Food and Consumer Poduct Safety Authority

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

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Hazards due to use of the equipment are:

Entanglement
Entrapment
Suffocation
Strangulation
Collision
Overloading of the body

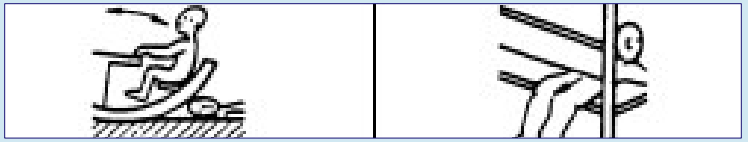
SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

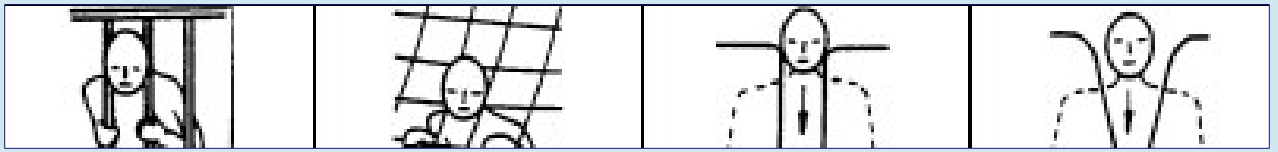
When there is presumption you confirms it with the test probes, such as:

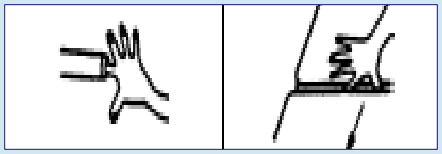
- entrapment of head and neck (openings where a standing surface is at all times available on both sides at less than 600 mm below the lower edge, do not present any hazard, as the child then has a support for the feet)
- entrapment of clothing (above 600 mm)
- entrapment of fingers (during or as a result of a forced movement; located at a place where the free fall height exceeds 1,200 mm)

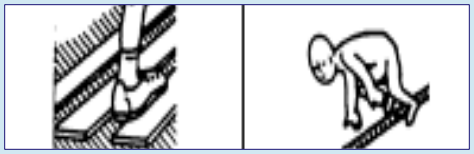
SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

Hazards due to use of the equipment are:









SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

Who are the foreseen users?

Equipment intended for children aged 3 years or over or 0 – 14 years.

From a free height of fall of 600 mm, the surface of impact area should have appropriate impact absorbing properties.

In the space within, on or arround the equipment there should be no unexpected obstacles that may cause injuries when the user bumps into them (e.g. beams at tripping height or at head height).

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

Around the carousel there shall be a free space of at least 2,000 mm.

The falling space of a carousel is equal to the free space of the carousel.

The nessary impact absorbing surfacing of a slide should be installed in an area that extends at least 1 m along the side of the landing area and 1 m beyond the end of the run-out section.

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

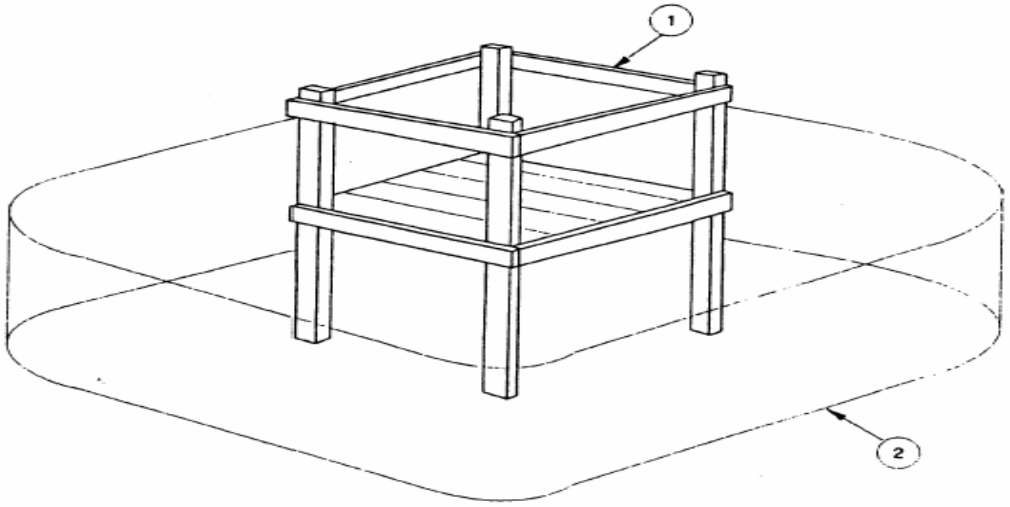
First of all I would explain some definitions:

Equipment space: space occupied by the equipment
Falling space : in or around the equipment that can be occupied by a user falling from an elevated part of the equipment (the falling space should be free of obstacles that could injure a user in the event of a fall)

The falling space commences at the free height of fall.

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

EN 1176-1:1998



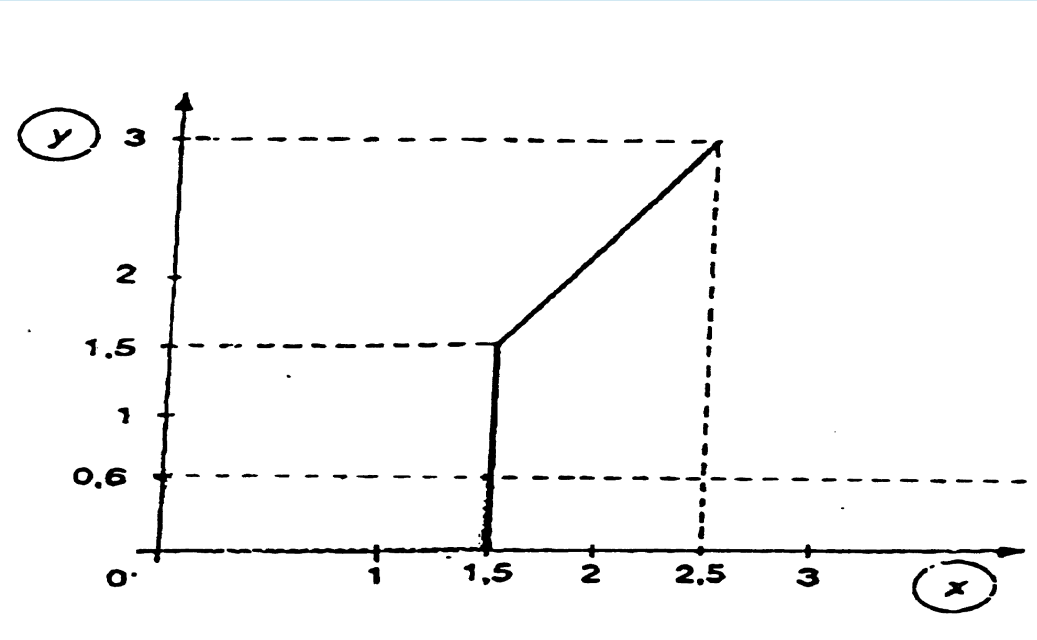
1 Space occupied by the equipment
2 Falling space

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

The sizes of the impact area should be suited to the free height of fall and the movements of the equipment.

Some exemples are:

0.2 m	-	0 m
0.5 m	-	0 m
0.6 m	-	1.5 m
1.0 m	-	1.5 m
1.5 m	-	1.5 m
2.0 m	-	1.8 m
2.5 m	-	2.2 m
3.0 m	-	2.5 m



SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

Free space: in or around the equipment that can be occupied by a user undergoing a movement forced by the equipment (e.g. swinging)

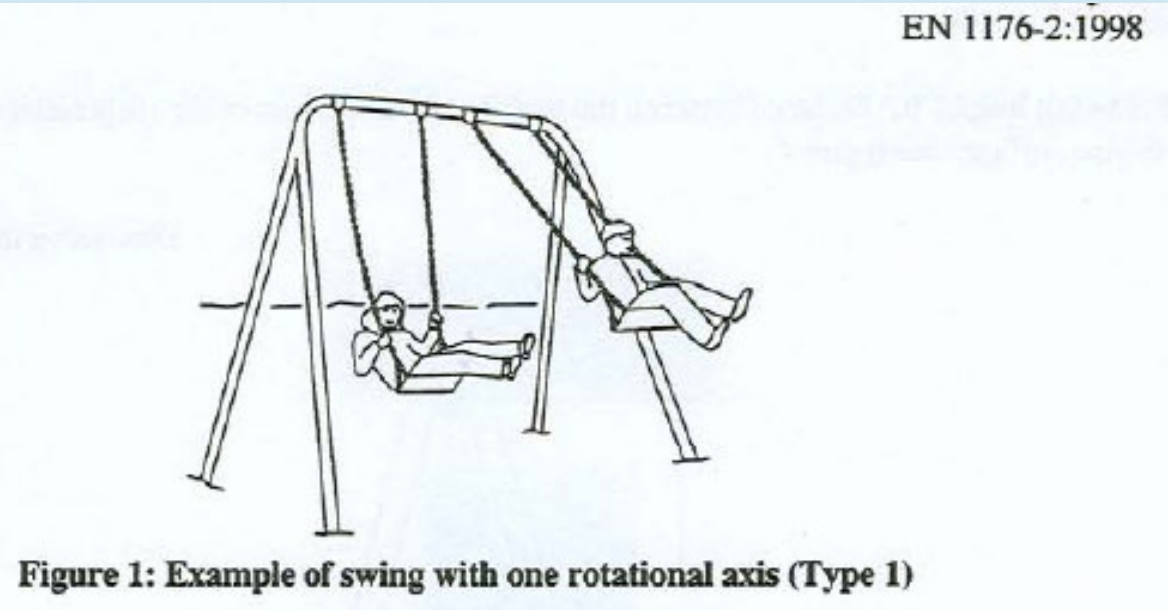
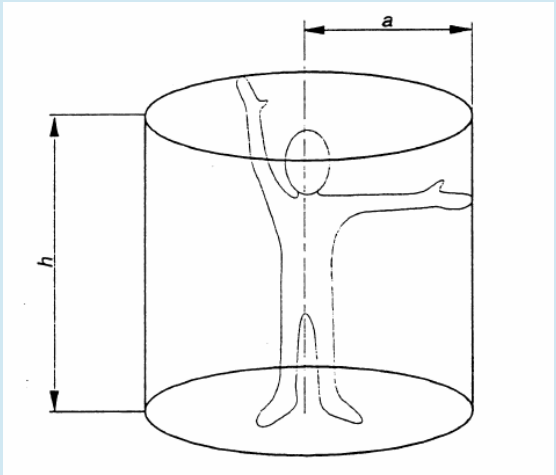
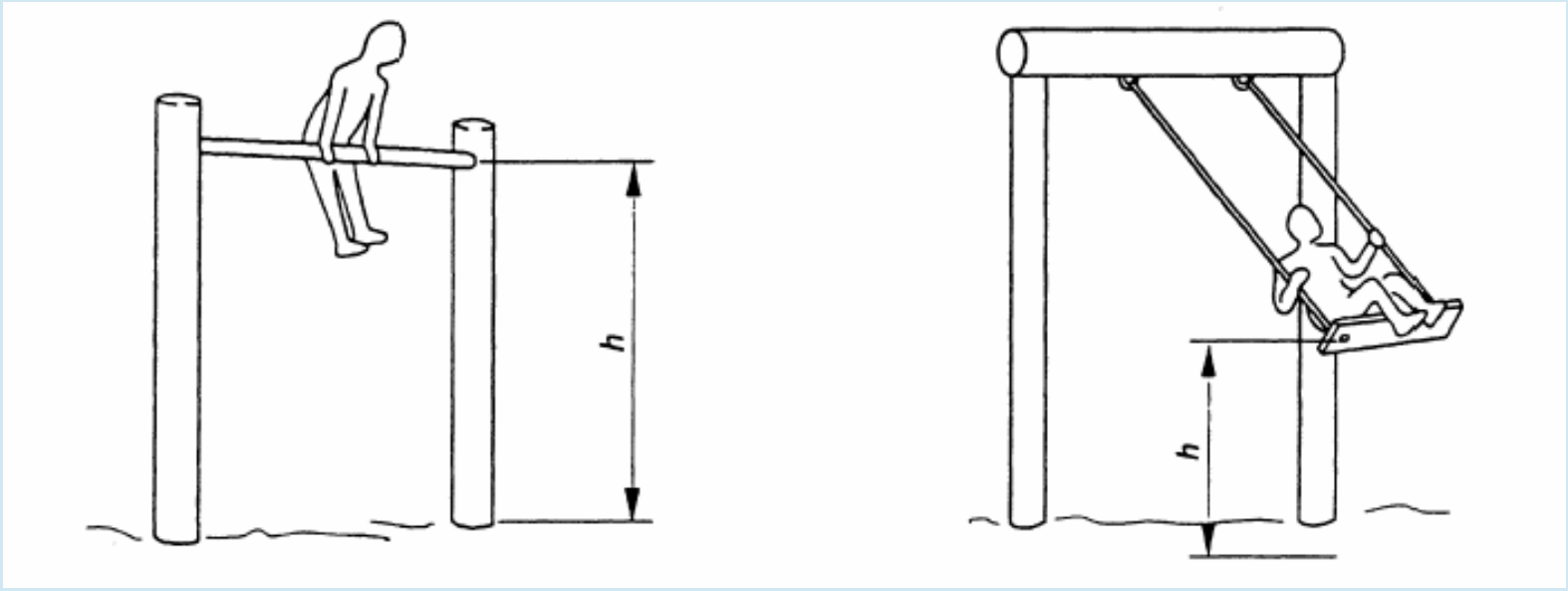


Figure 1: Example of swing with one rotational axis (Type 1)



SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

Free height of fall: greatest vertical distance from the clearly intended body support to the impact area below



SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

For the relative location of items of playground equipment, allowance should be made for the run-out during their use and for walkways between the items of equipment.

Hazards from poor maintenance and management.
The following are indicative:
- traces of vandalisme
- overfull litter bins
- overall impression of neglect
- unmanaged plantings

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

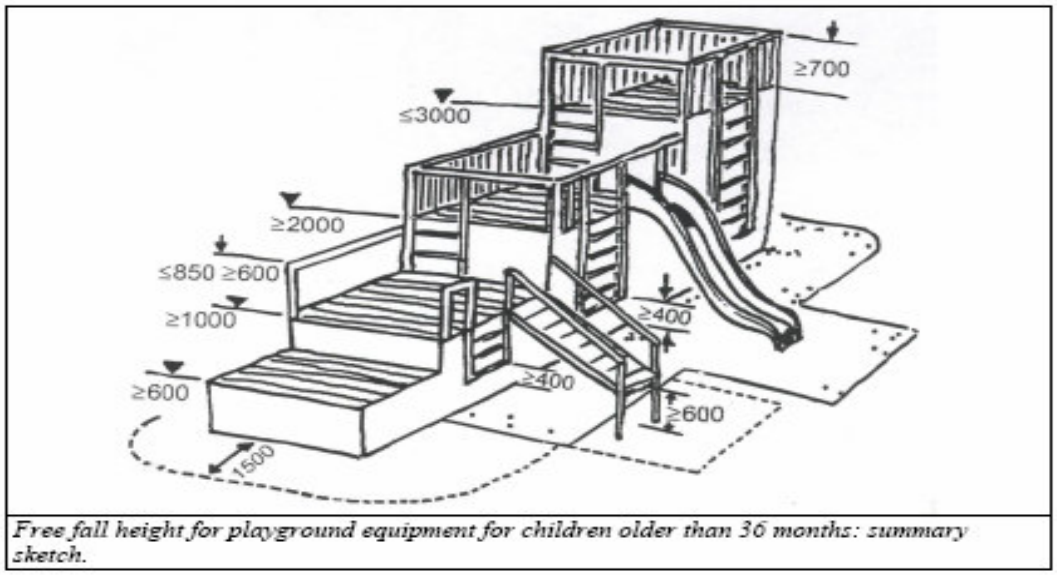
To explain some definitions:

Hand-rail : intended to prevent the user from losing his balance

Guard rail : intended to prevent the user from falling

Barrier : intended to prevent the user from climbing below or through it

Platform : a raised horizontal surface



Free fall height for playground equipment for children older than 36 months: summary sketch.

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

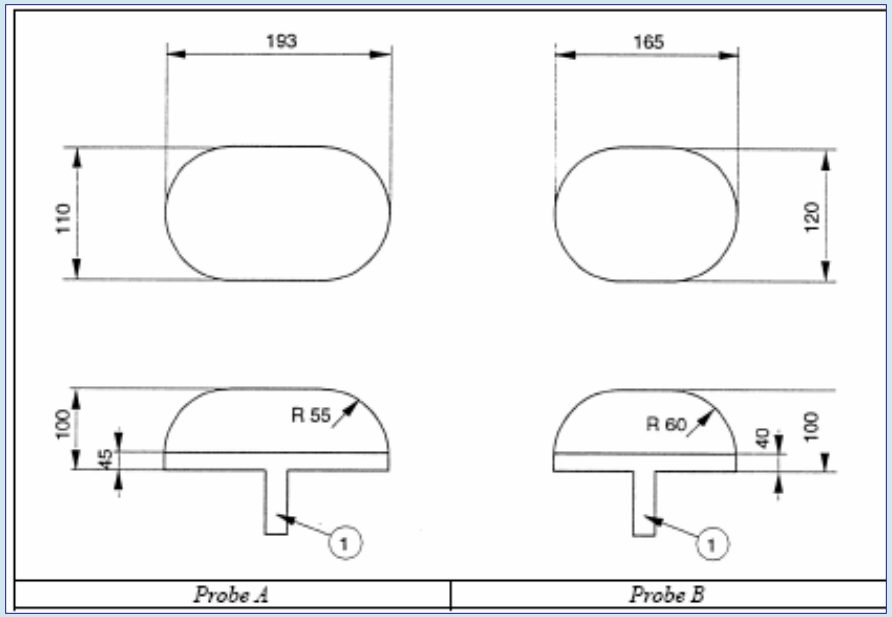
To explain some definitions:

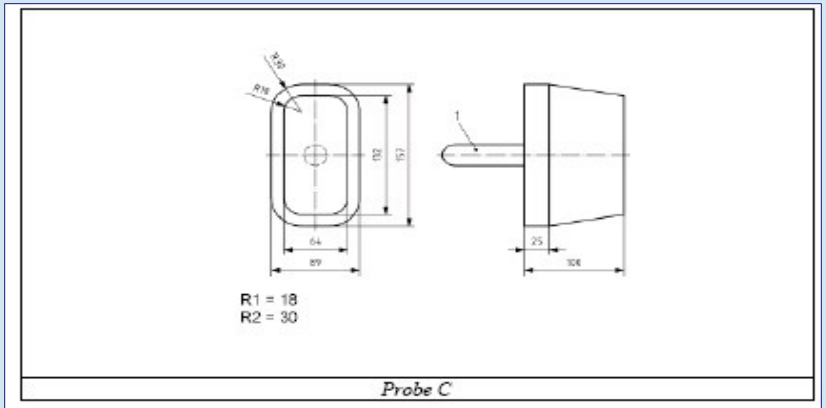
For rigid completely bound openings (feet first) in the equipment intended for children aged 3 or over: either probe A en D (head) should both be (un)able through the opening.
For completely bound openings other than those referred either probe B and probe D should both be (un)able to pass trough the opening.

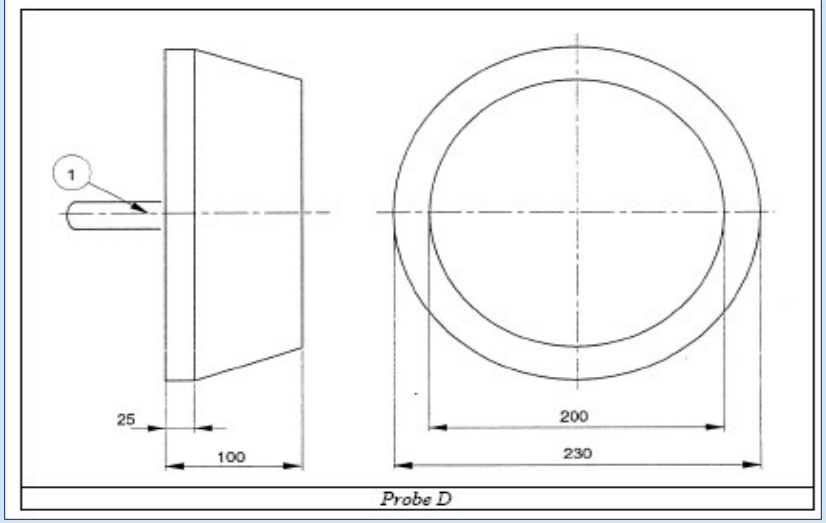
For completely bound openings in equipment for children aged 0 – 14 year: Either torso probe C and probe D (head) should both be (un)able through the opening.

For partially bound openings and V-shaped openings:
Either the opening should not be accessible to part 1 of probe V or part 2 of probe V should be able to enter to the full depth of the opening.

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

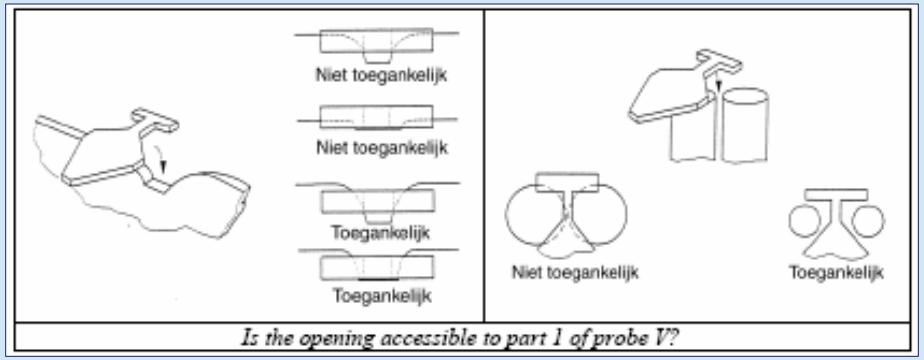




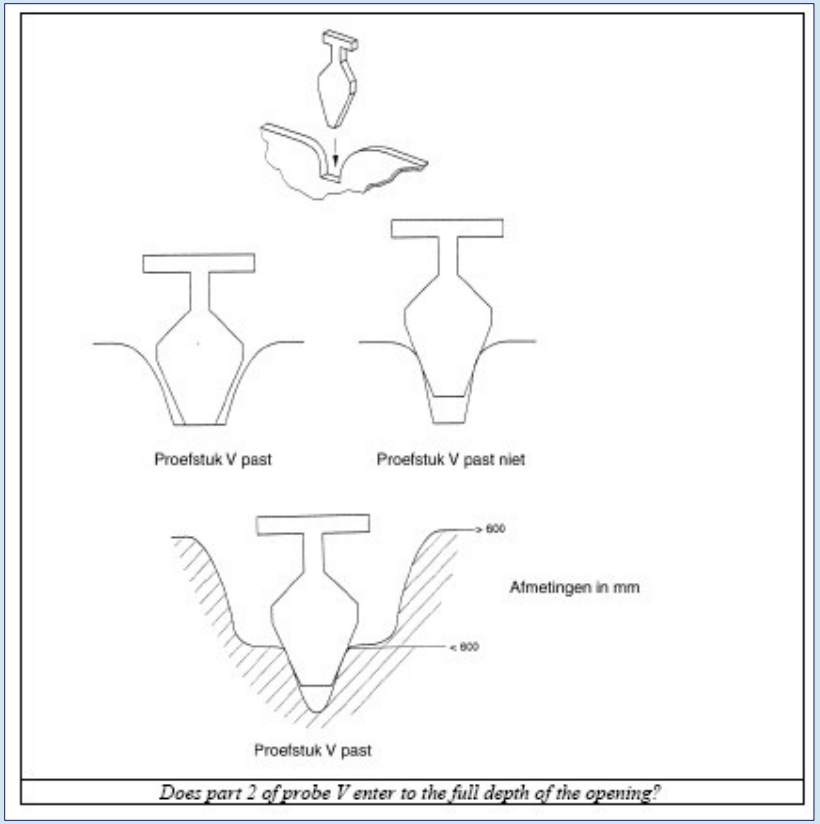


In the new edition of the standards
probe A and B be cancelled

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT



Is the opening accessible to part 1 of probe V?



Does part 2 of probe V enter to the full depth of the opening?

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

To explain some definitions:

Clothing may become entrapped in the following situation,

- V-shaped openings in the case of a forced movement.

No entrapment of the toggle probe at the starting section of a slide.

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

- move the test device slowly in the direction of the forced movement, ensuring that the pole remains vertical, and the application of the toggle/chain is influenced solely by its own weight.

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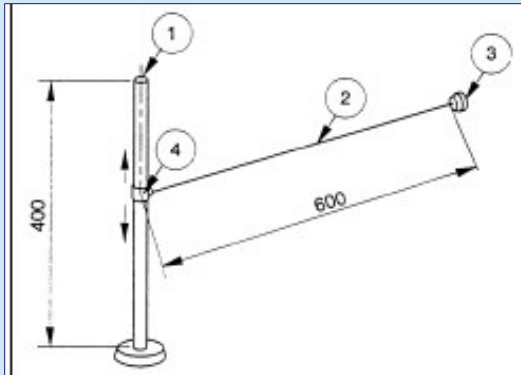
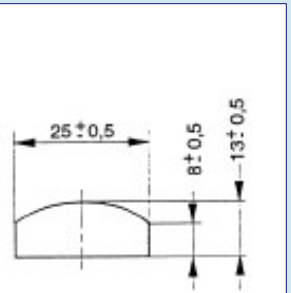


Toggle probe and its components: 1) pole; 2) chain; 3) toggle; 4) sliding ring



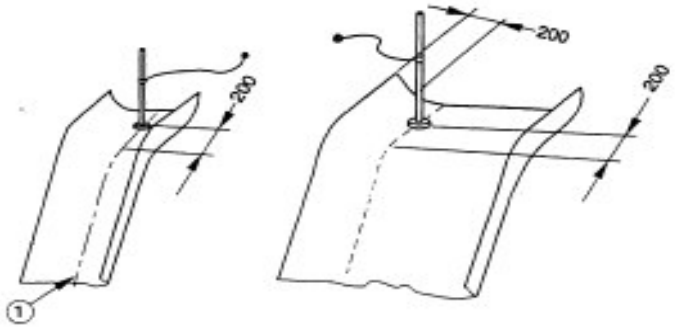
Toggle details.

D.3.2 Procedure

D.3.2.1 Slides

Position the 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 D.6.

Dimensions in millimetres



1 Centre line

a) Narrow slide b) Wide slide

Figure D.6: Position of the test device on slides

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

a) move the test device slowly in the direction of the forced movement, ensuring that the pole of the test device remains vertical, and the application of the toggle/chain is influenced solely by its own weight. 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 positioned at both width extremities of the bedway, as shown in figure D.6.

The test is over as soon as the toggle or chain gets blocked.

Record and report where any entrapment of the toggle or chain occurs.

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

To explain some definitions:

Openings located in the space where a user might dwell during or as a result of a forced movement should be designed in such a way that the finger probe (small) does not enter into the openings.

Openings located at a place where the free height exceeds 1,200 mm should be design in such a way that the finger probe (small) does not enter into the openings.

If the finger probe (small) enters an opening, the finger probe (large) should also enter.

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

The free spaces of different items of equipment should not overlap.

The free space of one item of equipment should not overlap the falling space of another item of equipment.

Free spaces should not be crossed by the main walking routes of the playground.

The free height of fall should not exceed 3 m.

If there is risk of falling from a height of more than 1 m, from one platform to an adjacent platform within the same item of equipment, impact absorbing surfaces should be provided.

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

For each item of equipment the operator should be in possession of
- either a conclusive risk assessment and the preventive measures derived from the assessment;
- or a declaration of conformity to a European standard from the EN 1176 series.

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

Surfacing (EN 1177)

The surfacing should be uniform and not pose a tripping hazard;
The surfacing should be free of sharp objects;
The following materials have poor impact absorbing capabilities and should therefore only be used in those places where the free fall heights are less than 600 mm:

- paving stones;
- rock;
- concrete;
- asphalt
- macadam.

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

The following materials have limited impact absorbing capabilities and may (without any further tests) be used in locations where the free fall height does not exceed 1 m:

- natural topsoil;
- tamped down soil;
- grass

The following table can be used in practice. The table is indicative, i.e. not normative. Normatively, the HIC value should be less than 1,000.

Material	*Grain size (mm)*	*Minimum layer thickness (mm)*	*Maximum free fall height (mm)*
Turf / topsoil Tamped down soil			1,000
Grass			1,000 (indicative value in the standard) or 1,500 (situation in Belgium – see box)
Bark	20 - 80	300	3,000
Wood chips	5 -30	300	3,000
Sand	0,2 - 2	300	3,000
Gravel	2 - 8	300	3,000

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

Requirements for all swings (EN 1176-2)

The minium distance between the ground and the lowest part of the swing seat must be 350 mm.

The minium distance between the ground and the lowest part of a « tyre seat » must be 400 mm.

The distance between a seat and the other parts of the equipment is at least 20% of the swing length + 200 mm.

The distance between two seats and the other parts of the equipment is at least 20% of the swing length + 300 mm.

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

Requirements for all swings (EN 1176-2)

Swings seats for toddlers should not be combined with other seats for an older age group in the same bay.

Seats for toddlers should be designed so that a child cannot slip trough them.

Swings should preferably be sited at the boundaries of the playground.

Seats should not tilt and should therefore preferably secured in triangular form.

The seats should be made of impact absorbing materials.

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

The impact area of a swing with several suspension points is a rectangle

- with as centre the rest point of the seat
- with a length equal to (both calculation methods yield the same result):

a) on both sides the projection of the seat to the ground, when tilted up through an angle of 60°

either

+ 1.75 m (in case of hard surfacing);

or

+ 2.25 m (in case of loose fill surfacing).

b) 0.867 x swing length before and behind the centre of the seat (at rest)

either

+ 1.75 m (in case of hard surfacing);

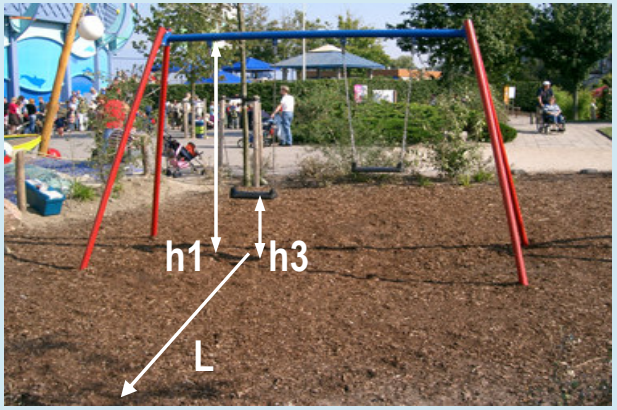
or

+ 2.25 m (in case of loose fill surfacing).

- with a width equal to:

either 1.75 m if the seat is smaller than 500 mm;

or 1.25 m + width of the seat, if the seat is wider than 500 mm.



Bepaling lengte (L) impactgebied:

L = A + B

A = 0,867 X (h1 – h3)

B = 1,75m (vast materiaal)

C = 2,25m (los materiaal)

L = (0,867 x (2,20m – 0,70m)) + 2,25m

L = 1,30m + 2,25m = 3,55m

SAFETY of PLAYGROUNDS and PLAYGROUND EQUIPMENT

Slide (EN 1176-3)

For free standing slides with a free fall height exceeding 1,000 mm at the starting section, the side rails should be 700 mm.

For all combined slides with a free height exceeding 1,000 m, a bar should be provide at the access opening to the slide.

The internal heihgt/width of a tunnel should be at least 750 mm.

Free height of fall (x)	*Minimum height of side rails*
x = 1,200mm	100 mm
1,200 mm < x = 2,500 mm	150 mm
x = 2,500 mm	500 mm

1176-3 § 4.5 Run-out section:

Sliding zone < 1500mm : H = 200mm maximaal

Sliding zone ≥ 1500mm : H = 350mm maximaal