INTERNATIONAL STANDARD

ISO 8124-4

Second edition
2014-10-01

Safety of toys —

Part 4: Swings, slides and similar activity toys for indoor and outdoor family domestic use

Sécurité des jouets —

Partie 4: Balançoires, glissoires et jouets à activité similaire à usage domestique familial intérieur et extérieur

Reference number
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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 181, *Safety of toys*.

This second edition cancels and replaces the first.edition (ISO 8124-4:2010) and amendment 1 (ISO 8124-4:2010/Amd.1:2012). This edition incorporates the amendments ISO 8124-4:2010/Amd.1:2012 and ISO 8124-4:2010/Amd.2:2014.

ISO 8124 consists of the following parts, under the general title *Safety of toys*:

— *Part 1: Safety aspects related to mechanical and physical properties*

— *Part 2: Flammability*

— *Part 3: Migration of certain elements*

— *Part 4: Swings, slides and similar activity toys for indoor and outdoor family domestic use*

— *Part 6: Certain phthalate esters in toys and children's products*

— *Part 8: Age determination guidelines*

The following parts are under preparation:

— *Part 5: Determination of total concentration of certain elements in toys*

— *Part 7: Requirements and test methods for finger paints*

Introduction

This part of ISO 8124 is largely based upon existing standards in the European Union (EN 71-8) and in the United States (ASTM F1148).

However, it should not be construed that a toy manufactured in compliance with this part of ISO 8124 will be in full compliance with relevant national toy safety requirements in the market where the product is intended to be distributed. The user of this part of ISO 8124 is therefore advised to be aware of relevant national requirements.

Compliance with the requirements of this part of ISO 8124 will minimize potential hazards associated with toys resulting from their use in their intended play modes (normal use) as well as unintended play modes (reasonable foreseeable abuse).

This part of ISO 8124 will not, nor is it intended to, eliminate parental responsibility in the appropriate selection of toys. In addition, this part of ISO 8124 will not eliminate the need for parental supervision in situations where children of various ages may have access to the same toy(s).

Safety of toys —

Part 4:
Swings, slides and similar activity toys for indoor and outdoor family domestic use

1 Scope

This part of ISO 8124 specifies requirements and test methods for activity toys for domestic family use intended for children under 14 years to play on or in.

Products covered by this part of ISO 8124 include swings, slides, seesaws, carousels, rocking toys, climbing frames, fully enclosed toddler swing seats and other products intended to bear the mass of one or more children.

Products not included within the scope of this part of ISO 8124 are:

a) fitness and sporting equipment unless attached to the activity toy;

b) equipment intended for use in schools, day care centres, kindergartens, public playgrounds, restaurants, shopping centres and similar public places;

c) juvenile care products such as, but not limited to, infant swings, playpens/enclosures, beds or furniture including picnic tables, cradle rockers and products specifically designed for therapeutic use.

Inflatable activity toys are included in the scope of this part of ISO 8124. However, a powered blower used to continuously inflate the toy is not covered by this part of ISO 8124 since it is considered to be a household appliance and covered by requirements given in IEC 60335-2-80.

See A.1.

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.

ISO 8124-1, *Safety of toys — Part 1: Safety aspects related to mechanical and physical properties*

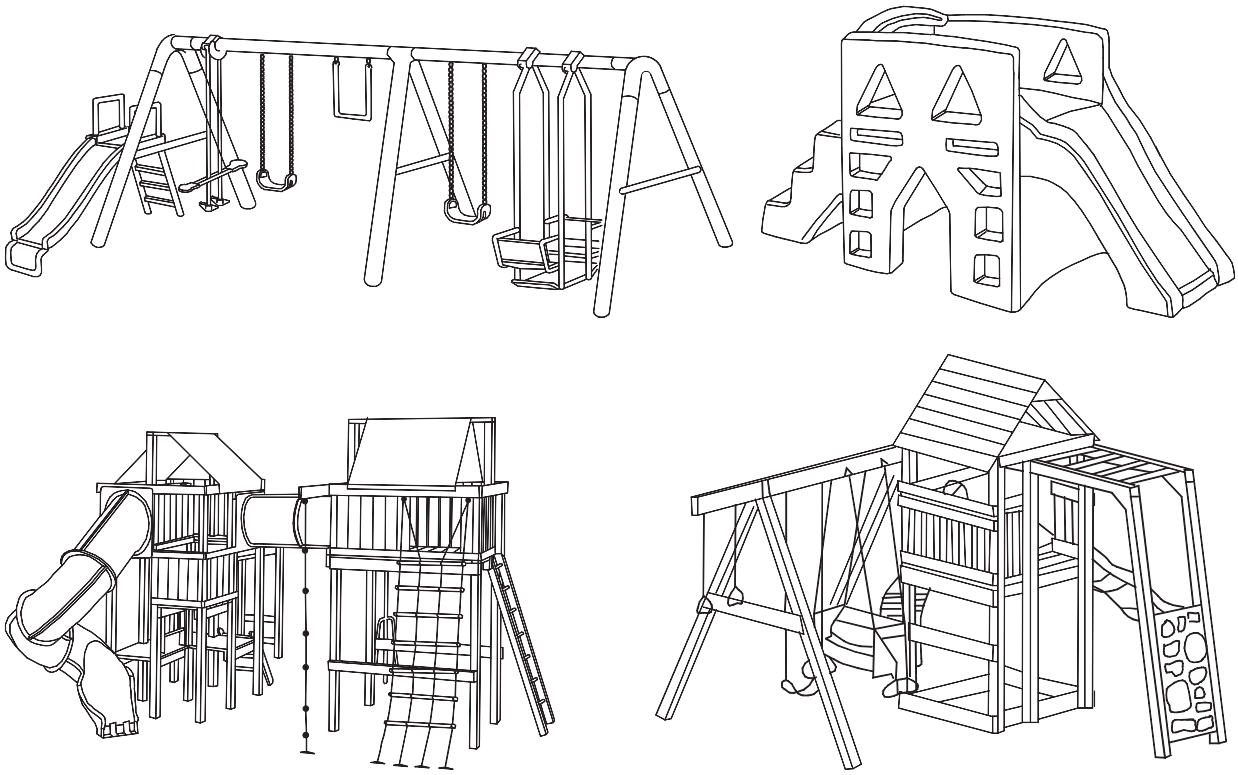
3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 8124-1 and the following apply.

3.1
activity toy
toy intended for family domestic use, intended to bear the mass of one or more children, the support structure of which remains stationary while the activity is taking place and which is intended for the performance by a child of any of the following activities: climbing, swinging, sliding, rocking, spinning, jumping, bouncing, crawling and creeping, or any combination thereof

EXAMPLE Swings, slides, carousels and climbing frames (see Figure 1).

Note 1 to entry: Aquatic toys, paddling pools, trampolines and ride-on vehicles are not considered as activity toys in the context of this part of ISO 8124.



"Not to scale"

Figure 1 — Examples of activity toys

3.2
anchor
device used to fix the toy to the ground surface

3.3
attachment slide
slide for which access to the starting section is possible only by passing via other equipment or parts of other equipment

3.4
barrier
device intended to prevent children from falling from elevated surfaces

3.5
crossbeam
bar or beam which forms a main load-bearing part of the toy

3.6
entrapment
condition in which a body, part of a body or clothing becomes caught and impedes withdrawal

3.7
forced movement
movement where the direction and the extent of the child's movement is determined by the operation of the equipment, for example swinging, sliding, rocking or revolving

3.8
free height of fall
greatest vertical distance from the intended body support, for example from the seat of a swing to the impact area below

3.9
free space
space in, on or around the activity toy that can be occupied by a user undergoing a forced movement by the equipment, for example swinging, sliding, rocking or revolving

Note 1 to entry: The definition of free space does not include the three-dimensional area in which a falling movement takes place.

3.10
fully enclosed toddler swing seats
fully enclosed single occupancy swing intended for young children who can sit upright unaided

Note 1 to entry: A seat is considered fully enclosed when a containment system is employed to support the child on all sides and in between the legs (see Figure 2).

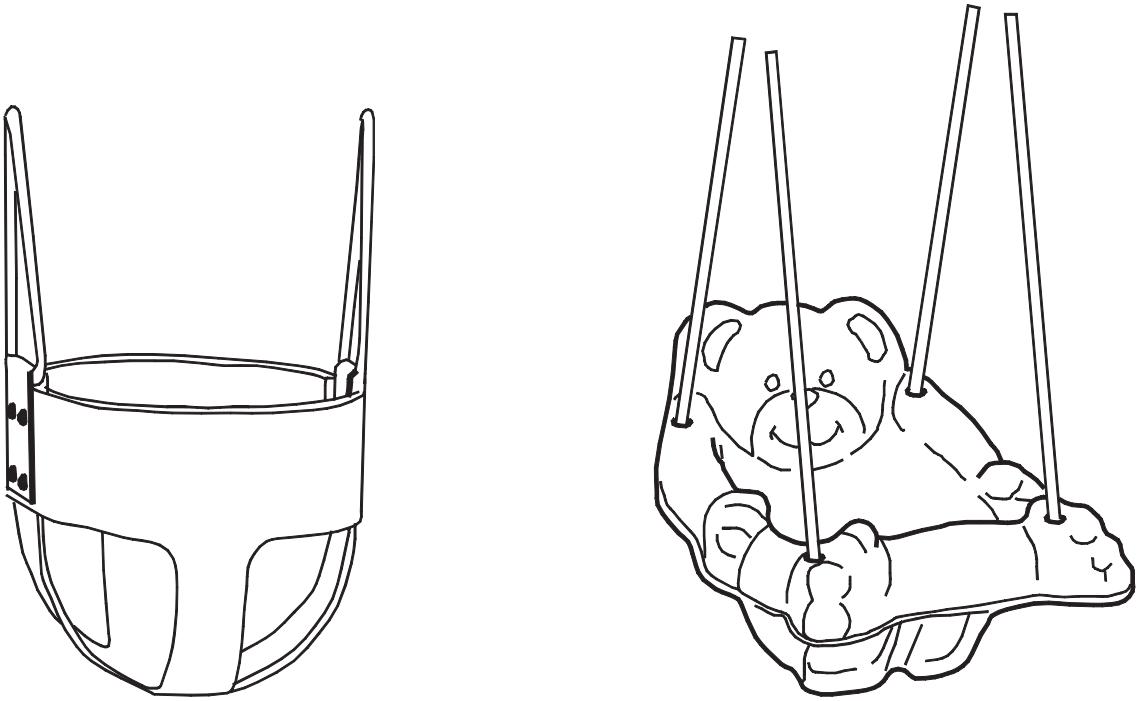


Figure 2 — Examples of fully enclosed toddler swing seat

3.11
impact area
area of a swing element that comes into contact with the test mass during an impact test in accordance with 6.4 (determination of impact from swing elements)

3.12
infant swing
stationary unit with a frame and a powered mechanism enabling an infant to swing in a seated position

Note 1 to entry: An infant swing is intended for use with infants from birth until the child is able to sit upright unassisted.

3.13
handrail
rail intended to assist the users to balance or steady themselves

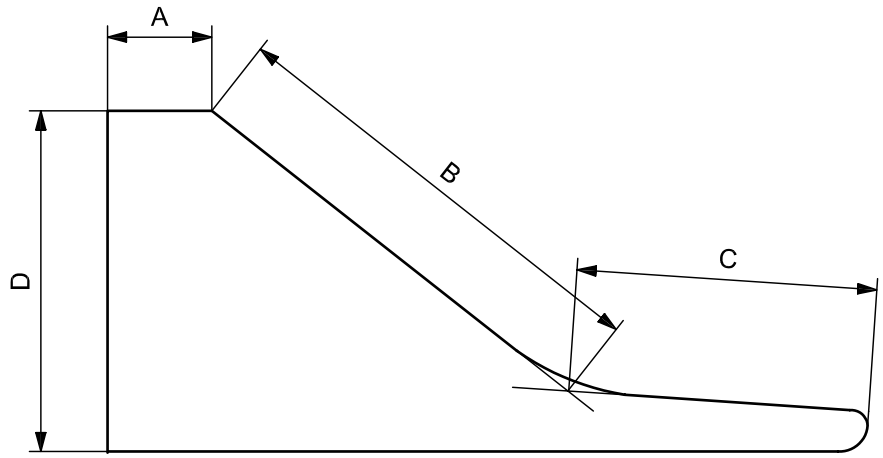
3.14
platform
any elevated substantially horizontal surface intended to be used by a child as a place for play or as a transition between components

Note 1 to entry: Slide starting sections less than 129 000 mm^2 are not considered platforms.

3.15
slide
structure with inclined surface(s) on which the user slides in a defined track

See Figure 3.

Note 1 to entry: Note1 to entry: Inclined planes, designed primarily for other purposes, such as roofs and ramps, do not constitute slides.



Key

A	starting section
B	sliding section
C	run-out section
D	height of slide
B+ C	slide length

NOTE The dimensions A, B, and C are measured at the centreline of the sliding surface. Each of these sizes represents one of the zones of the sliding surface. Each zone of the sliding surface is determined by the intersection of the curve of the sliding surface (taken at the bottom of the sliding surface) and the bisecting line of the angle formed between the zones of the sliding surfaces.

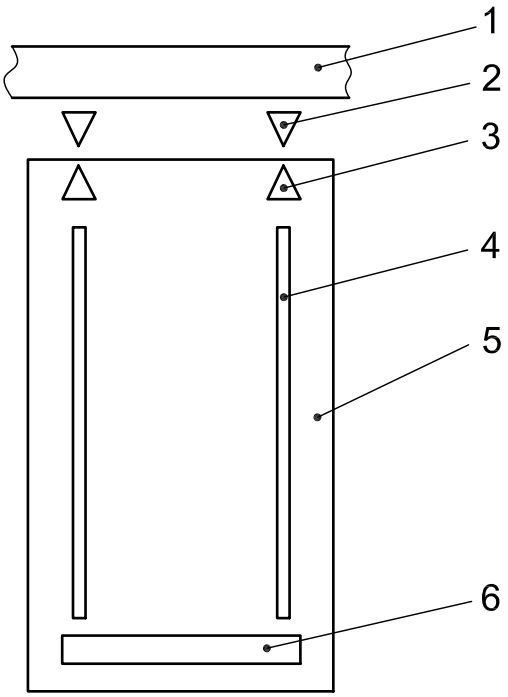
Figure 3 — Diagrammatic representation of a slide

3.16
suspension connector
device that forms the direct contact between a crossbeam and the swing device

See Figure 4.

3.17
swing
structure, normally intended to be attached to or incorporating a crossbeam, suspension connectors and a swing device with swing element, means of suspension and suspension coupling

See Figure 4.



Key

1	crossbeam/support member
2	suspension connector
3	suspension coupling
4	means of suspension
5	swing device
6	swing element (e.g. seat, rings, bar, gondola)

Figure 4 — Diagrammatic representation of a swing

3.18
inflatable activity toy
activity toy, with a structure made of flexible material, inflated by air, intended for children to play on or in

EXAMPLE Bouncy castle, inflatable slides (see Figure 5).

Note 1 to entry: There are two types of inflatable activity toys: one is kept inflated by a closure (valve) once inflated; the other is kept inflated only by the continuous input of air from a blower.

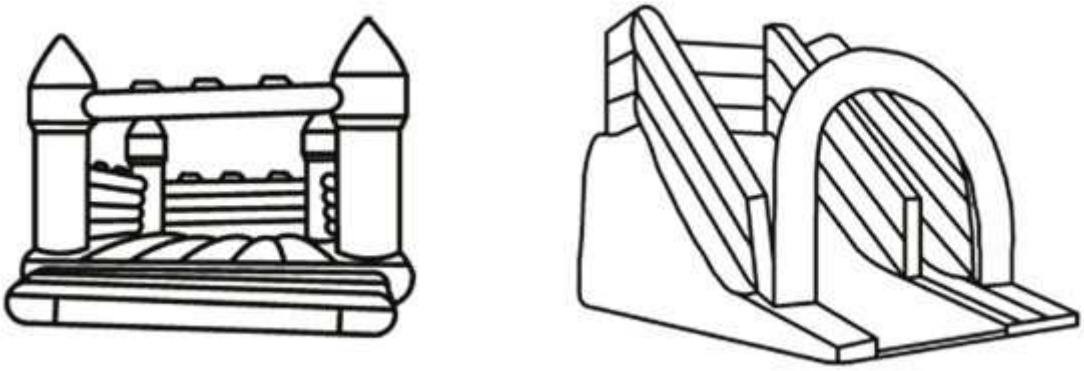


Figure 5 — Examples of inflatable activity toys

3.19
paddling pool
toy pool with a maximum depth of water of 400 mm measured between the overflow level and the deepest point within the pool

Note 1 to entry: A permanently installed pool would not be considered to be a toy.

Note 2 to entry: Examples of typical paddling pools can be found in the guidance document on the application of the European directive on the safety of toys (2009/48/EC), (http://ec.europa.eu/enterprise/sectors/toys/files/gd_doc8pools_en.pdf).

4 Requirements

4.1 General

See A.4.1.

4.1.1 Static strength

Activity toys, other than swings, shall not collapse when tested in accordance with 6.2.1 (strength of toys other than swings). After testing, the toy shall continue to comply with the relevant requirements of this part of ISO 8124. Requirements for swings are given in 4.7 (swings).

4.1.2 Maximum height

See A.4.1.2.

There shall be no part of the activity toy designed to encourage the child to climb, sit on or stand on, with a height of 2 500 mm or more when measured from the ground.

This does not include barriers, roofs, etc., that are not intended to be climbed, sat on or stood on.

Barriers, roofs, etc., that are not intended to be climbed shall be designed in such a way that climbing is not encouraged.

4.1.3 Corners and edges

See A.4.1.3.

Exposed corners and edges shall be rounded.

Corners and exposed edges on moving parts shall have a minimum radius of 3 mm. This does not apply to swing elements with a mass of 1 000 g or less, the corners and edges of which shall be rounded.

4.1.4 Protruding parts

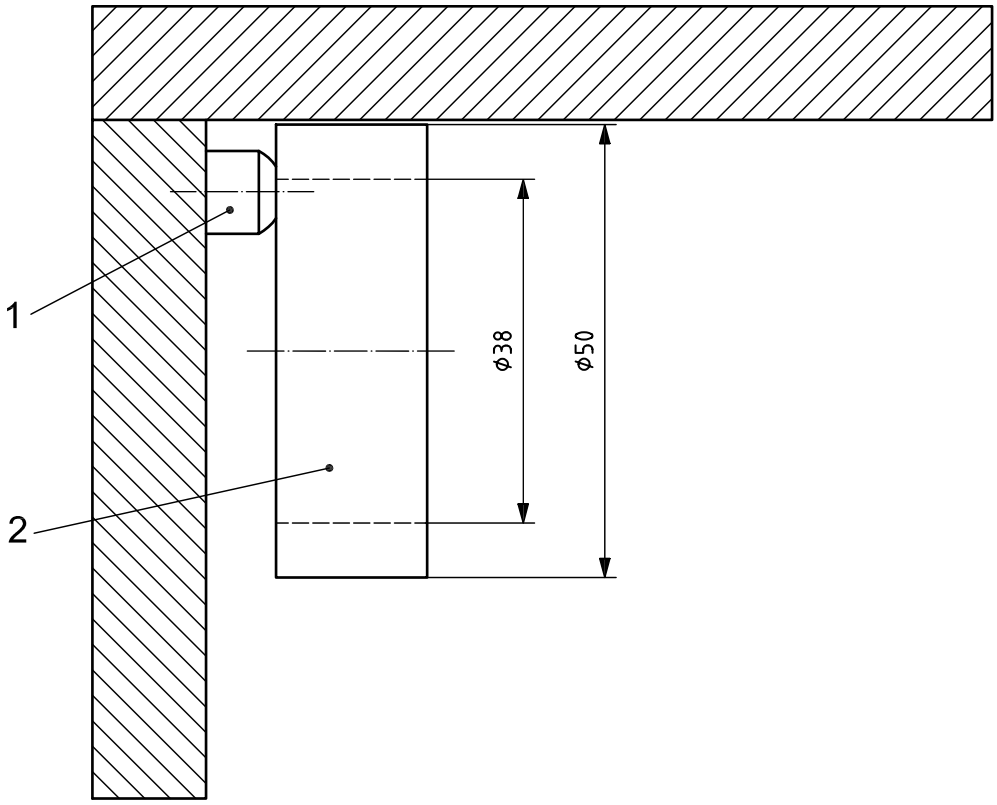
4.1.4.1 General

Protruding parts (such as bolt ends and nuts) shall be recessed or be protected in such a way that they do not constitute an entrapment hazard or other hazard to users.

If protrusions cannot be placed within the 50 mm outside diameter test gauge defined in 6.7.1 (all protrusions), they are considered to be inaccessible and are exempted from these requirements (see Figure 6).

Rope protrusions are specifically exempted from the requirements of 4.1.4.

Dimensions in millimetres



Key

1 inaccessible protrusion (excluded)

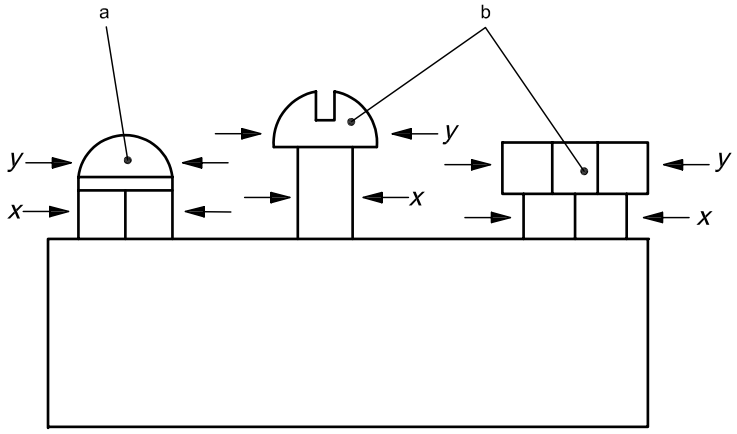
2 test gauge (50 mm diameter)

Figure 6 — Example of excluded protrusion

4.1.4.2 All protrusions

No protrusion shall extend beyond the full depth of the test gauges when tested in accordance with 6.7.1.

No protrusion shall terminate in a dimension greater than that of the base dimension (see Figure 7). In the case of hardware, the base dimension shall be defined as the major dimension of the attachment nut or bolt head.



Key

a Pass ($y \leq x$).

b Fail ($y > x$).

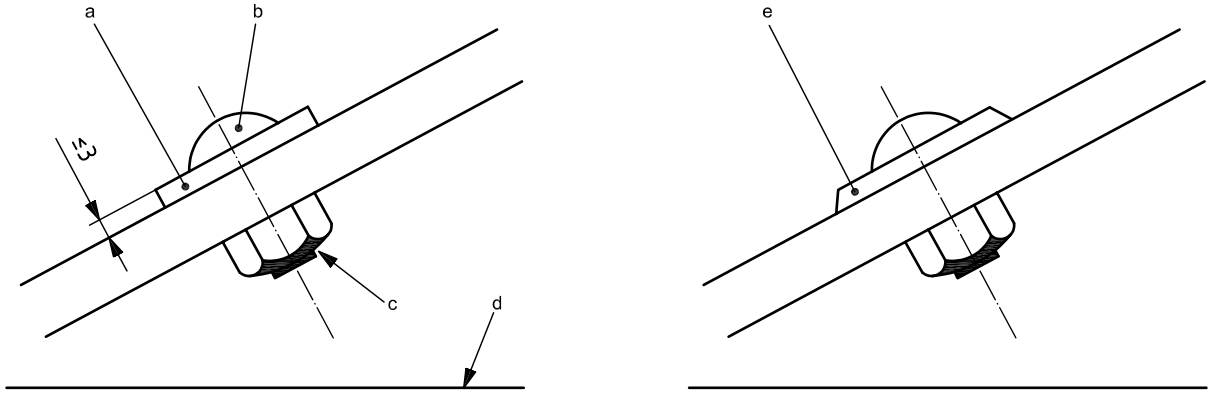
Figure 7 — Examples of protrusion configurations

4.1.4.3 Upright protrusions

Protrusions that fit within any of the gauges defined in 6.7.1 and that project upwards from a horizontal plane shall have no projection perpendicular or at an acute angle to the plane of the initial surface extending more than 3 mm in height (see Figure 8).

For example, the hemispherical ends of bolts are exempt from this requirement because they do not project perpendicular to the plane of the initial surface.

Dimensions in millimetres



Key

a Protrusions that project perpendicular or at an acute angle to the plane of the initial surface with the axis inclined upward from the horizontal plane shall comply with the 3 mm maximum requirement.

b Hemispherical end exempted from the 3 mm maximum requirement.

c Protrusions with axis horizontal or below horizontal shall not extend beyond the face of the test gauges defined in 6.7.1.

d Horizontal plane.

e Protrusions that project at an obtuse angle to the plane of the initial surface are exempt from the 3 mm maximum requirement.

Figure 8 — Upright protrusion test

4.1.4.4 Motion rides

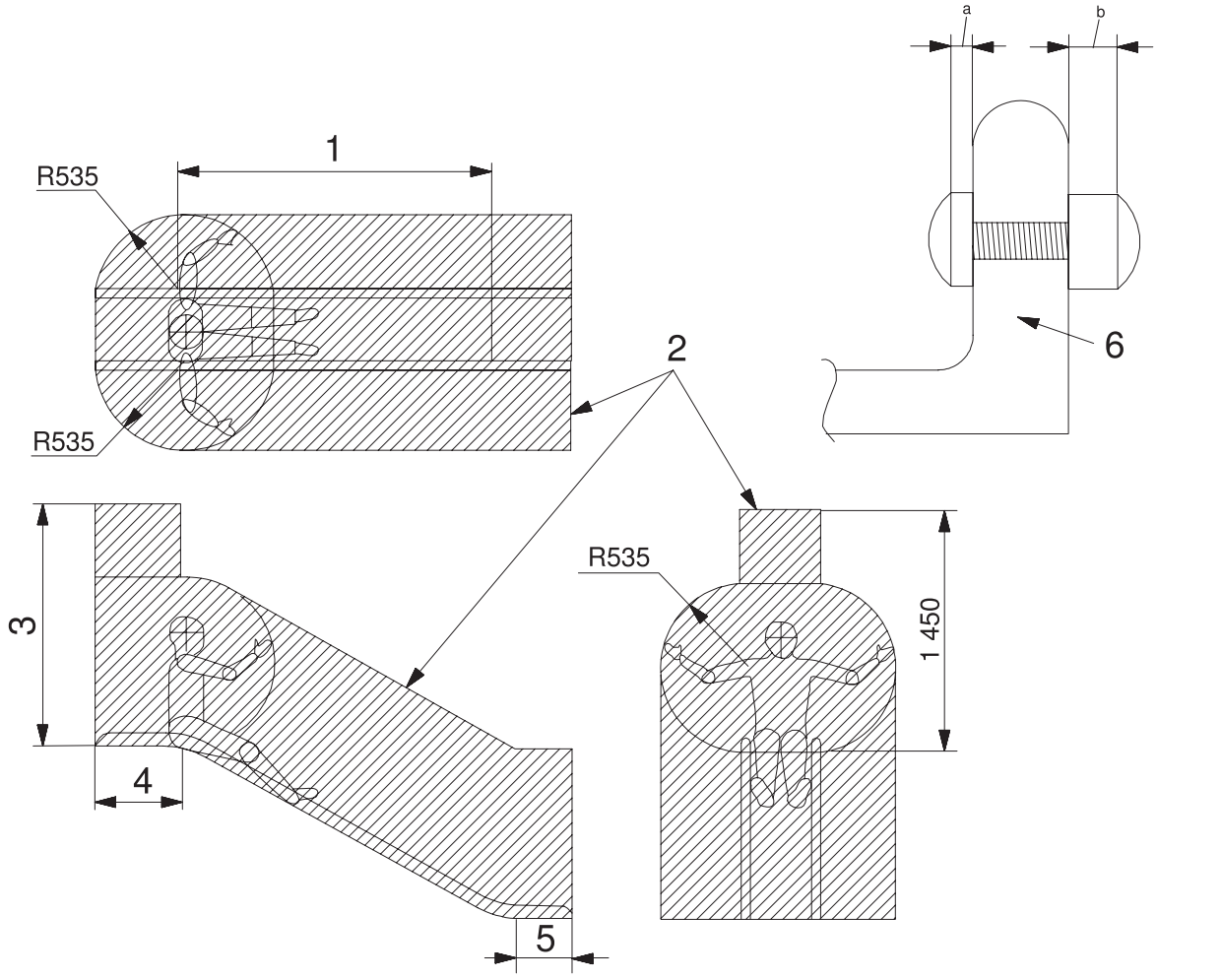
Protrusions on the front and rear surfaces of suspended members of swinging elements and those on the interior surface of slides shall not protrude beyond the full depth of the test gauge when tested in accordance with 6.7.2 (protrusions in motion rides).

4.1.4.5 Slides

Slides, including protective barriers and their means of attachment, and transition areas pose a greater risk of entrapment than other areas of play equipment. Therefore, the following requirements apply to slides and sliding devices.

Any accessible protrusion that allows the 77 mm test gauge defined in 6.7.1.2 to pass over it shall have no projection perpendicular or at an acute angle to the plane of the initial surface extending more than 3 mm. The areas subject to this requirement are outlined in Figure 9. The outside surface of tunnel slides that are completely enclosed are exempt from this requirement.

Dimensions in millimetres



Key

1	sliding surface	4	starting section
2	shaded areas representing non-entrapment/ protrusion zone	5	run-out section
3	standing height	6	slide side rail

a Pass (3 mm or less).

b Fail (more than 3 mm).

Figure 9 — Non-entrapment/protrusion zone and protrusion examples

Slides shall be constructed in such a way as to provide a smooth continuous sliding surface with no gaps or spaces that might create an entrapment hazard such as, but not limited to, the space created between sidewalls when two single slides are combined to create a doubly wide slide, or the point where a hood is attached to the sidewalls of a slide. Roller slides are exempt from the requirements of this subclause. See 4.6.4 (roller slides) for specific requirements for roller slides.

4.1.5 Climbing and swinging ropes, chains and cables

See A.4.1.5.

A suspended climbing rope, chain or cable shall be secured at both ends to prevent the rope, chain or cable from being looped back on itself creating a loop with an interior perimeter of 130 mm (diameter 41,4 mm) or more.

A rope, chain or cable used to support a swing seat is exempt from these requirements.

4.1.6 Open tubing

All open tubing ends that are not resting on the ground or otherwise covered shall be provided with caps or plugs that have a smooth finish and are tight-fitting. The protective cap or cover shall not become detached when tested in accordance with the torque test and the tension test for protective components specified in ISO 8124-1.

4.2 Barriers

See A.4.2.

Any platform intended for sitting or standing 760 mm or more above the ground shall be equipped with a barrier on all sides that face outward from the toy.

Openings in barriers to give access to slides, climbing frames and ladders are allowed.

Barriers for platforms from 760 mm to 1 000 mm above the ground shall have a minimum height of 630 mm.

Barriers for platforms greater than 1 000 mm and up to 1 830 mm above the ground shall have a minimum height of 720 mm.

Barriers for platforms more than 1 830 mm above the ground shall have a minimum height of 840 mm.

Barriers for platforms from 760 mm to 1 000 mm above the ground shall have a maximum vertical opening of 610 mm between the lowermost member of the barrier and the platform that it surrounds.

Barriers for platforms more than 1 000 mm above the ground shall be designed to minimize the likelihood of climbing. Openings within these barriers or between the barrier and the platform surface shall not permit the passage of the torso probe defined in 6.5.1 (head and neck entrapment in completely bound openings).

For barriers with an uneven top design, a straightedge of (200 ± 5) mm shall be used for measuring minimum height. Place the straightedge horizontally on top of the barrier. Measure the vertical distance between the platform and the bottom of the straightedge. The distance shall in no place be less than the minimum heights specified in this part of ISO 8124.

NOTE Special requirements apply to slides (see 4.6.2 (retaining sides for slides) and 4.6.3 (starting, sliding and run-out section on slides)).

When tested in accordance with 6.3 (dynamic strength of barriers and handrails), no part of the barrier or handrail shall collapse, such that the toy does not comply with the relevant requirements of this part of ISO 8124.

4.3 Rung ladders, stepladders and stairways

These requirements do not apply to toys with a platform height of 600 mm or less.

Rung ladders, stepladders and stairways shall comply with the following requirements.

a) The rung or tread shall have a substantial horizontal stepping surface with a lateral width of 240 mm or more (see Figure 10).

b) The distance between the upper surface of the rungs or treads on rung ladders or stepladders shall not be more than 310 mm and on stairways not more 230 mm when measured vertically in accordance with Figure 10.

c) The surface of the tread shall not be slippery.

NOTE This can be achieved by corrugation of the tread or by use of non-slip materials.

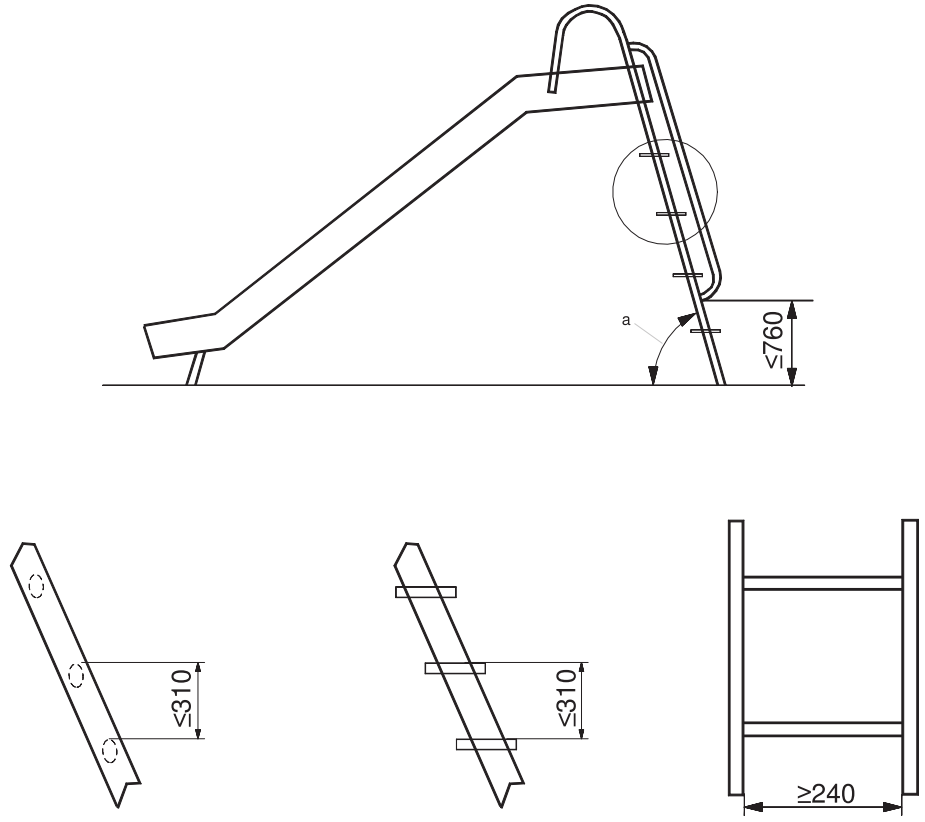
d) The diameter or cross-sectional dimension of the rungs on rung ladders shall be at least 16 mm but not more than 45 mm. Care should be taken when using designs other than circular cross-sections to ensure that gripping potential is not seriously impaired.

e) The depth of treads on stepladders with closed risers or stairways shall be 180 mm or more.

f) The inclination of stairways shall not be more than 50°. The inclination of stepladders shall not be less than 65° and not more than 75°. The inclination of rung ladders shall not be less than 60° and not more than 90°.

g) Stairways and stepladders with a height of 1 200 mm or more above the ground shall be provided with a means of continuous hand support from a height of 760 mm (see Figure 10).

Dimensions in millimetres



Key

a Angle of inclination:
- for stepladders ≥ 65° and ≤ 75°;
- for rung ladders ≥ 60° and ≤ 90°

Figure 10 — Dimensions of ladders

4.4 Entrapment

See A.4.4.

4.4.1 Head and neck entrapment

These requirements do not apply to openings where the ground forms the lower boundary.

Activity toys shall be constructed so that no openings create head and neck entrapment hazards either by head first or feet first passage.

NOTE Hazardous situations in which this type of entrapment can be encountered include the following:

— completely bound openings through which a user can slide head first or feet first;

— partially bound or V-shaped openings;

— shearing and moving openings.

When choosing materials, the manufacturer shall take into account the entrapment hazards that can occur due to distortion of material during use.

a) Accessible completely bound openings shall also allow passage of probe D (Figure 26) if they allow passage of probe C (Figure 25) when tested in accordance with 6.5.1 (test for head and neck entrapment).

b) Accessible rigid openings shall not allow the passage of probe E (Figure 27) unless they also allow the passage of probe D when tested in accordance with 6.5.1.

c) Partially bound and V-shaped openings shall be constructed so that either:

   1) the opening is not accessible as illustrated in Figure 29 and when tested in accordance with 6.5.2.3 a); or

   2) the tip of the template contacts the base of the opening when tested in accordance with 6.5.2.3 b);

d) Openings between flexible parts of suspended bridges and any rigid side members shall allow the passage of probe D (Figure 26) under the worst-case condition of loading. Both loaded and unloaded situations shall be tested.

e) Non-rigid members (e.g. ropes) shall not overlap if by doing so they create openings that do not comply with the requirements in a).

f) A shield intended to make inaccessible any opening that would otherwise fail the requirements of a) to e) shall

   1) be constructed of a rigid material;

   2) not fracture, fail or be displaced in a manner that will allow the opening to become accessible when impacted by a 127 mm diameter steel ball with 27 J at a point within 25 mm of the geometric centre of the shield;

   3) not fracture, fail or be displaced in a manner that will allow the opening to become accessible when tested in accordance with the torque and tension tests of ISO 8124-1.

4.4.2 Entrapment of clothing and hair

Hazardous situations in which clothing or hair can be entrapped may be created by:

a) gaps or V-shaped openings in which parts of clothing can become entrapped while or immediately before the user undergoes a forced movement;

b) protrusions;

c) rotating parts.

Slides, fireman's poles and roofs shall be constructed in such a way that the toggle or chain is not entrapped when tested in accordance with 6.6 (toggle test).

NOTE 1 When using elements of circular cross-section, special consideration should be given to avoid clothing and hair entrapment. This can be achieved by using spacers or similar devices.

Slides, fireman's poles and roofs shall be constructed so that openings located within the free space do not entrap the toggle or chain when tested in accordance with 6.6.

Rotating parts (e.g. spindles) shall have means of preventing entanglement of clothing or hair.

NOTE 2 Suitable covering or shields can be used to prevent entanglement of clothing or hair in rotating parts.

4.4.3 Entrapment of feet

Surfaces intended for standing, running or walking shall not contain any gaps likely to cause foot or leg entrapment. There shall be no gaps greater than 30 mm measured in one direction (see Figure 11), unless suitable means of balance is provided.

Dimensions in millimetres

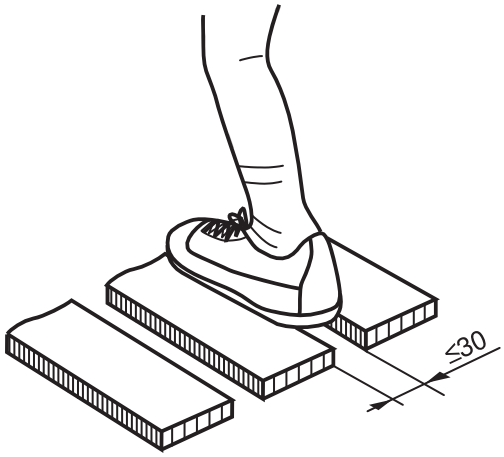


Figure 11 — Measurement of surface gap on running and walking levels

4.4.4 Entrapment of fingers

Activity toys shall be constructed in such a way that holes, slots and gaps do not cause an entrapment hazard to fingers.

Accessible holes, slots and gaps in or between any rigid materials (excluding chains), where the body is in a forced movement, shall also admit a 12 mm diameter rod if they can admit a 5 mm diameter rod to a depth of 10 mm or more.

The requirements in this subclause do not apply to weather-induced dry cracks in solid wood.

4.5 Stability of activity toys other than slides, swings and toys with crossbeams

4.5.1 General

NOTE Stability requirements for slides are given in 4.6.1 (stability of slides) and for swings and other activity toys with crossbeams in 4.7.1 (stability of swings and other activity toys with crossbeams).

Activity toys supplied with anchors intended to be permanently fixed (e.g. in concrete) when used in accordance with the manufacturer's instructions shall not be subjected to stability tests.

Activity toys supplied with removable ground anchors shall be tested with anchors fixed in accordance with the manufacturer's instructions.

Activity toys not supplied with anchors shall be subjected to stability tests.

4.5.2 Stability of activity toys with a free height of fall of 600 mm or less

Activity toys with a free height of fall of 600 mm or less shall not tip over when tested in accordance with 6.1.1 (stability of activity toys with a free height of fall of 600 mm or less).

4.5.3 Stability of activity toys with a free height of fall of more than 600 mm

Activity toys with a free height of fall of more than 600 mm shall not tip over when tested in accordance with 6.1.2 (stability of activity toys with a free height of fall of more than 600 mm).

4.6 Slides

See A.4.6.

4.6.1 Stability of slides

Slides supplied with anchors intended to be permanently fixed (e.g. in concrete) when in use in accordance with the manufacturer's instructions shall not be subjected to stability tests.

Slides supplied with removable ground anchors shall be tested with anchors fixed in accordance with the manufacturer's instructions.

Slides not supplied with anchors shall be subjected to stability tests.

Slides shall not tip over when tested in accordance with 6.1.3 (stability of slides).

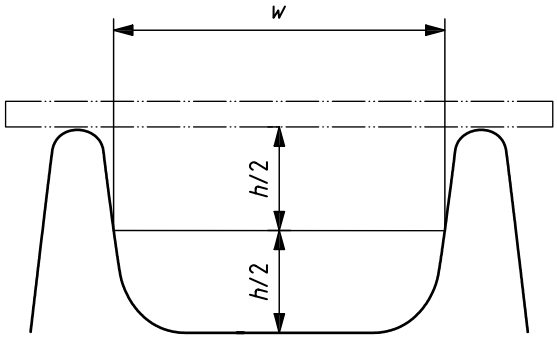
4.6.2 Retaining sides for slides

Retaining sides for slides shall comply with the following requirements (see Figure 12).

a) For slides with a height of more than 1 000 mm above the ground, the height, *h*, of the retaining sides shall be 100 mm or more.

b) For slides with a height of 1 000 mm or less above the ground, the height, *h*, of the retaining sides shall be 50 mm or more.

Retaining sides are not required for the run-out section.



Key

h height of the retaining sides

w width of the slide

Figure 12 — Height of retaining sides

4.6.3 Starting, sliding and run-out section on slides

NOTE For attachment slides, the platform may be used as a starting section.

The starting and run-out section on slides shall comply with the following requirements (see Figure 13).

a) The starting section for slides with a height of 1 000 mm or less above the ground shall have:

   — a width greater than the sliding section less 40 mm (see Figure 12 for measurement of width); if, for example, the sliding section has a width of 300 mm, the starting section shall have a width greater than 260 mm;

   — a length of 150 mm or more;

   — an inclination of between 0° and 10° to the horizontal.

b) The starting section for slides with a height of more than 1 000 mm above the ground shall have:

   — a width greater than the sliding section less 40 mm (see Figure 12 for measurement of width); if, for example, the sliding section has a width of 300 mm, the starting section shall have a width greater than 260 mm;

   — a length of 250 mm or more;

   — an inclination of between 0° and 10° to the horizontal.

c) The starting section shall be provided with a means of assistance to the child coming from the stair/ladder into the sitting position, e.g. a handrail. A barrier provided in accordance with 4.2 (barriers) may also serve as a handrail.

d) The angle of inclination to the horizontal of the sliding section shall not exceed 60° at any point. The inclination of the sliding section shall be measured at the centreline.

e) The run-out section for the slide shall have:

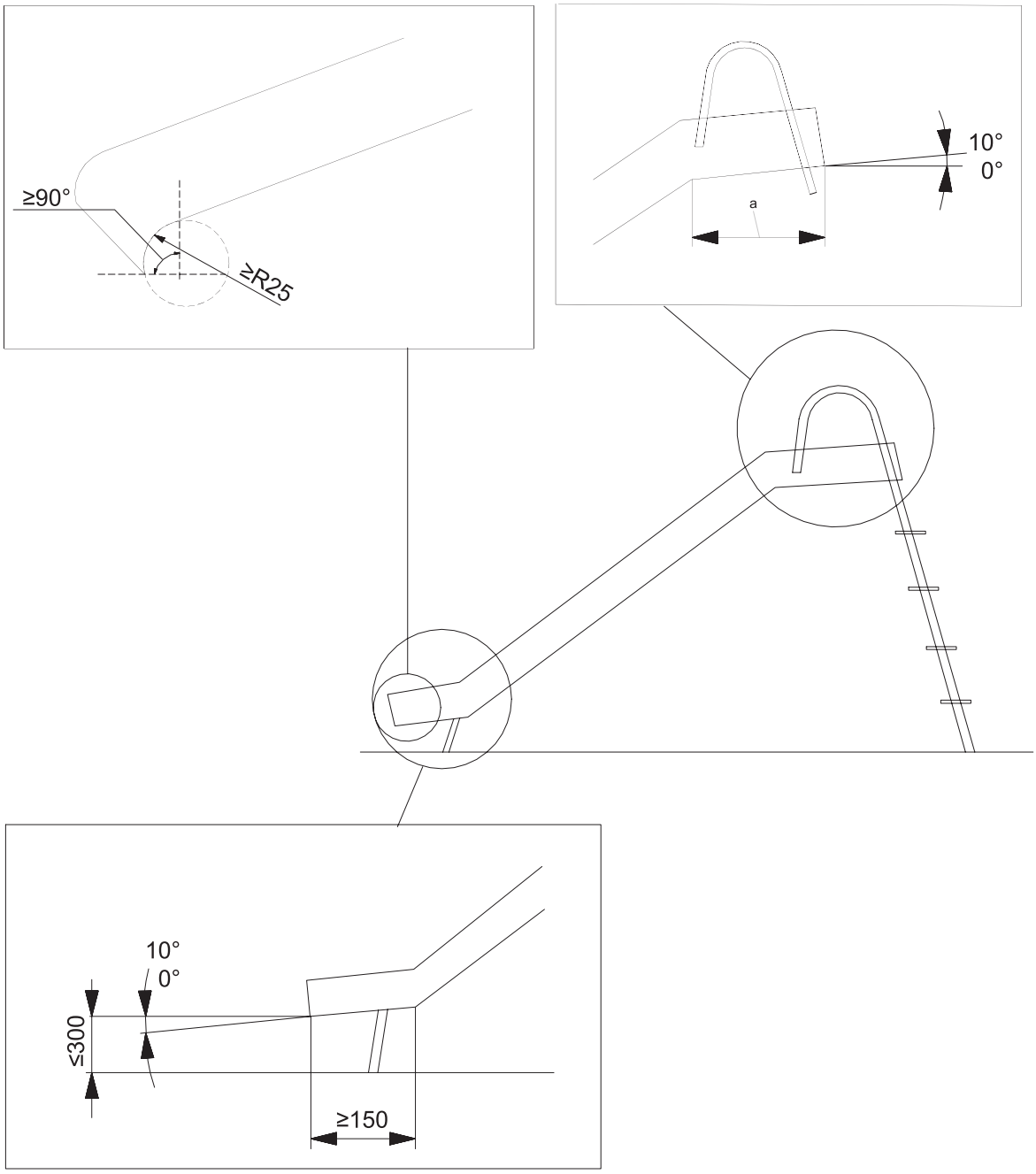
   — a length of 150 mm or more;

   — a height of 300 mm or less above the ground at the end of the section;

   — an inclination of between 0° and 10° to the horizontal.

f) The finishing end of the run-out section shall have a radius of 25 mm or more through at least 90°. This requirement does not apply to slides where the run-out section ends 25 mm or less from the ground.

Dimensions in millimetres



Key

a Length of starting section:

- ≥ 150 mm for slides with a height of 1 000 mm or less [(see 4.6.3 a) (starting, sliding and run-out section on slides)];
- ≥ 250 mm for slides with a height of more than 1 000 mm [see 4.6.3 b)].

Figure 13 — Requirements for slides

4.6.4 Roller slides

Roller slides shall comply with the requirements for slides in 4.6.1 (stability of slides) to 4.6.3 (starting, sliding and run-out section on slides).

There shall be no pinch, crush, shear, entrapment or catch points between the junctures of two or more components that could present a hazard during normal use or reasonably foreseeable abuse.

A pinch, crush, shear, entrapment or catch point is any point that will freely admit a 5 mm diameter rod to a depth of 10 mm or more at one or more positions, either between rollers or adjacent segments.

4.7 Swings

See A.4.7.

4.7.1 Stability of swings and other activity toys with crossbeams

4.7.1.1 General

Swings supplied with anchors intended to be permanently fixed (e.g. in concrete) when used in accordance with the manufacturer's instructions shall not be subjected to stability tests.

Swings supplied with removable ground anchors shall be tested with anchors fixed to the standing surface in accordance with the manufacturer's instructions.

Swings not supplied with anchors shall be subjected to stability tests.

4.7.1.2 Swings with crossbeams more than 1 200 mm above the ground

When tested in accordance with 6.1.4.1 (stability of swings and other activity toys with crossbeams more than 1 200 mm above the ground), the toy shall not tip over.

4.7.1.3 Swings intended for children under 36 months with crossbeams 1 200 mm or less above the ground

When tested in accordance with 6.1.4.2 (stability of swings and other activity toys with crossbeams 1 200 mm or less above the ground), the toy shall not tip over.

4.7.2 Strength of crossbeams, swing devices, suspension connectors and suspension couplings

See A.4.7.2.

Structures and/or crossbeams shall not collapse when tested in accordance with 6.2.2 (strength of swings and similar toys).

After testing, the toy shall continue to comply with the relevant requirements of this part of ISO 8124.

4.7.3 Swings intended for children under 36 months

4.7.3.1 General

Swing seats shall be provided with a back and a safety device preventing the child from falling off the seat.

NOTE The following have been found appropriate:

— a T-bar or a protective bar with a crotch strap, the horizontal section of which is situated between 200 mm and 300 mm above the seat measured as the distance between the lowest part of the sitting surface area of the seat and the upper surface of the bar;

— a device to fasten the child to the seat, e.g. a belt with a crotch strap.

Frames and/or crossbeams shall not collapse when tested in accordance with 6.2.2.3.2 (strength of swings intended for children under 36 months).

After testing, the toy shall continue to comply with the relevant requirements of this part of ISO 8124.

4.7.3.2 Toddler swings without a crossbeam

Toddler swings shall remain stable when tested in accordance with 6.1.5 (stability of toddler swings).

4.7.4 Impact from swing elements

When tested in accordance with 6.4 (determination of impact from swing elements), swing elements shall not impart an average peak value of acceleration, measured with a cut-off frequency of 10 kHz, greater than 50 *g*, and the average surface compression shall not be greater than 90 N/cm^2.

This requirement does not apply to swing elements where the combined mass of the swing element and the means of suspension, as illustrated in Figure 4, is less than 1,0 kg and for which the estimated impact area is larger than 20 cm^2.

4.7.5 Minimum clearance between swing elements, and similar equipment and adjacent structures

These requirements do not apply to single swing elements in swings with a crossbeam height of 1 200 mm or less.

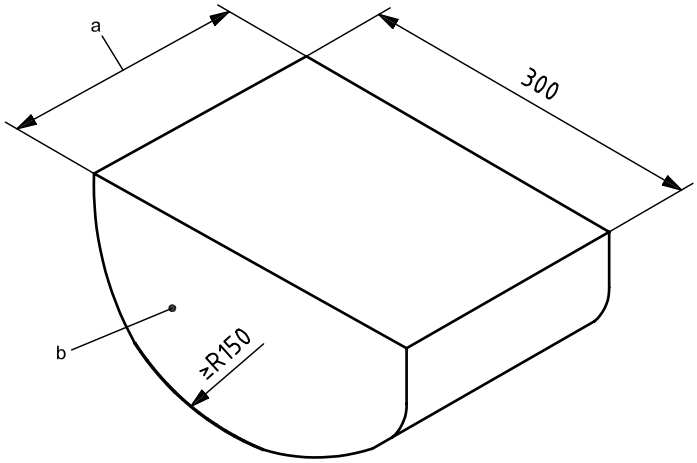
The minimum clearances between adjacent swing elements shall be as given in Table 1 when loaded as they are typically used.

Table 1 — Minimum clearances between swing elements

Clearances between	Free swinging elements mm	Elements excluding free swinging mm	Adjacent structure of swing device mm
Free swinging elements	450	450	300
Elements excluding free swinging	450	300	300

For flexible seats, the fixture shown in Figure 14 may be used to simulate a typical load.

Dimensions in millimetres



Key

a Dimension W depth of seat.

b Mass of 12 kg.

Figure 14 — Typical load fixture for flexible seats

4.7.6 Lateral stability of swing elements

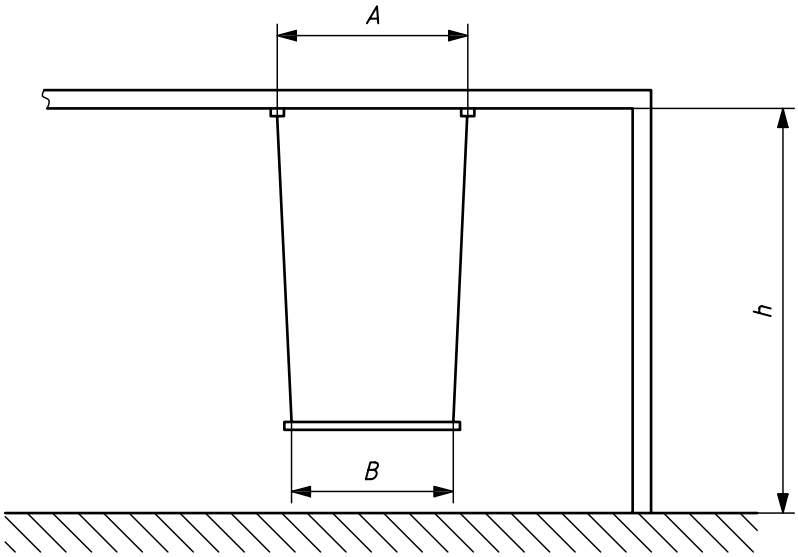
See A.4.7.6.

This requirement does not apply to swings with rigid means of suspension.

The minimum distance between the suspension points of a swing measured along the crossbeam shall be calculated as follows (see Figure 15):

$$A = 0{,}04\ h + B \quad (1)$$

Where



A is the distance between the suspension points along the crossbeam;

B is the distance between the two junction points of the swing element and the means of suspension measured centre to centre;

h is the distance from the ground to the lower side of the crossbeam.

Figure 15 — Minimum distance between suspension points of swings

4.7.7 Minimum clearance between swing elements and the ground

The minimum clearance between swing elements and the ground surface shall be as given in Table 2 when loaded as they are typically used.

Table 2 — Minimum clearances between swing elements and the ground

Swing element	Clearance from the ground surface mm
The seating surface of swing elements with flexible means of suspension where the crossbeam height is greater than 1 200 mm	350
The seating surface of swing elements with rigid means of suspension where the crossbeam height is greater than 1 200 mm	400
The seating surface of swing elements where the crossbeam height is 1 200 mm or less	200
Footrests of swing elements	350

For flexible seats, the fixture shown in Figure 14 may be used to simulate a typical load.

4.7.8 Suspension connectors and means of suspension

See A.4.7.8.

a) Suspension connectors on suspended swing elements shall be prefixed when supplied. This requirement does not apply to swings with rigid means of suspension. Methods of attachment requiring the consumer to tie a knot during assembly as the sole means of securing the suspensions to a crossbeam are not permitted.

b) Suspension connectors shall be of a design that will prevent unintentional disconnection.

EXAMPLE Hooks wound over at least 540° or a spring-hook type.

c) Ropes used as means of suspension shall have a minimum diameter of 10 mm (the measurement being the average of five separate measurements taken at representative positions along the rope). Straps and chains shall have a minimum width of 10 mm.

d) Accessible chains shall have an opening of 5 mm maximum in order to prevent fingers from being jammed when loaded (see Figure 16).

e) The need for carrying out checks and maintenance on the main parts at regular intervals shall be drawn to the attention of the users (see 5.3 (maintenance instructions)).

f) There shall be no loosening or structural failure of the suspension connectors when tested in accordance with 6.8 (durability test for suspension connectors and means of suspension).

Dimensions in millimetres

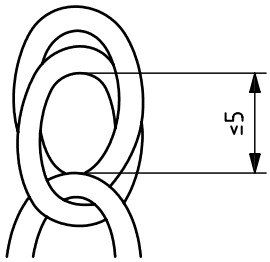


Figure 16 — Maximum openings in chains for swings

4.8 Seesaws

These requirements relate to seesaws in the form of a beam supported on a central pivot point.

The central point of the sitting or standing position of the seesaw shall not exceed a height of 1 200 mm. The sitting or standing position of the seesaw may swing out of the horizontal by a maximum of 30°.

For seesaws where the central point of the sitting or standing position can reach a height of 1 000 mm or more, each end of the seesaw shall be provided with dampening material on the part that touches the ground or shall have a dampening device incorporated in the swing centre.

4.9 Carousels and rocking toys

See A.4.9.

Carousels, rocking toys and similar toys shall comply with the following requirements.

The toy shall not tip over when tested in accordance with 6.1.1 (stability of activity toys with a free height of fall of 600 mm or less).

The toy shall not collapse when tested in accordance with 6.2.1 (strength of toys other than swings). After testing, the toy shall continue to comply with the relevant requirements of this part of ISO 8124.

When measured from the ground surface to any sitting or standing position, the maximum free height of fall for carousels and rocking toys shall not exceed 600 mm.

4.10 Inflatable activity toys

See A.4.10.

4.10.1 General

Inflatable activity toys shall meet the requirements of any other applicable part of this International Standard, e.g. for slides and barriers.

4.10.2 Anchorage

Inflatable activity toys intended for outdoor use, or that use a blower for continuous input of air, shall be provided with an anchorage system and any necessary accessories, enabling the toy to be securely fixed to the ground.

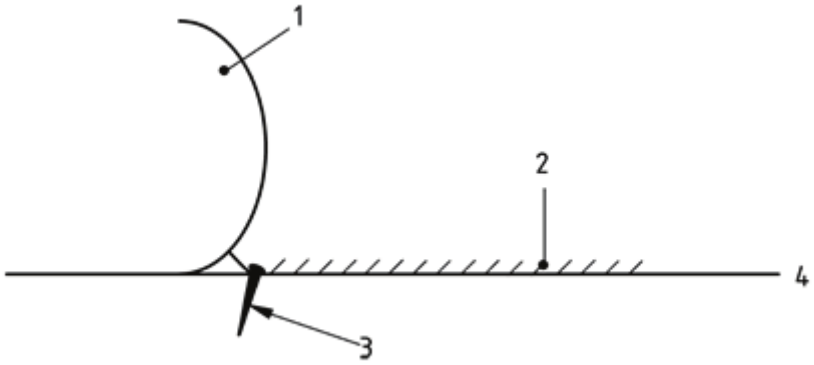
If secured by ground anchors, there shall be a minimum of two anchorage points per side of the inflatable activity toy and a minimum of four per toy, e.g. for a circular product, they shall be distributed approximately evenly.

NOTE Corner anchors count as 50 % on each side.

Each anchorage point and all of the components of the anchorage system, e.g. ropes, webbings, metal attachments, stakes and weights, shall withstand a force of 1 600 N applied in a direction in accordance with the angle of normal use as determined by the attachment to the toy.

The tops of ground stakes (if supplied) shall be free from sharp edges and/or provided with a protective cover of soft or resilient material to prevent injury if impacted.

The anchorage system shall be designed so that anchorage points are positioned away from potential impact areas, for example by attaching them to the bottom perimeter edge of the toy (see Figure 17).



Key

1 side of inflatable activity toy
2 impact area
3 anchorage stake as close as practicable to the side of the inflatable activity toy
4 ground level

Figure 17 — Anchorage at the bottom edge of the toy

Anchorage systems other than ground anchor stakes (such as a water pool, ballast bags, sandbox or a heavily weighted base) are permitted if the system will withstand the same forces as if it were secured with ground anchor stakes, taking into account the shape of the toy.

4.10.3 Connection tubes for continuous inflation

Connection tubes for continuous input of air from a blower to inflatable activity toys shall be long enough to allow the inflation device to be placed at a minimum of 2,5 m from the toy.

4.10.4 Containment

4.10.4.1 General

The containing wall height shall be measured from the surface of the platform or slope to the top of the wall, perpendicular to the platform or slope and in an unloaded condition.

Containing walls shall not include features that might be used as an aid to climbing the wall.

Toys and activities that are integral to the inflatable activity toy shall not be placed in a manner that allows them to be used as an aid to climbing containing walls.

Openings in containing walls to give access to slides, climbing frames and ladders are permitted.

4.10.4.2 Platforms

Any platform intended for sitting or standing 760 mm or more above the ground shall be provided with a means to contain users.

Containment shall be provided by either of the following:

a) walls with a minimum height of 1,8 m;

b) walls with a height of between 610 mm and 1,8 m, permanently roofed in a manner that contain users.

4.10.4.3 Slopes

Slopes of less than 30° shall be treated as a platform.

The first metre at the top of slopes greater than 30° shall meet the containment requirements for platforms.

The remaining length of slopes greater than 30° that are 760 mm or more above the ground shall be provided with containing walls with a minimum height of 900 mm.

The angle of slopes is measured in an unloaded condition.

4.10.4.4 Safe collapse

Inflatable activity toys shall be designed so that users have sufficient time and clearance to evacuate the toy in the case of a loss of air pressure.

When tested in accordance with 6.9 (deflation of inflatable activity toys):

a) the minimum time taken for the test load to reach its lowest point shall be as given in Table 3;

Table 3 — Minimum deflation times

Height of platform mm	Minimum time for test load to reach its lowest point s
Less than 600	10
Greater than 600 and less than 1 500	20
Greater than 1 500 and less than 2 000	30
Greater than 2 000	40

b) the opening of any tunnel or squeeze point under any platform shall not be reduced in height by more than 50 % within 30 s.

A squeeze point that has zero separation when the toy is fully inflated is exempt.

4.11 Paddling pools

4.11.1 General

Information provided on the packaging or with the product, including pictures and text shall not state or imply that a child will be safe in such a toy if left unsupervised.

4.11.2 Edges, points, and small parts

Paddling pools shall not present any hazardous sharp edges, hazardous sharp points, or small parts before and after testing according to 6.10 (static load test for paddling pools with non-inflatable walls).

Tests for hazardous sharp edges, hazardous sharp points, and small parts are performed according to ISO 8124-1.

4.11.3 Paddling pools with inflatable walls

All air-inflation inlets on paddling pools with inflatable walls shall have valves with stoppers permanently attached to the toy.

When the toy is inflated, the stopper must be capable of being pushed into the toy so that it does not stand more than 5 mm from the surface of the toy.

5 Warnings and labelling

5.1 Labelling

Labelling shall be permanently and prominently applied to both the toy and the packaging (if supplied). The following information shall be provided:

— that the toy is for domestic use only;

— whether the toy is intended for indoor or outdoor use;

— information as to the mass and/or age of the child for whom the toy is intended;

— if appropriate, the maximum number of children that may safely use the equipment simultaneously;

— identity or contact details of the manufacturer or distributor.

5.2 Assembly and installation instructions

5.2.1 General

Except for inflatable activity toys and paddling pools, equipment with a designated playing surface of 600 mm or less in height is exempt from the requirements of 5.2 (assembly and installation instructions).

The information given on the labelling/purchase information shall also be given in the installation instructions.

Activity toys that require assembly by the consumer shall be accompanied by appropriate assembly instructions, including drawings, which shall enable an unskilled layman to correctly assemble the activity toy.

The assembly and installation instructions shall also, when appropriate, include:

— a recommendation to place the activity toy on a level surface at least 1,8 m from any structure or obstruction such as a fence, garage, house, overhanging branches, laundry lines or electrical wires;

— detailed instructions on how and where anchors shall be installed to prevent overturning or lifting of the support members during normal use or reasonably foreseeable abuse, also taking into account the condition of the ground normally encountered. The instructions shall include information on the ground conditions for which the anchors supplied are intended and information on alternative anchors for other ground conditions that might reasonably be expected to be encountered, for example corkscrew augers for sandy soil;

— instructions that anchors shall be placed level with or under the ground in order to reduce tripping hazards;

— instructions that activity toys (for example swings, slides, climbing frames) should be installed over impact absorbing surfaces such as sand, wood-bark chips, rubber and foam and should not be installed over concrete, asphalt or any hard surface;

— scale drawings of assembly hardware to facilitate the correct length of fasteners being used;

— information to keep assembly and installation instructions for further reference;

— a recommendation on the orientation of the toy in relation to the sun (e.g. if there are surfaces that may become hot enough under direct sunlight to cause burning injuries).

5.2.2 Information on playground surfacing materials

5.2.2.1 Maximum fall heights

The instructions shall include the manufacturer's determination of maximum fall height for the product.

Maximum fall heights for products are determined as follows:

— for swings, the maximum fall height is the height of the suspension connector;

— for elevated platforms with barriers, the maximum fall height is the height of the top surface of the barrier;

— for elevated platforms without barriers, the maximum fall height is the height of the top surface of the platform;

— for climbing frames and horizontal ladders, the maximum fall height is the height of the top surface of the component;

— for rocking toys and seesaws, the maximum fall height is the maximum height of the designated play surface normally occupied by a user.

5.2.2.2 Impact attenuating surface

The instructions shall include the "Consumer information sheet for playground surfacing materials" from Annex B (consumer information sheet for playground surfacing materials) or specific surfacing guidelines for the product that are consistent with Annex B.

5.2.3 Paddling pools

The packaging and the assembly and installation instructions of paddling pools shall carry instructions that paddling pools should not be installed over concrete, asphalt, or any other hard surface.

The packaging and the assembly and installation instructions of paddling pools that can be filled to a depth of 300 mm or more shall carry a statement similar to: "Pool fencing laws may affect this product. Consult your local authority".

5.3 Maintenance instructions

Activity toys shall be accompanied by maintenance instructions drawing attention to the need for carrying out checks and maintenance of the main parts (crossbeams, suspensions, anchors, etc.) at regular intervals, pointing out that if these checks are not carried out, the toy could overturn or otherwise become a hazard. Guidelines shall also be provided on how to determine when deterioration has occurred and the requirements for replacing parts when necessary.

The maintenance instructions shall include the wording "Please keep for future reference".

The maintenance instructions shall, when appropriate, also include the following recommendations pointing out that it is of particular importance that they be followed at the beginning of each season as well as at regular intervals during the usage season:

— check all nuts and bolts for tightness and tighten when required;

— oil all metallic moving parts;

— check all coverings and bolts for sharp edges and replace when required;

— check swing seats, chains, ropes and other means of attachment for evidence of deterioration; replace when required in accordance with the manufacturer's instructions;

— sand rusted areas and tubular members and repaint using a non-lead based paint when required.

The maintenance instructions for inflatable activity toys shall include a recommendation that the toy be cleaned and any accumulated debris removed before each use. Advice shall also be given on cleaning materials and methods appropriate for the material used in the construction of the toy.

5.4 Warnings

5.4.1 Drowning

If there is a possibility that water can accumulate, such as by collection of rainwater, to a depth of more than 40 mm in any part of the activity toy, the toy shall either meet the requirements for paddling pools or a warning shall be provided in the instructions and on the toy regarding the risk of drowning if the accumulated water is not removed before use [see C.2.2, (drowning), for guidance].

5.4.2 Inflatable activity toys

5.4.2.1 Anchorage

Inflatable activity toys and their packaging (if supplied) shall carry a warning that they are not safe if the anchorage system provided is not used, and that they shall not be used in high winds [see C.2.3, (anchorage of inflatable activity toys), for guidance].

5.4.2.2 Connection tubes for continuous inflation

Connection tubes for continuous input of air from a blower to inflatable activity toys shall carry a warning concerning the risk of falling on to the inflation device and instructions that it should be positioned no less than 2,5 m away from the toy [see C.2.4, (connection tubes for inflating inflatable activity toys), for guidance].

5.4.2.3 Friction burns

If appropriate:

— a warning shall be provided on the toy and in the instructions for inflatable activity toys concerning friction burns [see C.2.5, (friction burns), for guidance];

— information shall be provided in the instructions for use that appropriate clothing should be worn when using the toy to avoid friction burns.

5.4.3 Paddling pools

5.4.3.1 Drowning

Paddling pools shall bear a safety sign representing direct supervision of young children and warning text similar to the following.

"Warning!

Drowning Hazard.

Supervise children at all times — Keep within arm's reach.

Empty the pool and store safely when not in use."

— The warning shall be indelible and easily legible and in a colour which contrasts with the adjacent surrounding body of the paddling pool.

— The safety sign shall be chosen from those available in internationally recognized standards and the colours shall be as specified in the applicable standard, including the background colour.

— The warning shall be clearly visible on the inside surface of the paddling pool.

— The size of the safety sign on the pool shall be not less than 40 mm in height and it shall be placed above or to the side of the warning.

— The following are examples of acceptable safety signs.

a) Mandatory action sign:

ISO 20712–1-WSM002

"Keep children under supervision in the aquatic environment"

b) Prohibition sign:

EN 71–8 2011

"Prohibition pictogram"

Figure 18 — Examples of safety signs

The packaging and the assembly and installation instructions shall include the statement: "Children can drown in very small amounts of water. Empty the pool when not in use".

5.4.3.2 Water contamination

The assembly and installation and the maintenance instructions for paddling pools shall carry a statement to the effect that water may become contaminated if not treated and that the pool water should be changed frequently (particularly in hot weather) or when noticeably contaminated.

6 Test methods

6.1 Stability

6.1.1 Stability of activity toys with a free height of fall of 600 mm or less

See 4.5.2 and 4.9.

6.1.1.1 Principle

The toy is loaded on an incline to simulate a child in an off-centre position.

6.1.1.2 Apparatus

— Loads of mass (50 ± 0,5) kg and dimensions as given in Figure 19.

— Loads of mass (25 ± 0,2) kg and dimensions as given in Figure 19.

— Inclined plane of (10 ± 1)°.

6.1.1.3 Procedure

Load the toy in the most onerous position with a mass of (50 ± 0,5) kg on its standing or sitting surface for 5 min.

For toys labelled as not suitable for children 36 months and over, load the toy with a mass of (25 ± 0,2) kg.

Place the toy on a (10 ± 1) ° slope in the most onerous position with respect to stability.

Where the toy is intended to bear the mass of more than one child at a time, load the toy with appropriate masses (25 kg or 50 kg) to represent each child in the most onerous combination of positions that the children may sit or stand.

Observe whether the toy tips over.

6.1.2 Stability of activity toys with a free height of fall of more than 600 mm

See 4.5.3.

6.1.2.1 Principle

A horizontal force is applied at the top of the toy to simulate a child climbing on the toy.

6.1.2.2 Apparatus

— Suitable device(s) to apply a horizontal force of (120 ± 5) N.

— Stops, if needed.

6.1.2.3 Procedure

Assemble the toy in accordance with the manufacturer's instructions and place it on a rigid horizontal surface.

For a free-standing toy, stops may be used to prevent it from slipping on the surface. The stops shall not, however, prevent the toy from overturning.

Activity toys supplied with removable ground anchors shall be tested with anchors fixed in accordance with the manufacturer's instructions.

Apply a horizontal force of 120 N in the direction most likely to cause the toy to tip over. The force shall be applied at the outermost and highest grippable point. The highest grippable point is, however, limited to 1 500 mm above the highest surface which is of a size that will always support a child.

NOTE 1 1 500 mm is the maximum shoulder height of 95 % of the children up to 14 years of age.

Apply any number of horizontal forces of 120 N up to the number of children intended to play at the same time on the toy (consult product information). The distance between any two points of application of the force shall be at least 600 mm.

NOTE 2 The most onerous stability condition may occur when less than the maximum number of forces are applied on the toy.

Observe whether the toy tips over.

6.1.3 Stability of slides

See 4.6.1.

6.1.3.1 Principle

The toy is loaded on an incline to simulate a child in an off-centre position.

6.1.3.2 Apparatus

— Loads of mass (50 ± 2) kg and dimensions as given in Figure 19.

— Inclined plane of (10 ± 1)°.

6.1.3.3 Procedure

Place the toy on a (10 ± 1)° slope in the most onerous position with respect to stability.

Slides supplied with removable ground anchors shall be tested with anchors fixed to the standing surface in accordance with the manufacturer's instructions.

Load the geometric centre of each area where a child can sit or stand with a mass of (50 ± 2) kg. Such areas include the starting section, ladder, run-out section and sliding section. Secure the load using appropriate means to prevent it from sliding or falling off.

Where the toy is intended to bear the mass of more than one child, masses shall be loaded either simultaneously or individually, depending on which is more onerous.

Observe whether the toy tips over.

6.1.4 Stability of swings and other activity toys with crossbeams

See 4.7.1.

6.1.4.1 Stability of swings and other activity toys with crossbeams more than 1 200 mm above the ground

See 4.7.1.1.

6.1.4.1.1 Principle

A horizontal force is simultaneously applied at each suspension point to simulate the horizontal forces created by pendulum effect.

6.1.4.1.2 Apparatus

— Suitable device(s) to apply a horizontal force from 125 N to (2 000 ± 20) N according to Table 4.

— Stops, if needed.

Table 4 — Examples of horizontal forces

Number of suspension points	1 child	2 children	3 children	4 children
	Force per suspension point N			
1	500	1 000	1 500	2 000
2	250	500	750	1 000
4	125	250	375	500

6.1.4.1.3 Procedure

Assemble the toy in accordance with the manufacturer's instructions and place or fix it on a rigid horizontal surface.

For a free-standing toy, stops may be used to prevent it from slipping on the surface. The stops shall, however, not prevent the toy from overturning.

Swings and other activity toys with crossbeams supplied with removable ground anchors shall be tested with the anchors fixed to the standing surface in accordance with the manufacturer's instructions.

On the suspension point(s), simultaneously apply horizontal forces of (500 ± 20) N per user in the swinging direction. Where a swing element has multiple suspension points, distribute the load equally between the points (using Table 4 as a guide). Forces on multiple suspension points shall be applied in the same direction simultaneously.

Observe whether the toy tips over.

6.1.4.2 Stability of swings and other activity toys with crossbeams 1 200 mm or less above the ground

See 4.7.1.2.

6.1.4.2.1 Principle

The toy is loaded and operated to simulate its normal use.

6.1.4.2.2 Apparatus

— Loads of mass (25 ± 0,2) kg and dimensions as given in Figure 19.

— Blocks, if needed.

6.1.4.2.3 Procedure

Place the toy on a horizontal surface. Blocks shall be used to prevent the front legs from slipping on the surface. They shall, however, not prevent the toy from overturning.

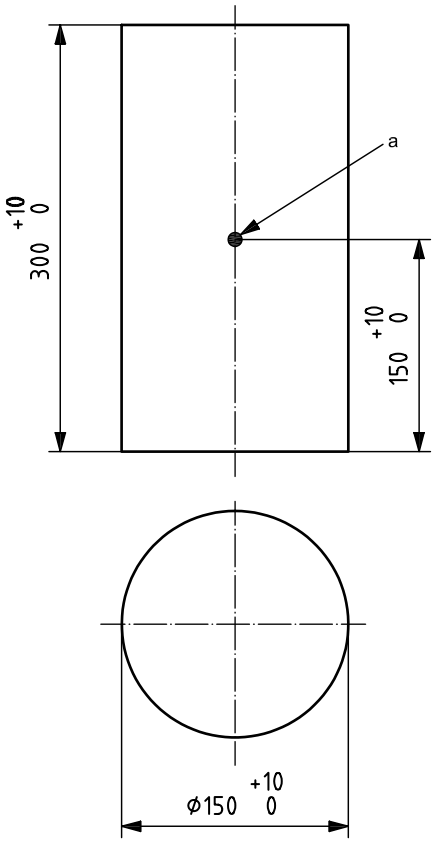
Load the seat with a mass of (25 ± 0,2) kg and secure it.

Raise the seat backward to its maximum position, but not exceeding 45° from the vertical, and release it (see Figure 20).

If there is more than one seat, load each seat with a mass of (25 ± 0,2) kg and secure it. Raise all seats backward to their maximum position, but not exceeding 45° from the vertical, and release them simultaneously.

Observe whether the toy tips over.

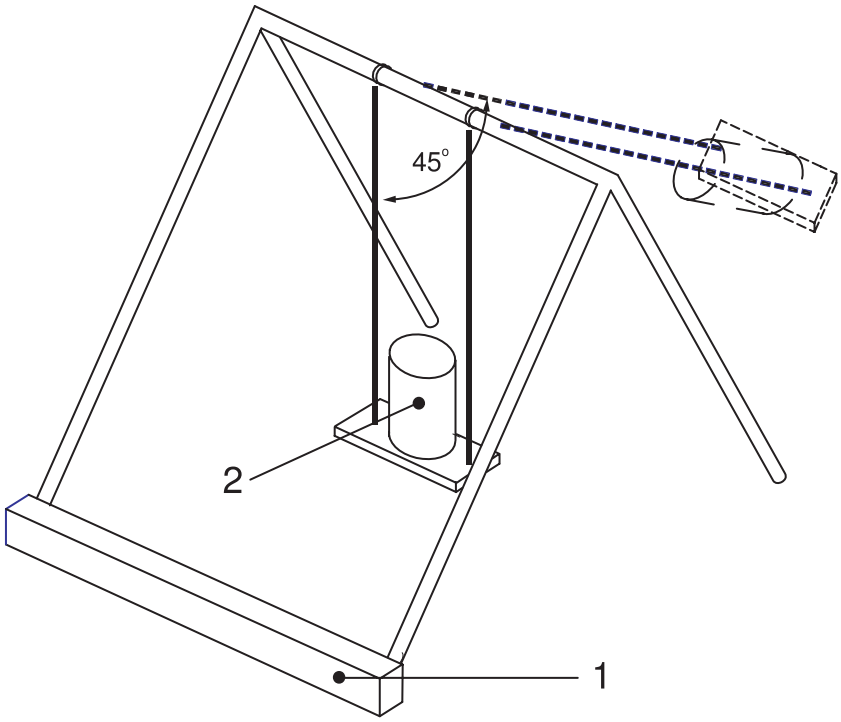
Dimensions in millimetres



Key

a Centre of gravity.

Figure 19 — Load for determination of strength and stability



Key

1 block for the front legs of the swing

2 mass of 25 kg

Figure 20 — Testing of stability of swing sets with crossbeams 1 200 mm or less above the ground

6.1.5 Stability of toddler swings

See 4.7.3.2.

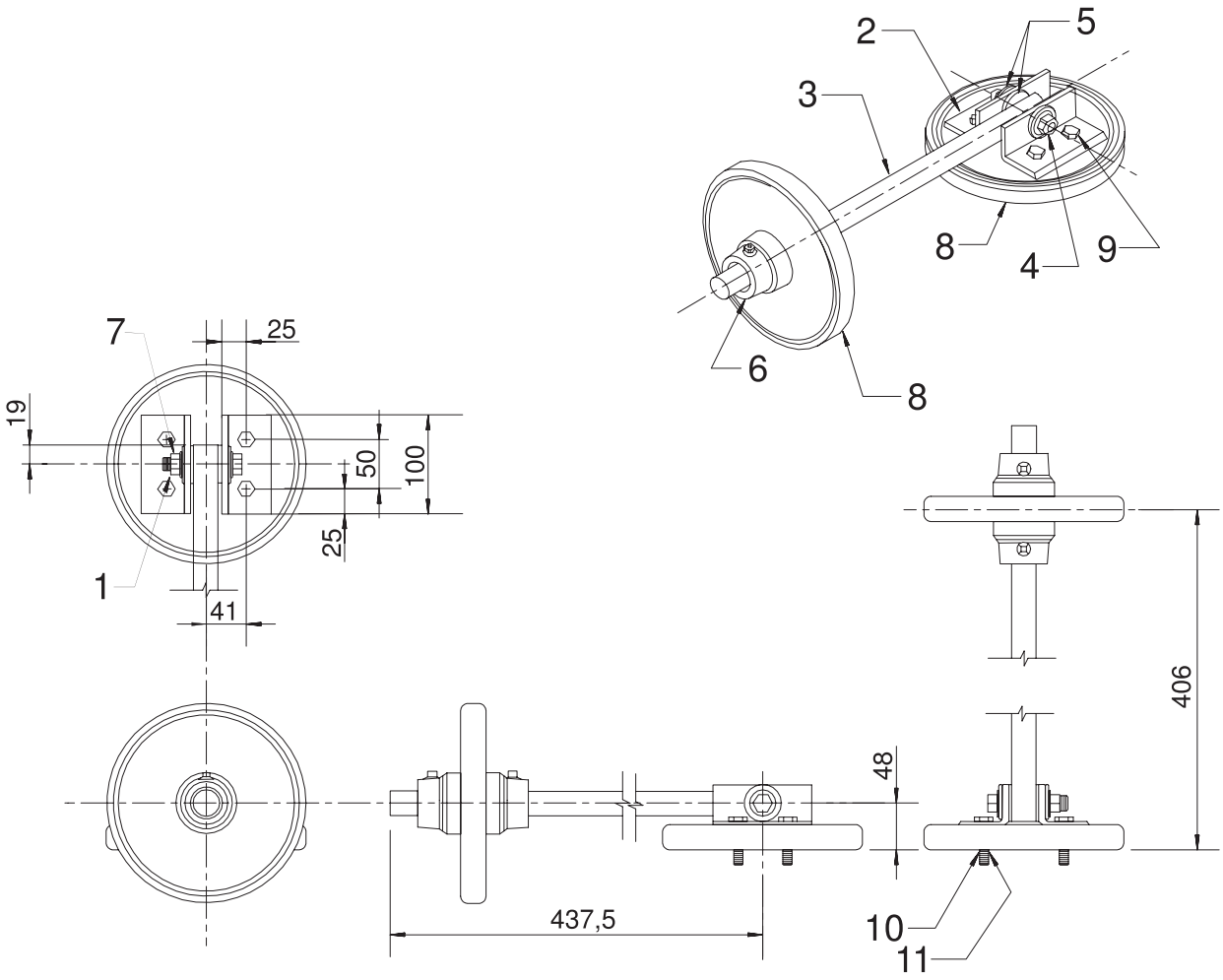
6.1.5.1 Principle

A pendulum is used to simulate a child falling forwards and backwards.

6.1.5.2 Apparatus

Pendulum test apparatus constructed in accordance with dimensions and materials specified in Figure 21.

Dimensions in millimetres



Key

1	bolt assembly with loose fit to allow free movement of pendulum	8	2 × 4,5 kg barbell weight – approximately 30 mm diameter × 25 mm thickness
2	2 × steel angle brackets – 50 × 50 × 100 – 5 mm thick	9	4 × 6 mm threaded bolts – length as needed or assembly
3	1 × steel tubing – 25 mm CO × 464 mm LG – 1,5 mm wall	10	4 × 6 mm nuts
4	1 × C/S bolt – 13 UNC – 2A × 64 mm LG	11	4 × 6 mm washers
5	4 × C/S washer – 13 × 35 mm OD		
6	2 × steel dumbbell collar with set screw – 60 mm OD		
7	1 × 13 UNC – 2H hexagonal nut		

Figure 21 — Pendulum test apparatus for toddler swing

6.1.5.3 Procedure

The pendulum test apparatus consists of a 4,5 kg barbell weight at the top of a freely pivoting bar and a 4,5 kg barbell weight affixed to the bottom of the test apparatus. The barbell weights shall have a maximum diameter of 210 mm. The total mass of the pendulum test apparatus shall not exceed 10,9 kg.

Suspend the toddler swing seat in accordance with the manufacturer's instructions. If the swing height is adjustable, perform the test at both the highest and lowest settings. With the swing at rest, establish a horizontal reference line on the swing seat.

Secure the complete pendulum test apparatus within 13 mm of the geometric centre of the swing seating surface with the direction of travel of the pendulum arm the same as the swing direction.

If the seating area of the toddler swing is made of a flexible material, additional bracing material may be added to the exterior bottom of the swing seat to aid in securing the pendulum test apparatus. Care should be taken to ensure that the additional bracing material does not influence the test results.

The centre of gravity of the top weight of the pendulum test apparatus shall be at a height of 410 mm from the top of the seating surface when the pivot arm is positioned vertically.

NOTE The 410 mm height is based on field testing of swings that were recalled because of tip-over and swings that have performed without tipping over.

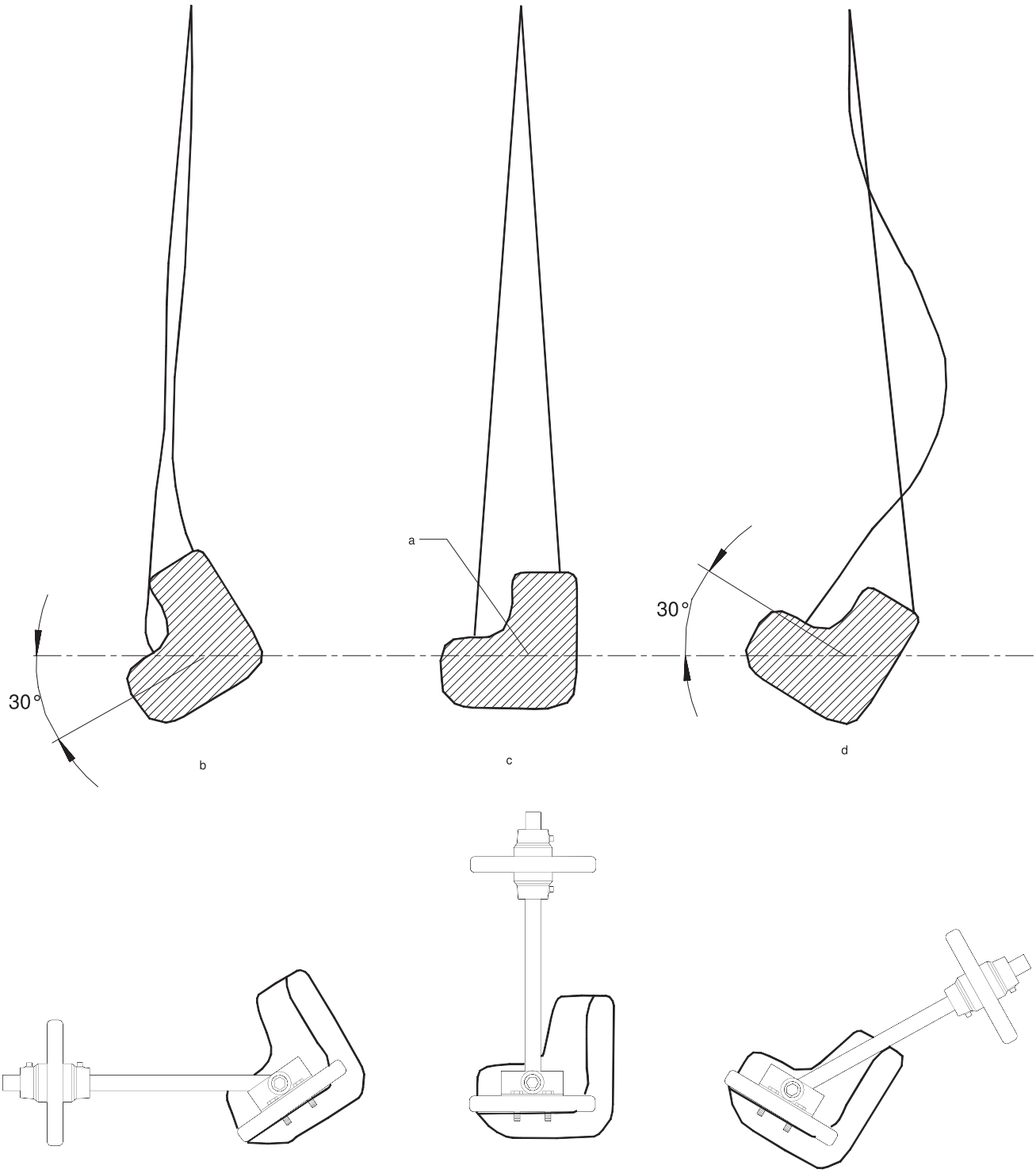
While holding the pendulum test apparatus to the rear of the seat, raise the swing seat in the rear direction to an angle of 60 $^{+5}_{-0}$)°as measured from vertical to a line that connects the suspension connector pivot point with the geometric centre of the seating surface.

Simultaneously release the swing and pendulum test apparatus and allow it to swing freely until the swing arc is within 15° of vertical in either direction. At this point, stop the swinging motion by slowly returning the swing to its at-rest condition while being careful not to disturb the position of the pendulum test apparatus. Measure the angle of the reference line on the swing seat from the horizontal.

Perform this action three times.

Repeat the test, but with the pendulum test apparatus held in the forward direction.

A swing is considered unstable and fails the requirement of 4.7.3.2 (toddler swings without a crossbeam) if, during any of the six swing attempts, the pendulum test apparatus tips or falls forward or backward and causes the horizontal reference line of the toddler swing to hang at an angle greater than 30° from its original position (see Figure 22).



Key

a Pivot point.

b 30° forward: fail.

c Horizontal.

d 30° backward: fail.

Figure 22 — Pass/fail criteria for toddler swings

6.2 Static strength

6.2.1 Strength of toys other than swings

See 4.1.1 and 4.9.

6.2.1.1 Principle

The toy is loaded so as to simulate the number of children for which it is intended.

6.2.1.2 Apparatus

— Load(s) of mass (50 ± 0,5) kg and dimensions as given in Figure 19.

— Load(s) of mass (25 ± 0,2) kg and dimensions as given in Figure 19.

6.2.1.3 Procedure

Load the toy in the most onerous position with a mass of (50 ± 0,5) kg on its standing or sitting surface. For toys with a crossbeam, apply the load at the centre of the crossbeam. Maintain the load for 5 min.

For toys labelled as not suitable for children over 36 months, load the toy as above with a mass of (25 ± 0,2) kg.

Where the toy is intended to bear the mass of more than one child at a time, test every sitting or standing area or centre of a crossbeam simultaneously.

Toys which, due to their design, are inherently unstable shall be supported for the duration of the test. Care should be taken to ensure that any additional support does not influence the load-bearing ability of the toy.

For toys where, by design, the mass of the child is distributed over various positions on the toy, distribute the prescribed load consistent with the recommended use of the toy. In this case, apply other test loads where the number of distribution points has to be taken into account.

Examine whether the toy still complies with the relevant requirements of this part of ISO 8124.

6.2.2 Strength of swings and similar toys

See 4.7.2.

6.2.2.1 Principle

The toy is loaded so as to simulate the number of children for which it is intended.

6.2.2.2 Apparatus

a) For swings, except those covered by b):

   — a load with a mass of (200 ± 10) kg;

   — loads with a mass of (50 ± 2) kg.

b) For swings intended for children under 36 months and with suspension points 1 200 mm or less above the base level:

   — a load with a mass of (66 ± 3) kg.

6.2.2.3 Procedure

6.2.2.3.1 Strength of swings intended for children over 36 months

See 4.7.2.

Swings intended for children over 36 months with suspension points more than 1 200 mm above the base level shall be tested as follows.

Assemble the toy in accordance with the manufacturer's instructions and place or fix it on a rigid horizontal surface.

For multi-swings and climbing frames, determine the number of children that are intended to use the toy at the same time (consult the manufacturer's instructions for use).

For swing-boats and suspended seesaws (i.e. a swinging toy with two seats, but only one suspension point), ensure that the load is evenly distributed over the two seats or standing surfaces.

Test a centre swinging pole on a climbing frame as if it were a swing, using the appropriate load.

Apply a load of 200 kg on each standing or sitting surface in turn for a period of 1 h.

Then, apply a load of 50 kg on each standing or sitting surface simultaneously for 1 h.

Determine whether the toy still complies with the relevant requirements of this part of ISO 8124.

6.2.2.3.2 Strength of swings intended for children under 36 months

See 4.7.3.

Swings intended for children under 36 months and with suspension points 1 200 mm or less above the base level shall be tested as follows.

Load the toy with a mass of 66 kg for a period of 1 h.

Ensure that the load is spread evenly over the seat.

NOTE Several methods are possible by using either a framework or by hanging loads from the seat.

Determine whether the swing still complies with the relevant requirements of this part of ISO 8124.

6.3 Dynamic strength of barriers and handrails

See 4.2.

6.3.1 Principle

A sudden horizontal impact stress is applied to the barrier or handrail, through a pad, by a falling load.

6.3.2 Apparatus

— A pad with a length of 200 mm and a height of 50 mm minimum made of textile, leather or similar material and stuffed with suitable material and with a shape that will enable it to be attached to the top of a barrier or handrail.

— A device consisting of a pulley and a (25 ± 1) kg mass attached to one end of a non-elastic cord, that will enable a horizontal impact to be applied to the pad on the barrier or handrail by means of a free-falling mass.

An example is given in Figure 23.

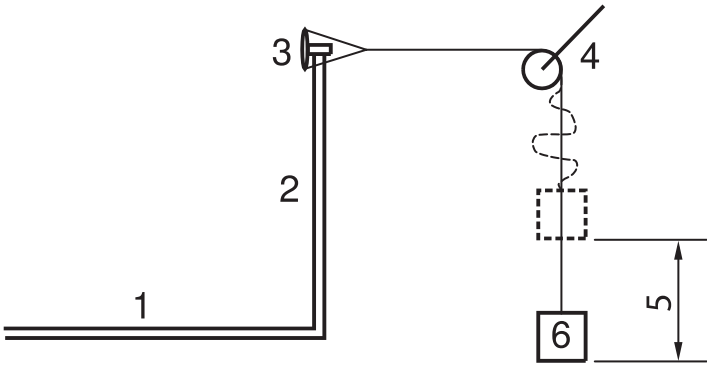
6.3.3 Procedure

Assemble the toy in accordance with the manufacturer's instructions and place or fix it on a rigid horizontal surface.

Place and secure the pad to the top of the barrier or handrail at the most onerous position and without causing any damage to the toy. Attach the free end of the rope to the pad.

Arrange the rope and the pulley so that the load hangs freely. Raise the load vertically (125 ± 10) mm and let it drop freely (this will give an impact energy of approximately 30 J). Within 10 s, remove all tension from the barrier.

Observe whether the toy still complies with the relevant requirements of this part of ISO 8124.



Key

1 platform
2 barrier or handrail
3 pad
4 pulley
5 falling height
6 load

Figure 23 — Example of apparatus for dynamic testing of barriers and handrails

6.4 Determination of impact from swing elements

See 4.7.4.

6.4.1 Principle

Swing seats are raised and allowed to swing to strike a test mass. The signal emitted by an accelerometer during each impact is processed (cut-off frequency of 10 kHz) to determine the peak value of acceleration. The impact area between the swing and the test mass is measured and the surface compression is calculated.

6.4.2 Apparatus

— Test mass, consisting of an aluminium sphere or semi-sphere of radius 80 mm ± 3 mm, and a total mass (including accelerometer) of (4,6 ± 0,05) kg. The impacting part between the surface struck and the accelerometer shall be homogeneous and free from voids. Cables connected to the accelerometer shall be placed in such a way that the effect on the mass of the test mass is minimized. An example is given in Figure 24.

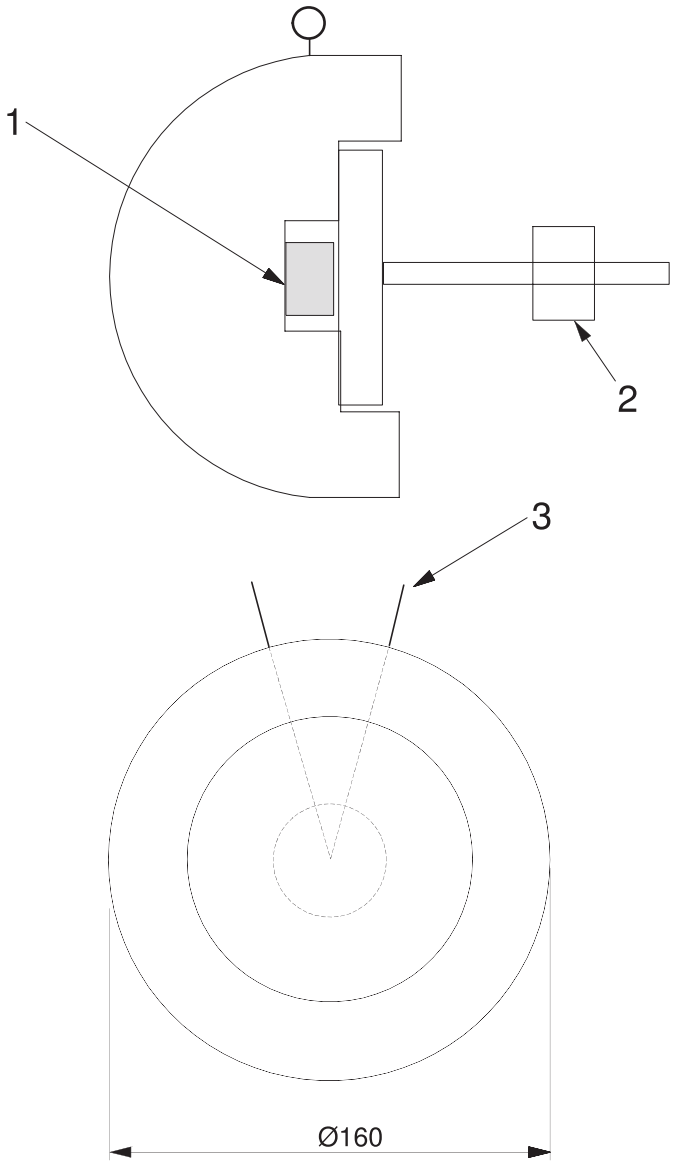
— Accelerometer, mounted at the centre of gravity of the test mass assembly with the sensitivity axis aligned to within 2° of the direction of travel of the test mass, capable of measuring acceleration

triaxially in the range of ± 500 g with an accuracy of ± 0,1 g and with a frequency range from 0 Hz to 10 000 Hz.

— Amplifier with a sampling frequency of 10 kHz and a cut-off frequency of 10 kHz.

— Two chains where the chain links have a thickness of material (diameter) of (6 ± 0,5) mm and an outer major dimension of (47 ± 2) mm. The chains shall be of equal length suspended from pivots 600 mm apart at the same height as the suspension connectors, such that they meet at the point of connection to the test mass. The fictive prolongations of the chains shall meet in the centre of the test mass (see Figure 24).

Dimensions in millimetres



Key

1 accelerometer
2 balance weight
3 connection points

Figure 24 — Example of test mass and connection points for chains

6.4.3 Procedure

Assemble and install the swing element to be tested in accordance with the manufacturer's instructions.

Suspend the swing with the means of suspension that has been supplied with the swing and at the maximum height that these permit. If ropes or cables are the means of suspension, they may need to be stretched in order to allow smooth travel when the swing is released during the test. If needed, apply a load of, for example, 5 kg to the end of each rope or cable and leave it for 6 h or until the ropes or cables have been straightened.

Adjust all parts of the set-up so that the suspending chains for the test mass are parallel to the means of suspension for the swing element.

Suspend and adjust the test mass so that the contact point of the swing element and the centre of the test mass are in the same horizontal plane as the centre of gravity of the test mass. Ensure that the chains for test mass are not twisted and that the test mass hangs in a vertical line.

Affix an index mark to the side of swing elements that are supported by chains, ropes, cables or other non-rigid suspending elements. The index mark may be on any part of the suspended member that is immediately below the pivot point in the free-hanging rest position.

Swing elements that are supported by chains, ropes, cables or other non-rigid suspending elements shall be raised along their arc of travel until the side-view projection of a straight line through the pivot point and index mark forms an angle of (60 ± 1) ° with the vertical. Once the suspended member is raised to the test position, some curvature will be produced in the suspending elements. Adjust the suspended member position to determine that curvature which provides a stable trajectory.

Swing elements that are supported by rigid suspending elements shall be elevated along their arc of travel until the side-view projection of the suspending element, which was vertical in the rest position, is at an angle of (60 ± 1)° to the vertical or at the maximum angle attainable, whichever is less.

NOTE Caution should be exercised to prevent damage to the test equipment. If an unusually heavy or hard swing element is to be tested, preliminary tests should be made at lower test angles (for example, 10°, 20°, 30°, etc.). If the requirements are exceeded at a lower test angle than specified above, the member fails and no further tests are necessary.

Support the swing element in the test position by a mechanism that provides release without the application of external forces that would disturb the trajectory of the seat. Prior to release, the swing element and means of suspension shall be motionless. Upon release, the assembly shall travel in a smooth downward arc without any visible oscillations or rotations of the swing element, which will prevent it from striking the test mass at the impact point. If any obvious oscillations or rotations are noted, the test result shall not be registered, but another test shall be performed.

Prior to the start of a series of measurements, it should be ensured that the intended point of impact is achieved. Mark the centre of the test mass, (+), with a chalk marker so that an imprint is obtained on the impact surface of the seat. Check and, if necessary, make fine adjustments of the test mass in the vertical and horizontal directions. Repeat the procedure until repeatability has been obtained for the intended point of impact.

Some seats of a flexible nature will require a brace to maintain the seat configuration during the test procedure. The mass of brace should not exceed 10 % of the mass of the seat. If a brace is used, the requirement for maximum 50 g may be increased by the same percentage as the mass increase caused by the brace (maximum 10 %).

The intended point of impact is defined as the geometrical centre of the impact surface of the swing.

Mark the centre of the test-mass, (+), with a chalk marker so that an imprint is obtained on the impact surface of the element.

Ensure that the test mass is at complete rest and that it is correctly triaxially adjusted.

Elevate the element and release it as specified above so that the swing element collides with the test mass.

Check that the imprint on the impact surface of the element lies within ± 5 mm (vertical direction) and ± 10 mm (horizontal direction) from the intended point of impact.

6.4.4 Results

6.4.4.1 Peak acceleration

Collect data from five impacts (free from obvious oscillations or rotations). Measure the peak acceleration in *g* for each impact. Calculate the average peak acceleration and check whether the requirement is met. The peak acceleration from one impact shall be calculated as the root-mean-square of the highest values in each direction of measurement:

$$\text{Peak acceleration} = \sqrt{(\max. X)^2 + (\max. Y)^2 + (\max. Z)^2} \quad (2)$$

Note that the maximum value in each direction shall be measured regardless of the time at which it occurs (maximum X may occur at a different moment than maximum Y).

The acceleration, *g*, shall be registered to one decimal place.

6.4.4.2 Surface compression

In two of the five impact tests, the impact area shall be measured as follows:

— apply chalk to the test mass before the impact test and measure the chalked surface on the swing element after the impact;

— use a transparent celluloid-film (such as that used for overhead projectors) in order to make a copy of the impact area;

— place a “millimetre paper” under the film and calculate the exact impact area in square centimetres to one decimal place.

Calculate the average impact area for the two tests and thereafter the surface compression in newtons per square centimetre using the equation:

$$\text{Surface compression} = F/A \quad (3)$$

where

A is the average impact area;

F is egual to $m \times a$, where m is is the test mass (4,6 ± 0,23) kg and a is the average peak acceleration value calculated from the five impact tests.

NOTE 1 If the swing element is deformed during testing, a new sample shall be used for the remaining tests.

NOTE 2 It might be necessary to clean the test mass with spirits between tests.

6.5 Test for head and neck entrapment

6.5.1 Head and neck entrapment in completely bound openings

See 4.2 and 4.4.1.

6.5.1.1 Principle

Test probes are used for assessing completely bound openings for head and neck entrapment.

6.5.1.2 Apparatus

Test probes made of any suitably rigid material and with dimensions as given in Figures 25, 26 and 27.

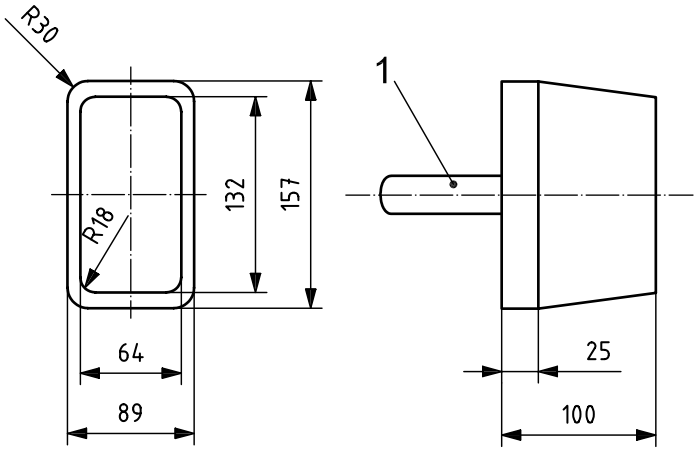
6.5.1.3 Procedure

Insert probe C (Figure 25) into the opening with a force of 220 N. If the opening allows the passage of probe C, determine whether the opening also allows the passage of probe D (Figure 26) when inserted with a force of 100 N.

Insert probe E (Figure 27) into the opening with a force of 100 N. If the opening allows the passage of probe E, determine whether the opening also allows the passage of probe D when inserted with a force of 100 N.

Insert the probes perpendicular to the opening and do not tilt them.

Dimensions in millimetres



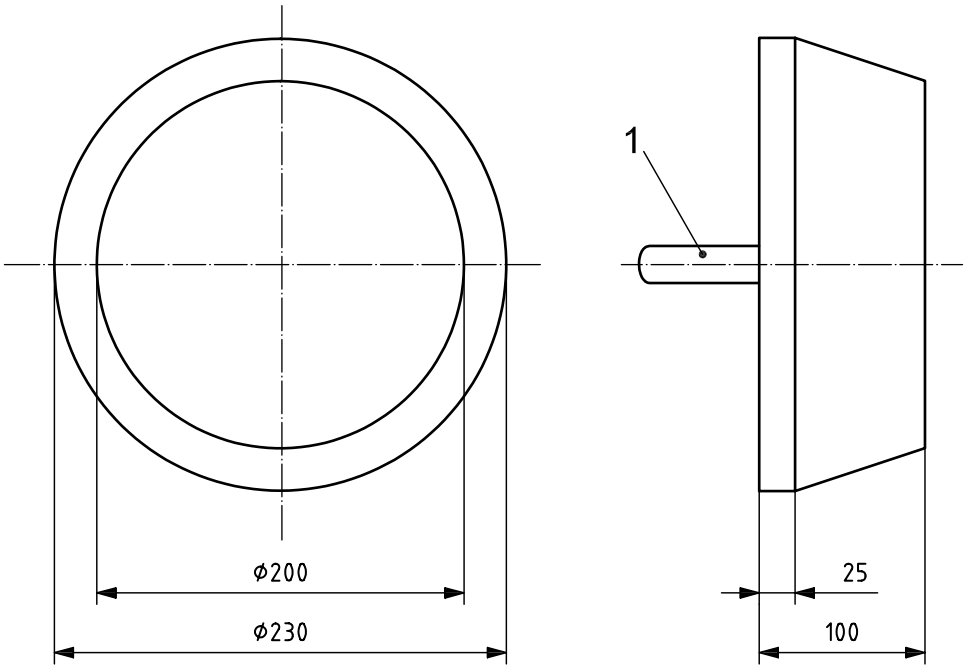
Key

1 handle

NOTE Unless stated otherwise, tolerances on measurements are ± 1 mm for dimensions.

Figure 25 — Probe C (torso) for assessment of completely bound openings

Dimensions in millimetres



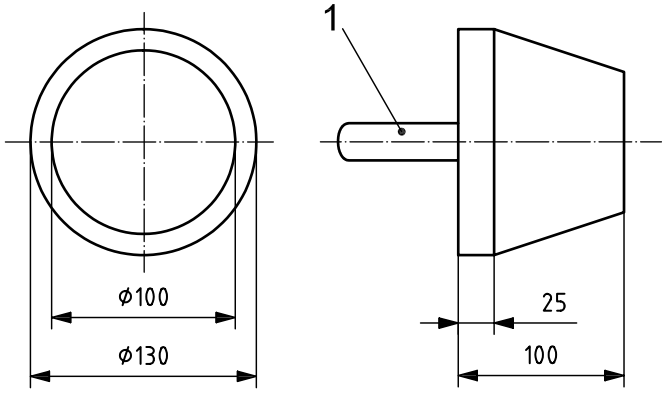
Key$

1 handle

NOTE Unless stated otherwise, tolerances on measurements are ± 1 mm.

Figure 26 — Probe D (large head) for assessment of completely bound openings

Dimensions in millimetres



Key

1 handle

NOTE Unless stated otherwise, tolerances on measurements are ± 1 mm.

Figure 27 — Probe E for assessment of completely bound openings

6.5.2 Head and neck entrapment in partially bound and V-shaped openings

See 4.4.1.

6.5.2.1 Principle

A test template is used for assessing partially bound and V-shaped openings for head and neck entrapment.

6.5.2.2 Apparatus

Test template made of any suitable rigid material and with dimensions as given in Figure 28.

6.5.2.3 Procedure

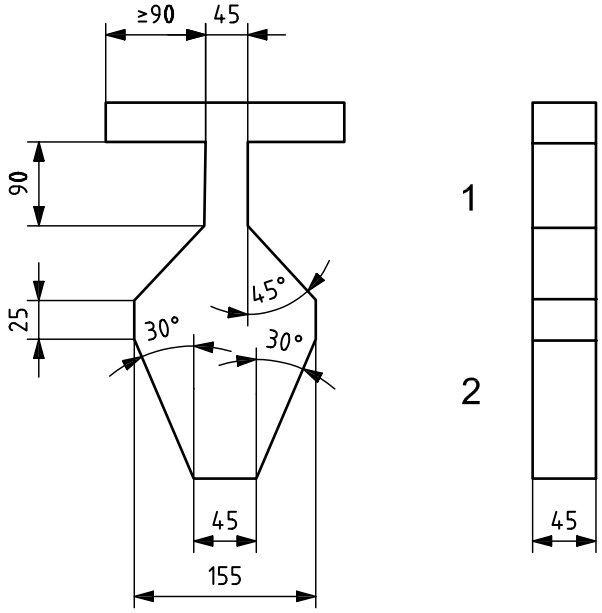
a) Position the "B" portion of the test template between and perpendicular to the boundaries of the opening, as shown in Figure 29.

Observe whether the template fits within the boundaries of the opening or whether it cannot be inserted to its full thickness as indicated in Figure 29.

Determine whether the opening is accessible or not accessible as defined in Figure 29.

b) If the test template can be inserted to a depth greater than the thickness of the template (45 mm) when tested in accordance with a), apply the "A" portion of the test template, so that its centre line is in line with the centre line of the opening. Ensure that the plane of the test template is parallel and applied in line with the opening, as shown in Figure 30.

Dimensions in millimetres



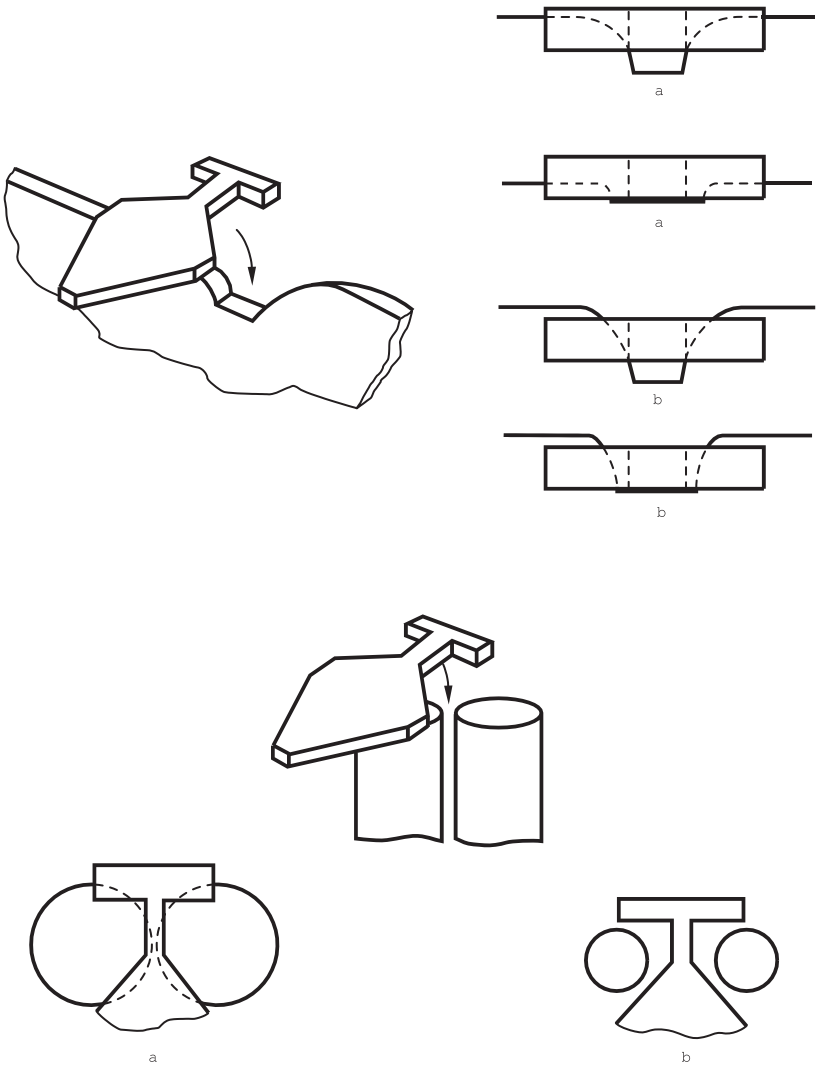
Key

1 portion B

2 portion A

NOTE Unless stated otherwise, tolerances on measurements are ± 1 mm for dimensions and ± 1° for angles.

Figure 28 — Test template D for assessment of head and neck entrapmentin partially bound and V-shaped openings

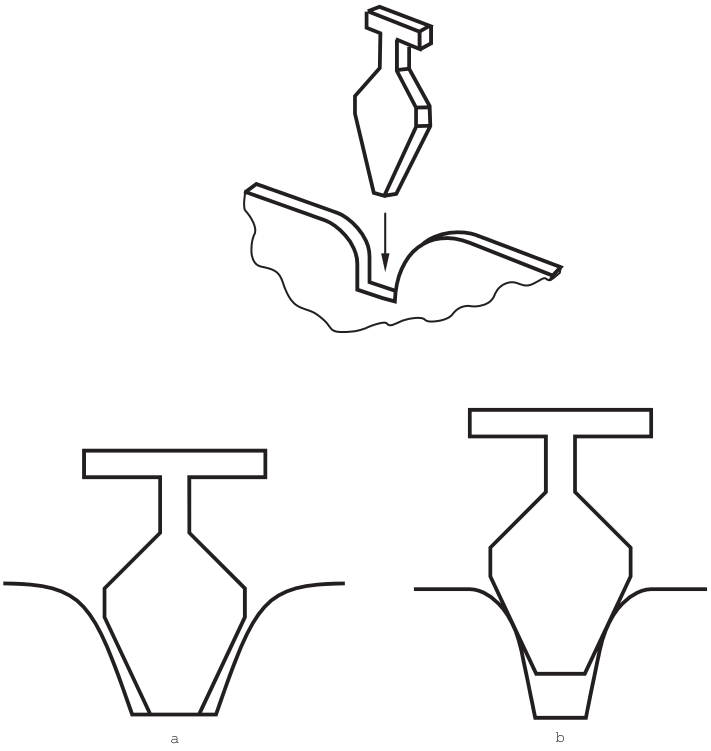


Key

a Not accessible.

b Accessible.

Figure 29 — Method of insertion of the "B" portion of the test template



Key

a Passes.

b Fails.

Figure 30 — Method of insertion of the "A" portion of the test template

Insert the test template along the centre line of the opening until its motion is arrested by contact with the boundaries of the opening or the tip of the template contacts the base.

Observe whether the tip of the template contacts the base of the partially bound or V-shaped opening as indicated in Figure 30.

6.6 Toggle test

See 4.4.2.

6.6.1 Principle

A toggle test device is moved along the direction of a forced movement in order to establish whether there is a potential entrapment hazard.

6.6.2 Apparatus

Toggle test device as shown in Figure 31 a) comprising of:

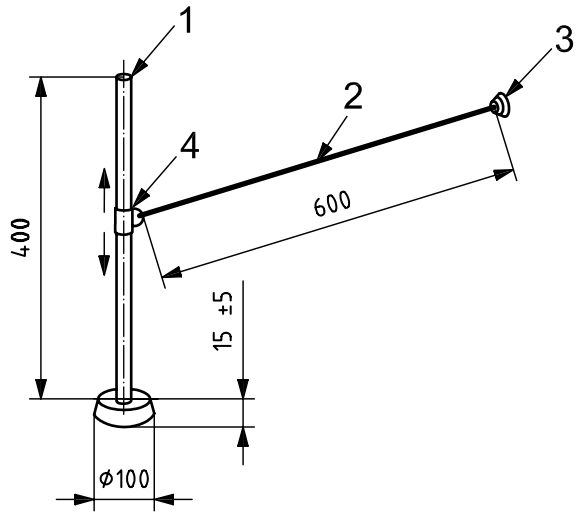
— toggle, as shown in Figure 31 b), made of polyamides (PA) (e.g. nylon) or polytetrafluroethylene (PTFE), which have been found to be suitable materials;

— chain, as shown in Figure 31 c);

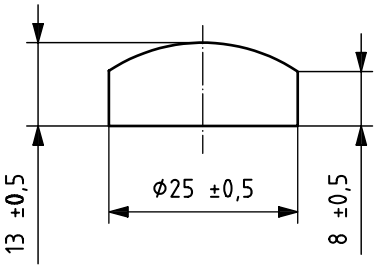
— collar, detachable and with good slip;

— pole.

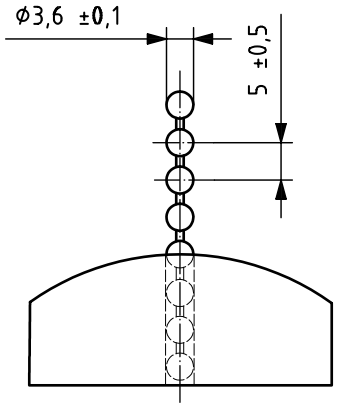
Dimensions in millimetres



a) Complete test device



b) Toggle



c) Chain

Key

1 pole
2 chain
3 toggle
4 collar

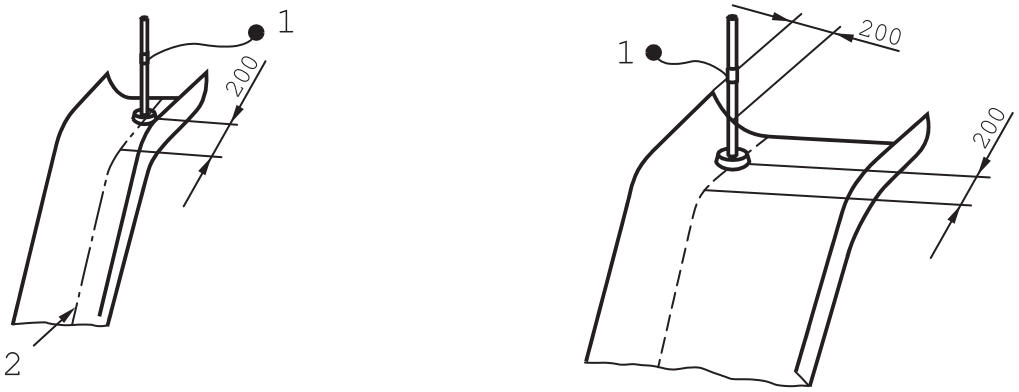
Figure 31 — Toggle test device

6.6.3 Procedure

6.6.3.1 Slides

Position the complete test device vertically 200 mm from the transition point of the starting section of the slide and at the appropriate lateral location, as shown in Figure 32.

Dimensions in millimetres



a) Narrow slide **b) Wide slide**

Key

1 toggle test device

2 centre line of slide

Figure 32 — Positioning of the test device on slides

Apply the toggle and chain to all positions within the range, as follows.

a) Move the complete test device in the direction of the forced movement, ensuring that the pole of the test device remains vertical and that the application of the toggle and chain is influenced solely by its own mass. Do not apply any additional initial force to wedge the toggle or chain in an opening.

b) Where a slide is wider than the width of the test device, carry out the test twice with the base of the pole positioned at both width extremities of the bed way, as shown in Figure 32.

Observe whether entrapment of the toggle or chain occurs.

6.6.3.2 Fireman's poles

Conduct the test in two different ways, as follows.

a) Position the complete test device vertically at the edge of the platform at the point closest to the fireman's pole.

Apply the test device to all positions within range, ensuring that the application of the toggle or chain is influenced solely by its own mass. Do not use any additional initial force to wedge the toggle or chain in an opening. If a potential entrapment point is thus identified, move the test device in the direction of the forced movement of a user.

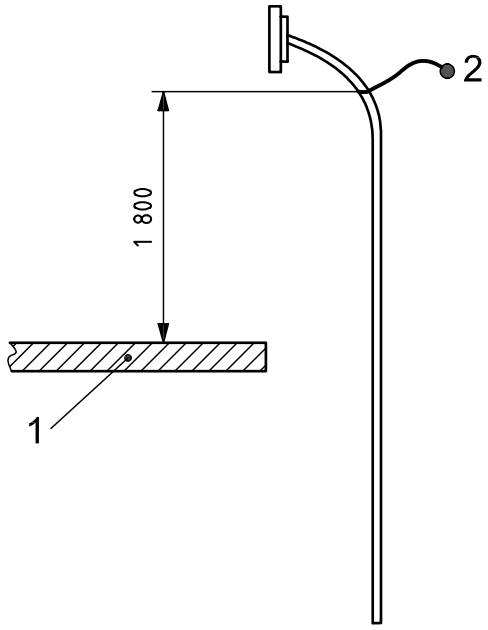
Observe whether entrapment of the toggle or chain occurs.

b) Detach the toggle and the chain from the complete test device and position it so that it is at a point 1 800 mm above the surface of the adjacent platform, as shown in Figure 33.

Apply the toggle and chain to all positions along the entire length of the fireman's pole down to the point 1 000 mm above ground level, ensuring that the application of the toggle and chain is influenced solely by its own mass. Do not use any additional initial force to wedge the toggle or chain in an opening. If a potential entrapment point is thus identified, move the toggle and chain in the direction of the forced movement of a user.

Observe whether entrapment of the toggle or chain occurs.

Dimensions in millimetres



Key

1 starting platform

2 toggle and chain

Figure 33 — Positioning of the test device on fireman's pole

6.6.3.3 Roofs

Apply the toggle and chain to any accessible opening at the apex or along the surface of the roof, ensuring that the application of the toggle or chain is influenced solely by its own mass. Do not use any additional initial force to wedge the toggle or chain in an opening.

Move the test device in the direction of any potential sliding movement of the user.

Observe whether entrapment of the toggle or chain occurs.

6.7 Test for protrusions

See 4.1.4.

6.7.1 All Protrusions

See 4.1.4.1, 4.1.4.2 and 4.1.4.3.

6.7.1.1 Principle

Test gauges are used for assessing the extent of protrusions.

6.7.1.2 Apparatus

Test gauges made of any suitable rigid material and with dimensions as given in Figure 34.

Dimensions in millimetres

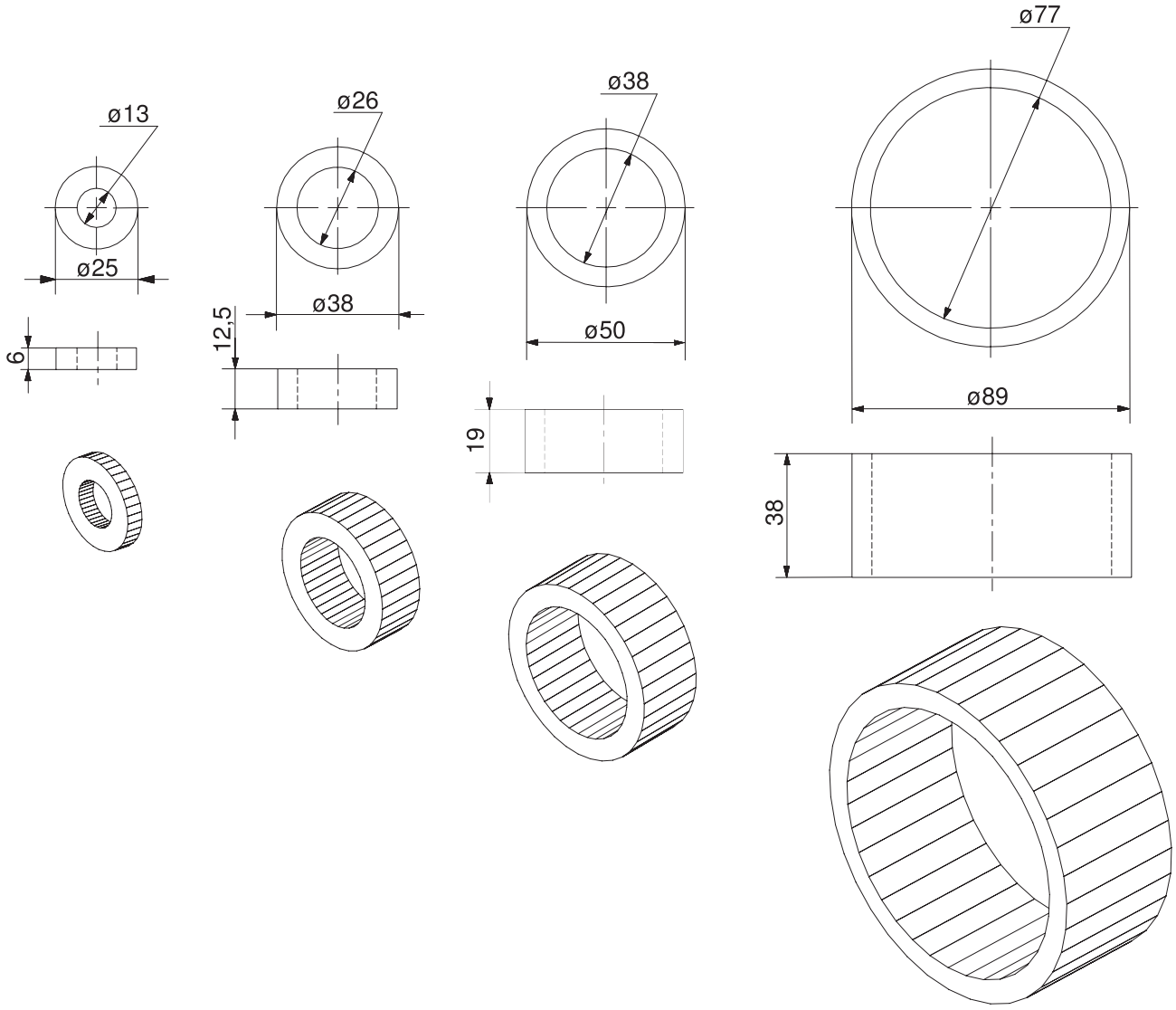


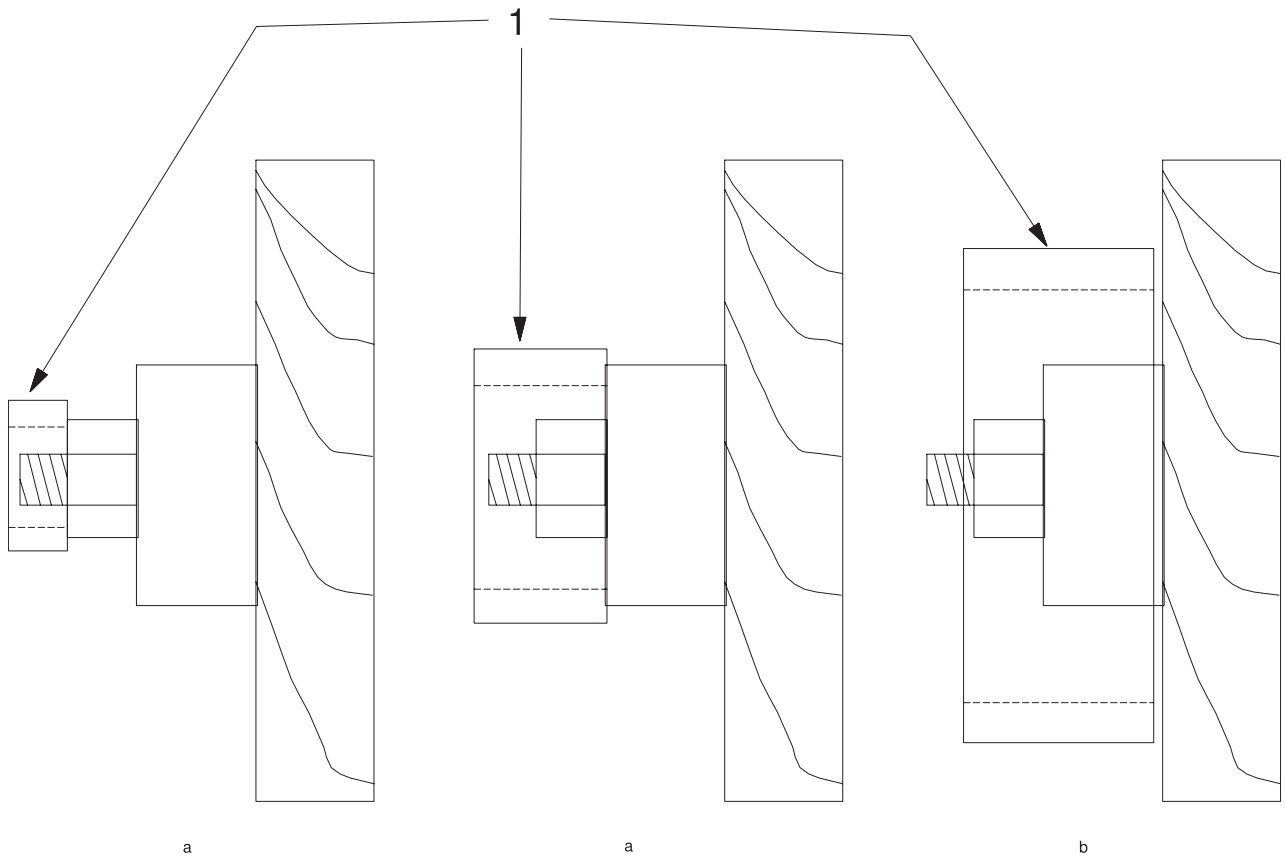
Figure 34 — Protrusion test gauges

6.7.1.3 Procedure

Place each test gauge shown in Figure 34 over the protrusion.

For each gauge that fits over the protrusion, determine whether the protrusion extends beyond the full depth of the gauge.

See Figure 35 for examples of test gauge use.



Key

1 gauge

a Pass.

b Fail.

Figure 35 — Compound protrusion test

6.7.2 Protrusions in motion rides

See 4.1.4.4 and 4.1.4.5.

6.7.2.1 Principle

A test gauge is used to assess the extent of protrusions.

6.7.2.2 Apparatus

A test gauge made of any suitable rigid material and with dimensions as given in Figure 36.

6.7.2.3 Procedure

a) For swing elements, conduct the test with the swing element in its rest position. Place the gauge shown in Figure 36 over any protrusions on the front and rear surfaces of the suspended member such that the axis of the hole is parallel to both the intended path of the suspended member and a horizontal plane.

b) For slides, place the gauge shown in Figure 36 over any protrusions on the interior surface of the slide.

Determine whether the protrusion extends beyond the full depth of the gauge.

Dimensions in millimetres

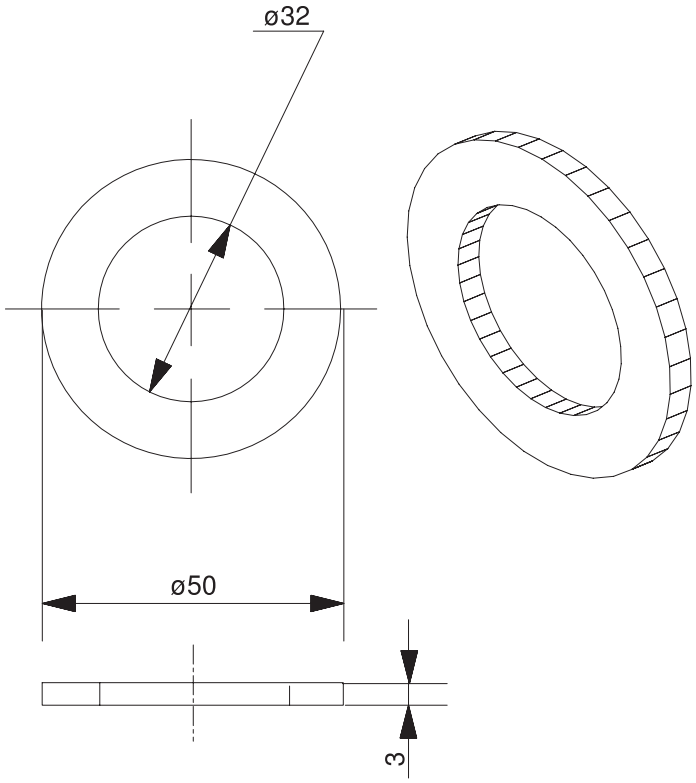


Figure 36 — Motion-ride test gauge

6.8 Durability test for suspension connectors and means of suspension

See 4.7.8.

6.8.1 Principle

Suspension connectors and means of suspension are cycled 180 000 times under load to simulate use.

6.8.2 Apparatus

Test masses as specified in Table 5

Table 5 — Swing arc and test masses

Swing type	Swing arc °	Test mass kg
Single-occupancy swing (two suspension connectors)	90	37
Multiple-occupancy exposed swing (two suspension connectors, two occupants)	60	60
Multiple-occupancy enclosed swing (four suspension connectors, two occupants)	45	27
Multiple-occupancy enclosed swing (four suspension connectors, four occupants)	45	54

6.8.3 Procedure

Attach each type of swing element to its support member in accordance with the installation instructions, and mount in a suitable test fixture.

Flexible components of the swing element may be replaced by rigid components of at least the same size and mass, as long as the alternate components do not affect the moving parts of the swing element.

Secure the appropriate test mass to each occupant position to be tested.

Oscillate this suspended unit through an arc with an included angle as specified in Table 5 for a total of 180 000 cycles (forward and backward).

Determine whether any loosening or structural failure of the suspension connector occurs.

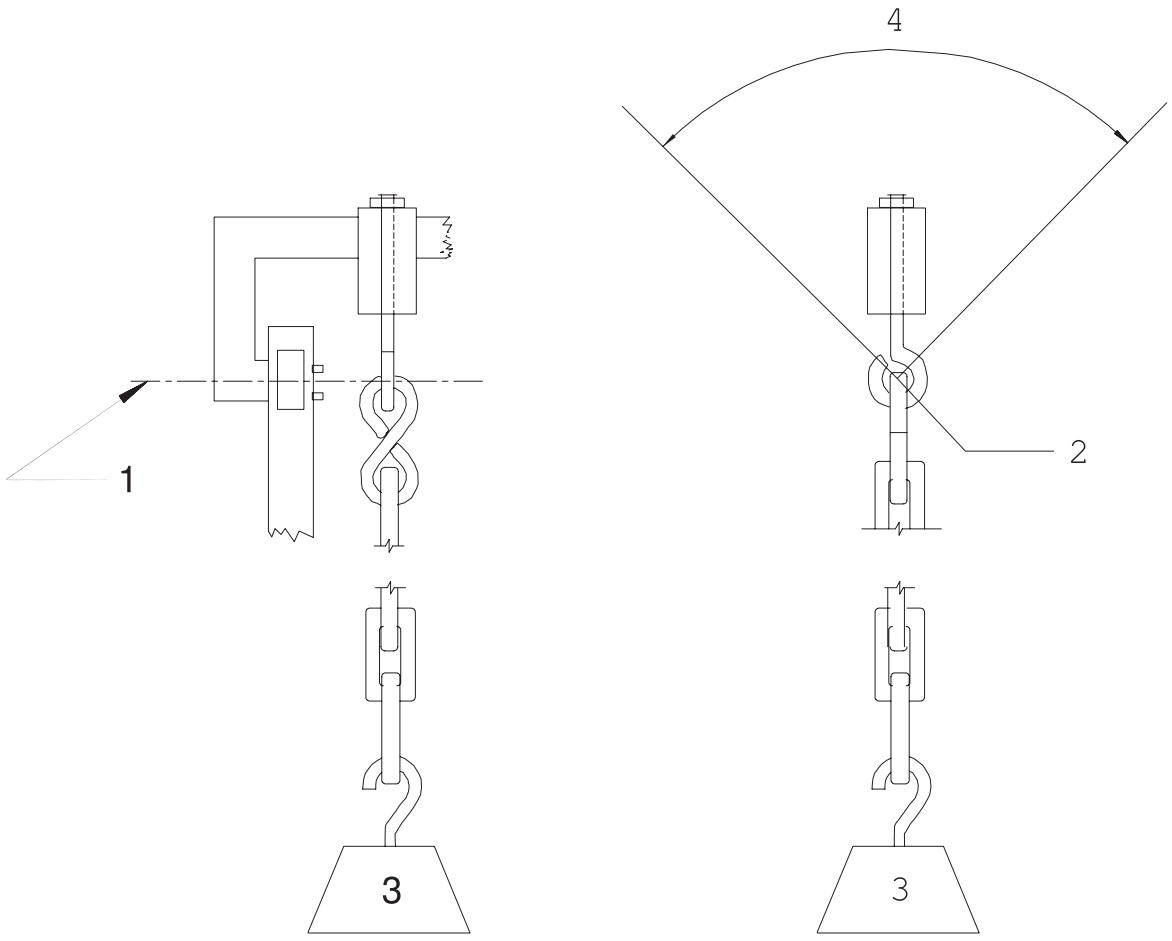
6.8.4 Alternate procedure

As an alternative to the above test, swing suspension connectors may be tested individually in a laboratory test fixture as follows.

Secure the suspension connector to a portion of its support member in accordance with the manufacturer's installation instructions.

Install the support member and suspension connector in the test fixture shown in Figure 37, ensuring that the pivot axis of the test fixture and the pivot point of the suspension connector are aligned.

In accordance with Table 5, attach the appropriate test mass to the suspension connector and oscillate the support member 180 000 cycles (forward and backward) through the appropriate arc (see Table 5).



Front view Side view

Key

1 pivot axis
2 pivot point
3 test mass
4 swing arc (see Table 5)

Figure 37 — Suspension connector and means of suspending test fixture

6.9 Deflation of inflatable activity toys

6.9.1 Principle

A test mass is applied to a single platform or playing surface and the valve is opened or the blower motor is stopped, as applicable. The time for the toy to deflate so that the mass reaches its lowest point is measured.

The test is repeated for each individual platform or playing surface.

6.9.2 Apparatus

6.9.2.1 Loading pad, made of a rigid material with a diameter of 400 mm.

6.9.2.2 Additional loads, consisting of sandbags sufficient to make up the test loads as specified in Table 6.

6.9.3 Procedure

Inflate the activity toy to its specified minimum air pressure or to the pressure of the supplied blower.

Apply the appropriate load in accordance with Table 6, at the geometric centre of the platform or playing surface through the loading pad.

Table 6 — Test loads for deflation test

Height of platform mm	Mass of test load kg
Less than 1 500	20
1 500 or more	35

Open the valve or stop the blower motor as applicable.

Measure:

a) the time taken for the test mass to reach its lowest point, and

b) the time taken for the opening of any tunnel or squeeze point under the platform to be reduced in height by 50 %.

6.10 Static load test for paddling pools with non-inflatable walls

See 4.11.2.

Apply a 25 kg load (see Figure 19) vertically for a period of 5 min to any point of the structure not intended to bear the mass of a child and which is most likely to produce failure.

Annex A
(informative)

Rationale

A.0 General

This annex provides a rationale for certain important requirements of this part of ISO 8124. It is intended for those who are familiar with the subject of this part of ISO 8124 but who have not participated in its development. An understanding of the reasons for these requirements is considered to be essential for the proper application of this part of ISO 8124.

The clauses in this annex have been numbered to correspond to the clauses to which they refer. The numbering is, therefore, not consecutive.

A.1 Scope

Toys covered by this part of ISO 8124 have hazards in common with products intended as public playground equipment. It is sometimes difficult to decide whether they are toys for family domestic use or public playground equipment. As a general rule, products that are intended exclusively for family use fall under the scope of this part of ISO 8124.

A.3.19 Paddling pool

The definition of paddling pool is aligned with that in EN 71-8. Pools with a maximum depth greater than 400 mm are not considered to be toys and so are not covered by the requirements of this part of ISO 8124. This depth is felt to be a reasonable limitation on what should be considered a toy

A.4.1 Requirements, general

This clause gives basic requirements for all activity toys. It is intended to reduce the hazards resulting from inadequate strength, falls from heights, hazardous protrusions and gives certain hardware requirements.

A.4.1.2 Maximum height

The maximum fall height does not change with the age of the user, as a single activity toy commonly covers a wide range of users. The requirements for barriers are intended to ensure that raised platforms are safe for children of all ages.

A.4.1.3 Corners and edges

The requirement for a 3 mm curvature radius on moving parts applies to swings, carousels and similar items involving a certain mass and speed. It does not apply to doors, lids and similar movable items. However, whenever possible, manufacturers are recommended to use generous radii in order to minimize hazards.

NOTE General requirements for sharp edges are given in ISO 8124-1.

A.4.1.5 Climbing and swinging ropes, chains and cables

Free-hanging ropes present a potential for strangulation. This requirement is intended to prevent the possibility of a rope becoming looped around the neck of a child.

Note that a suspended rope chain or cable that can form a loop larger than 130 mm will also be able to form a loop of 130 mm and so will fail the requirement.

A.4.2 Barriers

Barriers are not required for platforms lower than 760 mm, as falls from this height do not present a serious risk of injury.

Platforms from 760 mm and up to 1 000 mm present a higher risk of injury for young children. The barrier on these platforms is intended to prevent inadvertent falls by younger children who are not aware of the inherent dangers of higher platforms. These barriers may be any height greater than 630 mm, but the maximum vertical opening of 610 mm is intended to ensure that the barrier will be effective for the youngest children likely to be playing on the equipment.

Platforms above 1 000 mm present a higher risk of injury and as such the barriers required are higher and include a requirement that will prevent children passing through them. The barrier height for platforms between 1 000 mm and 1 830 mm high is based on the height of the centre of gravity of the 95th percentile of six year olds. The barrier height for platforms greater than 1 830 mm high is based on the height of the centre of gravity of the 95th percentile of 10 year olds.

While children older than 10 years are expected to use the equipment, it is believed that the combination of their increased co-ordination, fine motor skills and comprehension of the hazard makes higher barriers un-necessary.

A.4.4 Entrapment

Fatal accidents are known to have happened when the head of a child gets entrapped, causing strangulation. Openings therefore have to be designed so that if the torso can pass through, then the head can also pass through. This hazard is further complicated by the fact that children sometimes wear bicycle helmets or so-called play helmets.

The exclusion of openings less than 600 mm above the ground is no longer allowed, as new studies indicate that it is possible for young children to be strangled even when their feet are on the ground.

Hoods and hood-strings on clothing also involve a significant hazard, for example when sliding down a slide, and the toggle test given in 6.6 (toggle test) is intended to reduce the risk for entrapment of these items.

Subclause 4.4 (entrapment) also includes requirements for entrapment of fingers, as well as other parts of the body.

A.4.6 Slides

The requirements for handrails [see 4.6.3 (starting, sliding and run-out section on slides) c)] for the starting section and for ladders are intended to prevent children from falling when moving into a sitting position at the starting section.

A.4.7 Swings

These requirements are intended to reduce the risks from frames and suspension arrangements, and from children becoming entrapped in the suspension ropes.

A.4.7.2 Strength of crossbeams, swing devices, suspension connectors and suspension couplings

The most common swing for children under 36 months is used indoors and often hung in door openings.

These swings are tested with a load of 200 kg, as it can be expected that an older child will try to use them. Swings with suspension points less than 1 200 mm above the base point are considered to be too low to be used by older children and can therefore be tested with the lower mass of 66 kg.

A.4.7.6 Lateral stability of swing elements

This requirement reduces the risk of impact with adjacent swing elements.

A.4.7.8 Suspension connectors and means of suspension

The minimum diameter of ropes or width of straps and chains is set at 10 mm in order to reduce the risk of strangulation.

A.4.9 Carousels and rocking toys

The intention of this requirement is to ensure the strength and the sideways and fore and aft stability of rocking activity toys so that they do not overturn unexpectedly.

A.4.10 Inflatable activity toys

Inflatable activity toys have a high surface area in proportion to their mass and can be affected by wind if not properly anchored.

Commercial inflatable play devices are required to have sufficient anchorage to withstand a Beaufort scale 6 wind speed (11,1 m/s). The number of anchorage points required on each side of the device is calculated using Formula (1):

$$\text{Number of anchorage points} = \frac{F}{1\ 600\ \text{N}} \times 1{,}5 \tag{1}$$

where

$$F = C_{\text{w}} \frac{\rho}{2} V^2 A \tag{2}$$

F is the force;

C_{w} is the wind coefficient;

ρ is the density of air;

V is the maximum wind speed;

A is the area of exposed surface determined by measurement or calculation (m^2) using the following default values:

C_{w} = 1,5;

ρ = 1,24 kg/m^3;

V = 11,1 m/s (mean of Force 6 Beaufort).

Using these values, two anchorage points per side are sufficient for a device with an exposed surface area of 18,7 m^2. Two anchorage points per side are therefore considered to be sufficient for a toy intended for domestic family use.

Each component of the anchorage system is required to withstand a force of 1 600 N applied in the direction of normal use. Failure is determined by separation of the component from the ground or the toy. It is expected that if the force is sufficient to loosen the component, then it will be sufficient to completely separate it.

A.5.4.3 Paddling pools

This is an International Standard and is expected to apply to products sold in multiple markets. It has therefore been decided to allow safety signs that might be specified in other internationally recognized standards such as ASTM, ANSI, and EN.

Annex B
(informative)

Consumer information sheet for playground surfacing materials

The US Consumer Product Safety Commission (CPSC) estimates that about 100 000 playground equipment-related injuries resulting from falls to the ground surface are treated annually in US hospital emergency rooms. Injuries involving this hazard pattern tend to be among the most serious of all playground injuries, and have the potential to be fatal, particularly when the injury is to the head. The surface under and around playground equipment can be a major factor in determining the injury-causing potential of a fall. It is self-evident that a fall on to a shock-absorbing surface is less likely to cause a serious injury than a fall onto a hard surface. Playground equipment should never be placed on hard surfaces, such as concrete or asphalt, and while grass may appear to be acceptable, it may quickly turn to hard-packed earth in areas of high traffic. Shredded bark mulch, wood chips, fine sand or fine gravel are considered to be acceptable shock absorbing surfaces when installed and maintained at a sufficient depth under and around playground equipment.

Table B.1 lists the maximum height from which a child would not be expected to sustain a life-threatening head injury in a fall on to four different loose-fill surfacing materials if they are installed and maintained at depths of 150 mm, 225 mm and 300 mm.

Table B.1 — Fall height in millimetres from which a life-threatening head injury would not be expected

Type of material	Depth of surfacing material		
	150 mm	225 mm	300 mm
Double shredded bark mulch	1 800	3 000	3 300
Wood chips	1 800	2 100	3 600
Fine sand	1 500	1 500	2 700
Fine gravel	1 800	2 100	3 000

However, it should be recognized that all injuries due to falls cannot be prevented, no matter what surfacing material is used.

It is recommended that a shock absorbing material extend a minimum of 1 800 mm in all directions from the perimeter of stationary equipment such as climbing frames and slides. However, because children may deliberately jump from a moving swing, the shock absorbing material should extend in the front and rear of a swing a minimum distance of twice the height of the pivot point measured from a point directly beneath the pivot on the supporting structure.

This information is intended to assist in comparing the relative shock-absorbing properties of various materials. No particular material is recommended over another. However, each material is only effective when properly maintained. Materials should be checked periodically and replenished to maintain correct depth as determined necessary for the equipment in question. The choice of a material depends on the type and height of the playground equipment, the availability of the material in a particular area, and its cost.

This information has been extracted from the CPSC publications "*Playground Surfacing — Technical Information Guide*" and "*Handbook for Public Playground Safety*".

Annex C
(informative)

Safety labelling guidelines for certain types of activity toys

C.1 General

This annex provides guidance for labelling of certain types of activity toys.

The purpose of safety labelling is to supply appropriate safety information to the consumer at the point of purchase (i.e. on the toy or on the packaging, if supplied) and/or prior to the initial use of the toy (i.e. in the instructions) and/or prior to each use of the toy (i.e. labelling on the toy). Requirements for toy safety labelling for certain toys or toy characteristics are given in the appropriate subclauses of Clause 5 (warnings and labelling).

C.2 Safety labelling

C.2.1 Label definition and location

The safety labelling should be in a visible, easily legible, understandable and indelible form.

The safety information should be in a format that draws the attention of the consumer and should be placed on the packaging or the product so that the consumer, at the point of purchase, can easily see it.

Safety labelling and manufacturing markings should be in the language of the country in which the toys will be distributed.

C.2.2 Drowning

See 5.4.1.

If there is a possibility that water can accumulate to a depth of more than 40 mm in any part of the activity toy, a warning similar to the following should be provided in the instructions and on the toy.

Warning — Drowning Hazard. Remove accumulated water before use.

C.2.3 Anchorage of inflatable activity toys

See 5.4.2.1.

Inflatable activity toys and their packaging (if supplied) should carry a warning concerning the risk of using the toy in high winds and of not using the anchorage system, similar to the following

Warning — This toy is not safe if the anchorage system is not used as it may be lifted by light winds. Do not use in high winds.

C.2.4 Connection tubes for inflating inflatable activity toys

See 5.4.2.2.

Connection tubes for inflating inflatable activity toys should carry a warning concerning the risk of falling onto the inflation device, similar to the following:

Warning — Children may be injured by falling onto inflation devices. Ensure that inflation devices are positioned at least 2,5 m from the toy.

C.2.5 Friction burns

See 5.4.2.3.

Inflatable activity toys that have the potential to cause friction burns should carry a warning concerning this possibility and advising that appropriate clothing should be worn, similar to the following:

Warning — Use of this product may cause friction burns to exposed skin. Ensure that clothing fully covers arms and legs, as well as the torso.

Bibliography

[1] EN 71-8, *Safety of toys — Part 8: Safety of toys - Part 8: Activity toys for domestic use*

[2] ASTM F1148, *Standard Consumer Safety Performance Specification for Home Playground Equipment*

[3] IEC 60335-2-80, *Household and similar electrical appliances — Safety — Part 2-80: Particular requirements for fans*

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