 2 500 / ≥ 150 > 2 500 height / ≥ 500 Easily accessible (see EN 1176-1:2017, 3.24) > 2 000 / ≥ 500 The sides shall be perpendicular to the sliding surface or curved or angled at an obtuse angle to the sliding surface. The edges of the sides shall be rounded with a radius of at least 3 mm or provided with a means for protection from injury to the user.	P

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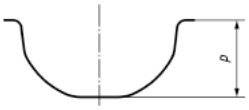
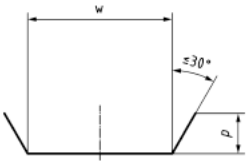
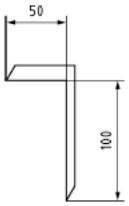
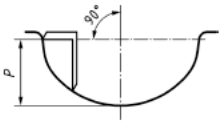
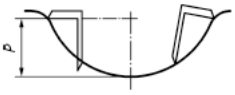
	In the case of multi-track slides, the track divider shall have a minimum height of 100 mm and shall be rounded with a radius of at least 3 mm. Track dividers shall be provided for the full length of the sliding section as a minimum.  a) Measurement of height of sides of curved profile sliding section  b) Measurement of width, height and inclination of sides of flat sided sliding sectio Dimensions in millime  c) Template for determining profile of curved profile sliding section  d) Application of template to curved profile sliding — Pass condition  e) Application of template to curved profile sliding section — Fail condition Key *p* height of lateral protection *w* width Figure 5 — Measuring of slide profile	
4.5	Run-out section All slides shall include a run-out section, either Type 1, where the run-out section is short with a long impact area, or Type 2, where the run-out section is long with a short impact area. The declination of the run-out section shall be 10° maximum (for Type 1) or 5° maximum (for Type 2) (see Figure 2). The minimum length of the run-out section shall be in accordance with Table 2. The height (H) of the end of the run-out section (see Figures 6 and 7) above the ground shall be as given in Table 2. It can be dangerous if users stop on the sliding section. Slides should be designed to prevent the user stopping unintentionally before reaching the run-out section.	P

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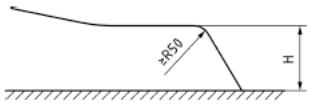
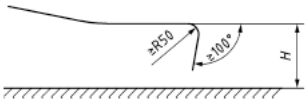
	The end of type 1 slide run-outs shall turn down into the ground with a radius of at least 50 mm or reverse at an angle of at least 100° in accordance with Figures 6 and 7. **Table 2 — Length and height of run-out section** Dimensions in millimetres Length of sliding section *B* / Minimum length of run-out section *C* / Height of the end of run-out section *H* — / Type 1 α = 10° max / Type 2 α = 5° max / — ≤ 1 500 / 300 / ≤ 200 > 1 500 ≤ 7 500 / > 500 with end of slide in accordance with Figures 6 or 7 / > 0,3 × length of sliding section, B / ≤ 350 > 7 500 / > 1 500 With end of slide in accordance with Figures 6 or 7 The end of type 1 slide run-outs shall turn down into the ground with a radius of at least 50 mm or reverse at an angle of at least 100° in accordance with Figures 6 and 7. Dimensions in millimetres  Key *H* height of the end of slide run-out **Figure 6 — Example of continuation of the end of the slide to the ground** Dimensions in millimetres  Key *H* height of the end of slide run-out **Figure 7 — Example of a slide ending above the ground**	
4.6	Surface of the slide The design of slides and accessible structures around them shall be such that no part of clothes can become trapped (see EN 1176-1:2017, D.3). The surface of the slide length and of the lateral protection (sides) should be manufactured in such a way as to obviate any alterations likely to cause injury after exposure to weathering or other stresses arising during use. If the slide surface is constructed from more than one piece of material it should be fabricated so as to eliminate gaps at the joints so that they inhibit the introduction of sharp objects such as razor blades and splinters. The preferred method of protecting against this problem is by manufacturing one piece slide surfaces.	P
4.7	Free space The free space starts at the end of the starting section and finishes at the end of the run-out section (see Figure 8). Certain slide features, e.g. rail or	P

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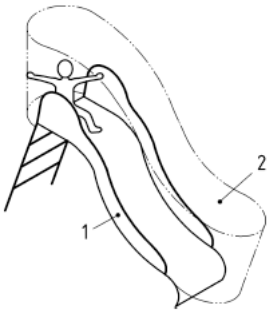
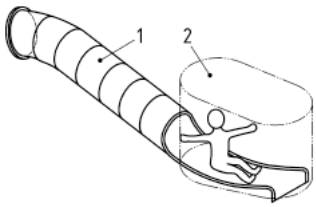
	crossbar, hoods or similar, may be present in the free space as they provide additional safety. If present, any such features shall conform to the relevant requirements in EN 1176-1, e.g. entrapment. Central supporting posts on spiral slides may be used in the free space. For open spiral slides, the height of the free space shall be 1 000 mm minimum (see EN 1176-1:2017, 4.2.8.2.3). In the case of multi-track slides, the free spaces may overlap.  a) Non-tunnel slide  b) Tunnel slide Key 1 space occupied by the equipment 2 free space Figure 8 — Examples of the free space of slide	
4.8	Impact area Different to the requirements given in EN 1176-1, the impact area shall be provided to a distance of at least 1 000 mm from the outer edge of the run-out section of the slide. End corners can be rounded off with a radius of maximum 1 000 mm (see Figure 9). The impact area for type 1 and a sliding section less than 1 500 mm shall be provided to a distance of at least 1 500 mm beyond the required run-out section. If the slide section is more than 1 500 mm, the impact area shall be provided to a distance of at least 2 000 mm beyond the required run-out section and 1 000 mm beyond the end of the required run-out section for type 2 (see Figure 9). The surface of the impact area around the run-out section shall have an adequate level of impact attenuation at least equivalent to a free height of fall of 1 000 mm. The impact area shall be provided to a distance of at least 1 000 mm around the run-out section.	NC

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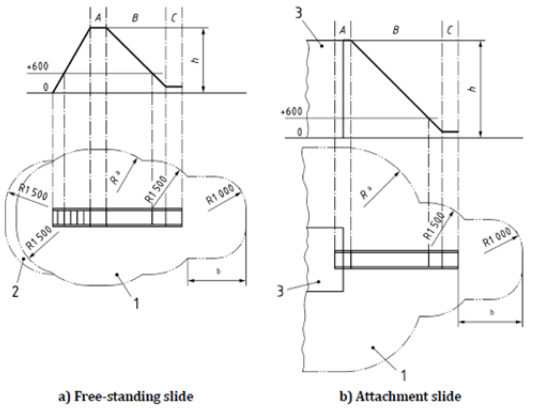
	Dimensions in millimetres  a) Free-standing slide b) Attachment slide Key *A* starting section *B* sliding section *C* run-out section 1 impact area 2 impact area surface with no test requirement (see EN 1176-1:2017, 4.2.8.5.3) 3 play structure *h* free height of fall R_a extent of the falling space depending on free height of fall *b* depending on the type of run-out section/length sliding section Figure 9 — Impact area of slides	
4.9	Tunnel and mixed tunnel slides	NA
4.9.1	Clearance Enclosed sections of tunnel slides shall have a minimum internal height of 750 mm, when measured perpendicular to the sliding surface, and a minimum internal width of 750 mm.	NA
4.9.2	Position Tunnel sections shall start at least at the end of the starting section and shall not extend into the run-out section. Tunnel sections shall be continuous over their whole length.	NA
5	Test reports	
6	Marking Slides shall be marked in accordance with EN 1176-1:2017, Clause 7. Marking shall be positioned on the slide in a location that will be visible when erected on site.	NC
Annex A-B	Details see EN 1176-3:2017	

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	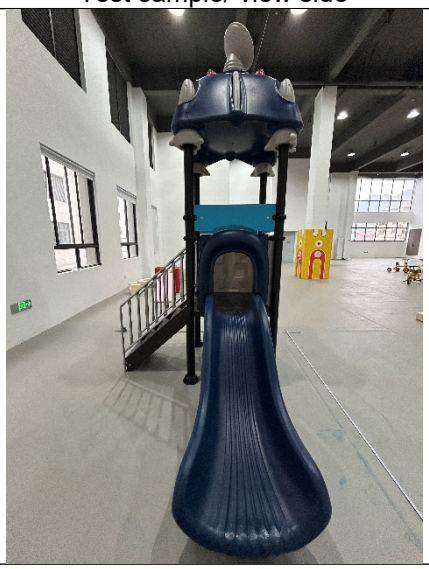

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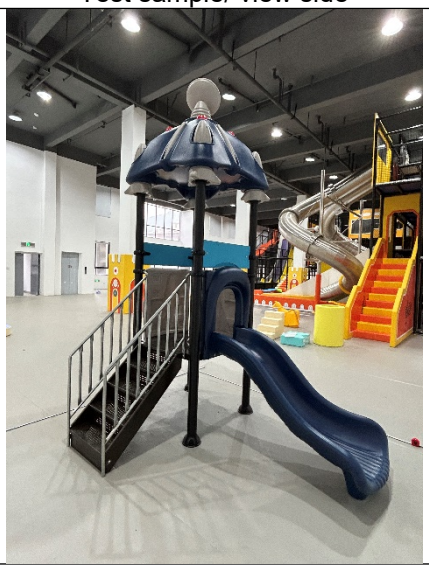
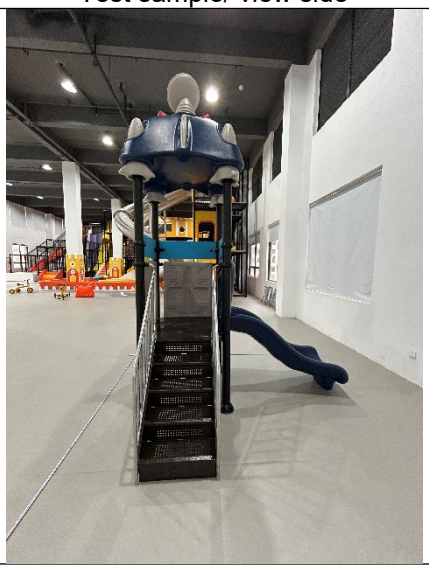
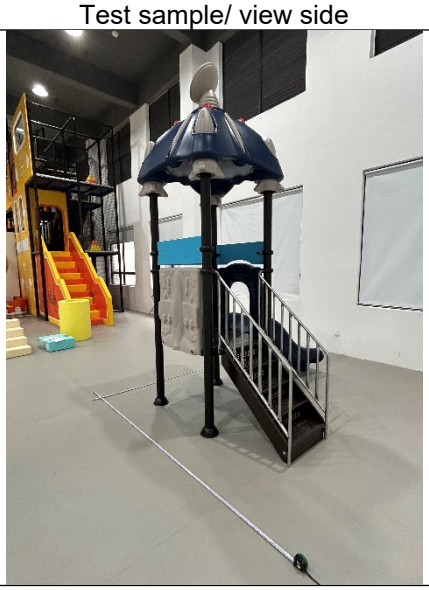
	
Test sample/ view side	**Test sample/ view side**
	

SGS authenticate the photo on original report only

Remark:

1. As requested by client, specific tests was not conducted according to EN 1176-1: 2017+A1: 2023 and EN 1176-3:2017, details see report content.

Result/Rating/Record Key(s)

1. Result/Rating Keys: P = Pass = Meet; F = Fail = Not Meet; NA = Not applicable = Not suitable; NR = NC = Test not conduct/requested per client request; C = Claimed; R = Recorded; D = Data only

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*** End of Report ***

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