



**Playground People Ltd**  
The *Smarter* way to Play

**2016**  
EDITION

# All you need to know about Playground Equipment & Under-surfacing Safety

Based on the Essential Guide to European Playground  
Equipment and Safety Surfacing Standards

# All you need to know about Playground Equipment & Under-Surfacing Safety

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## Introduction

New Zealand has revised and adopted a new playground safety standard.

As we have done previously, to help New Zealand Schools, Councils and Landscape Architects better understand playground equipment and under-surfacing safety we have compiled a document in layperson's terms based on the RoSPA Guide to the European Playground Safety Standards, which we have modified for New Zealand use. The RoSPA Guide to the European Playground Safety Standards has been reproduced and modified with permission from the authors.

This booklet has been modified from the "pink book" - which was made freely available by Playground People in 2005 and downloadable from our website in 2012.

That document was based on the RoSPA document **"A Guide to the European Playground Equipment and Surfacing Standards"** By Rob Davies & Peter Heseltine and the **EN1176 Standard, Parts 1-7, 10 & 11: 2008, EN1177: 2008**

Permission was given to Playground People Ltd by the late Peter Heseltine to modify and use that document to make it suitable for use in New Zealand. It was modified to suit the New Zealand situation for Playground Safety as a free service to Councils and Schools.

We thank the family of the late Mr Peter Heseltine for the generous offer of use of his and Rob Davies work.

This latest version draws heavily on **"An Essential Guide to BS EN 1176 and BS EN 1177 – a Children's Playground Equipment & Surfacing: updated for 2008"** By Peter Heseltine and Keith Dalton of the Play Inspection Company and Rob Davies of Wicksteed Playscapes.

We also acknowledge the enormously beneficial input of Keith Dalton of the Play Inspection Company and his training of New Zealand RPII Playground Safety Inspectors. His reasoned approach to conflicting interpretations within the Standard has been gratefully received.

These gestures will, we are sure, result in a clearer understanding of Playground Safety for those who do not require the technical standard. This in turn will lead to safer playgrounds for NZ children.

The revised European Standards EN 1176 Parts 1-7 and Parts 10, 11 and EN 1177 came into effect throughout Europe on 25 April 2008 and are applicable throughout 30 countries of the European Union. The new Part 11 Spatial Networks has been added

This revised version of the European Standards was adopted in its entirety in New Zealand in 2016 with added NZ specific appendices.

This booklet attempts to explain in everyday terms for the interested lay person the main requirements of the Standard. It does not replace the Standards. In the event of legal claims or disputes, reference should be made to the full Standards.



## Legal Background

The New Zealand Playground Safety Standard is not retrospective but is a legal requirement for Preschools and State schools and represent "best practice" in the event of an accident claims.

Their limitations should be recognised, mere compliance will not automatically create a safe playground.

While not incorporated into law for public playgrounds provided by local authorities, the Local Government Act 2002 clearly provides that local government exists to benefit, and promote the wellbeing of their communities. Unsafe playground equipment in public playgrounds that may cause serious injuries to children is inconsistent with that overarching objective

Most NZ Council require compliance with the Playground Safety Standard as part of their playground equipment supply contracts.

Equipment produced and installed before this new version was published should meet Standards existing at the time and have written confirmation of compliance by a Chartered Professional Engineer.

Where there are differences between the superseded 2004 Standard and the revised 2015 Standard, our advice is **DON'T PANIC!** Equipment which has been perfectly safe under the previous standards for 10 years, providing it complied with the current Standard of the time, did not suddenly become dangerous the day after publication of the revised Standard. The manufacturers have 12 months from the date of publication 15<sup>th</sup> December 2015 to achieve conformity

Chartered Structural Engineers will use the new standard in assessing compliance. The same applies to the provision of impact absorbing surfaces.

Some elements of the revised Standard are open to opinion. Common sense will remain a good guide.

**A number of studies around the world have identified that a high proportion of safety surfaces under play equipment do not meet the quality standard required to provide protective Impact Attenuation for the children using the equipment.**

**It is the responsibility of the Operator to ensure ongoing compliance of the equipment and ongoing compliance of the impact attenuation quality of the safety surface also. This is the Operator's "Duty of Care". '**

## Definitions

The official definitions may be found in the Standard. The explanations which follow attempt to explain them in every-day terms. The definitions selected are primarily for the purchaser/ operator. Others that affect the manufacturers or suppliers have not been given. Additional definitions are included in each section.

- **Playground equipment:** these are items provided for outdoor play such as swings, slides, roundabouts etc. or where such outdoor items are used indoors. Although not stated we believe this refers to permanently fixed equipment only - equipment produced for the home is not covered by this Standard. It does not include soft-play areas, skateboard areas or ancillary items, such as fences, seats, litter bins etc. This Standard does not include Outdoor Exercise equipment.
- **Climbing equipment:** items on which children cannot stand unaided but must hold on with hands and use three point contact unless moving.
- **Playing surface:** The ground, in most cases this will be the top of the safety surface.
- **Forced movement:** a movement to which a child is committed by the design of the equipment (i.e. a slide or fireman's pole).
- **Free space:** the space which children are forced to use by the action of the equipment (i.e. the swing arc, slide chute or fireman's pole)
- **Falling space:** the space through which the child falls from the point of fall
- **Free height of fall:** distance from the clearly intended body support or position which can easily be reached, to the impact area
- **Collective use:** use by more than one user at a time
- **Ladders, stairs and ramps:** primary means of access and egress, the difference between them being detailed on Page 18
- **Impact area:** the area where the child will strike the surface or another item or part of equipment (see also Section on surfacing - Page 5)
- **Grip and grasp:** a part which the child needs to support their weight will require "grip" and a part the child uses for balance would require "grasp".
- **Obstacle:** a piece of the equipment extending into the path of movement
  - i in the free space, something in the path of a user undergoing forced movement
  - ii in the falling space, a hard and sharp object the user can strike during fall
  - iii other types of movement – something unexpected likely to cause a collision by the user
- **Family of products:** modular or multi-play equipment
- **Easily accessible:** protection against falling is required where there are ladders, stairs, ramps or tiered platforms (less than 600mm height difference) which fail to allow time for the intervention of a parent or care-giver
- **Overhead equipment:** overhead components designed to support a child by the hands only (e.g. horizontal ladder, ring ladders etc.)
- **Cluster:** separate items designed to be grouped together (i.e. adventure trails).  
**N.B:** Space between individual items must be appropriate to the intended age.
- **Steep play element:** a play feature steeper than 45° to enter or leave equipment.

## Minimum Space around equipment and zones

It is made up of three parts:

1. Space occupied by equipment
2. Free space (only applies where there is 'forced' movement" and this distance should be stated by the supplier)
3. Falling space (surfacing area). Free spaces may not overlap, falling spaces may overlap but free spaces and falling spaces may not overlap (other than for Cluster items)

- The free space is measured vertically as well as horizontally (i.e: as if a tin can is enclosing the child and moving with the equipment or motion – see Diagram1)
- The measurements of the free space are  
Standing A: **1000mm** B: **1800mm**  
Sitting A: **1000mm** B: **1500mm**  
Hanging A: **500mm** B: **300mm** above the hanging position and **1800mm** below

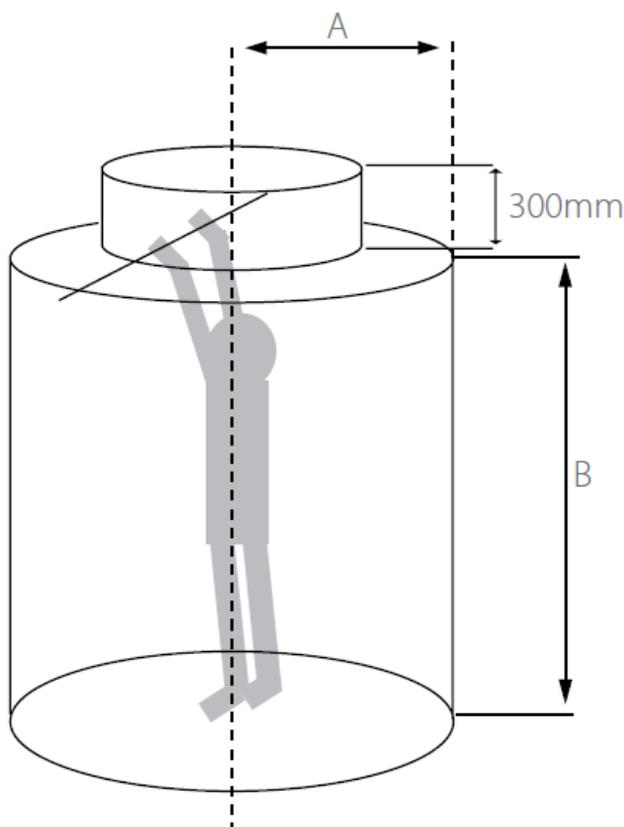


Diagram 1

- Some equipment may have different distances set by the supplier.

### Protection against injuries in the free space

- No obstacles in the free space (other than structures to assist or safeguard the user, for example, platforms with fireman poles or hand-rails)
- Clearance between pole and take-off platform 350mm minimum
- Fire poles should meet grip requirements
- Traffic flows should not go through the free space

### Protection against injuries in the falling space

- Free height of fall should not exceed **3m**.
- Overhead equipment shall not exceed 2200mm Free Height of Fall at the handgrip.
- No obstacles in the falling space (i.e. solid bar at base of angled nets or links).
- The impact absorbency should be sufficient for the free fall height.
- Dimensions are as given in Surfacing (Page 9).
- Adjacent platforms with fall heights of more than 1m between them require impact absorbency unless there is a barrier preventing falls from the upper platform.

### Protection against injuries due to other types of movement

No unexpected obstacles - see Diagram2

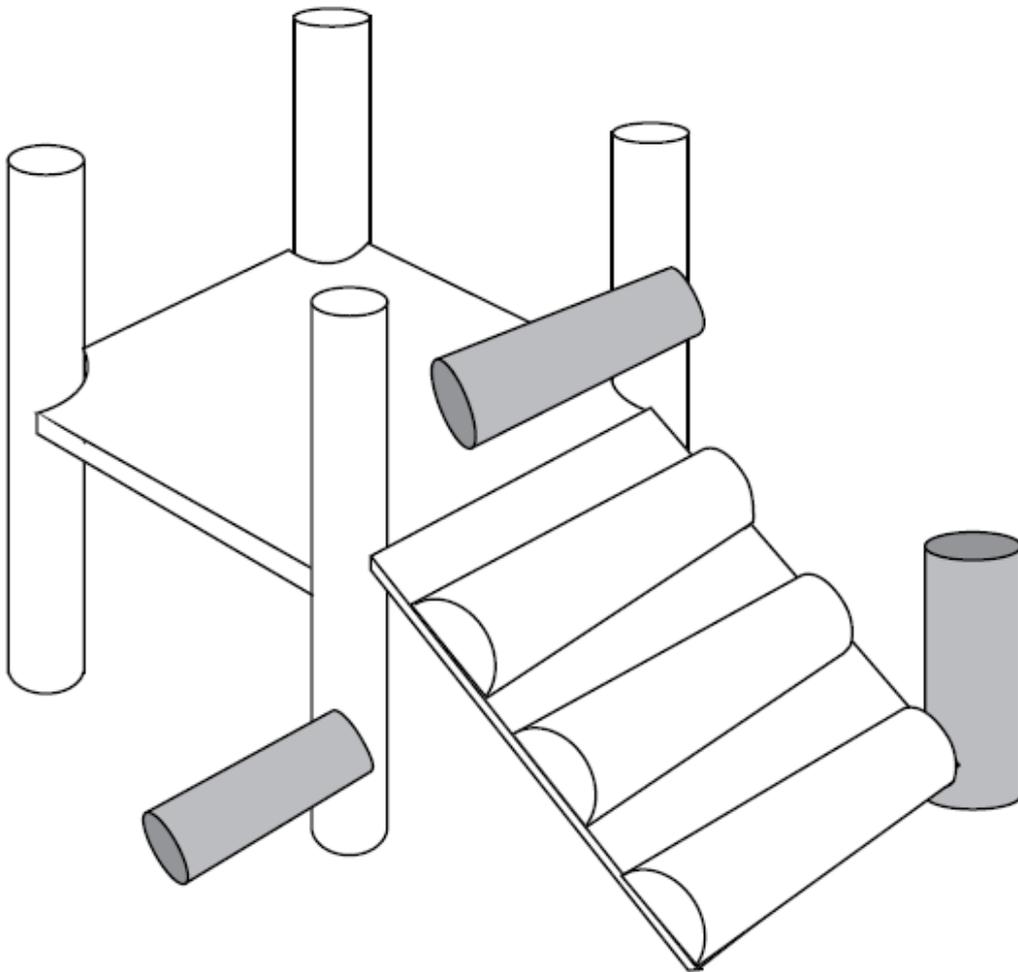


Diagram 2

## Surfacing

A variety of materials are allowed, for example: rubber tiles, mats, wet-pour, loose- fills, engineered wood fibre. The main change from the previous standards is that the extent is dependent upon the height over 1.5m up to 2.5m (on a sliding scale). Equipment with a free fall height of 1.875m requires 1.75m.

### Definitions

**Free height of fall:** Distance from the clearly intended body support or a position which may easily be reached to the impact area

**Measurement from:**

*Standing* (from foot to surface)

*Sitting* (seat to surface below)

*Hanging* (hand support to surface below)

**NB** Climbing should not give access to free height of fall over 3m

**Impact area:** The area which can be hit by the falling user

### Information

- Surfacing suppliers must supply:
  1. Correct installation instructions
  2. Maintenance instructions
  3. Inspection procedures
  4. Proof of compliance e.g. a certificate from a chartered engineer.

### Safety requirements

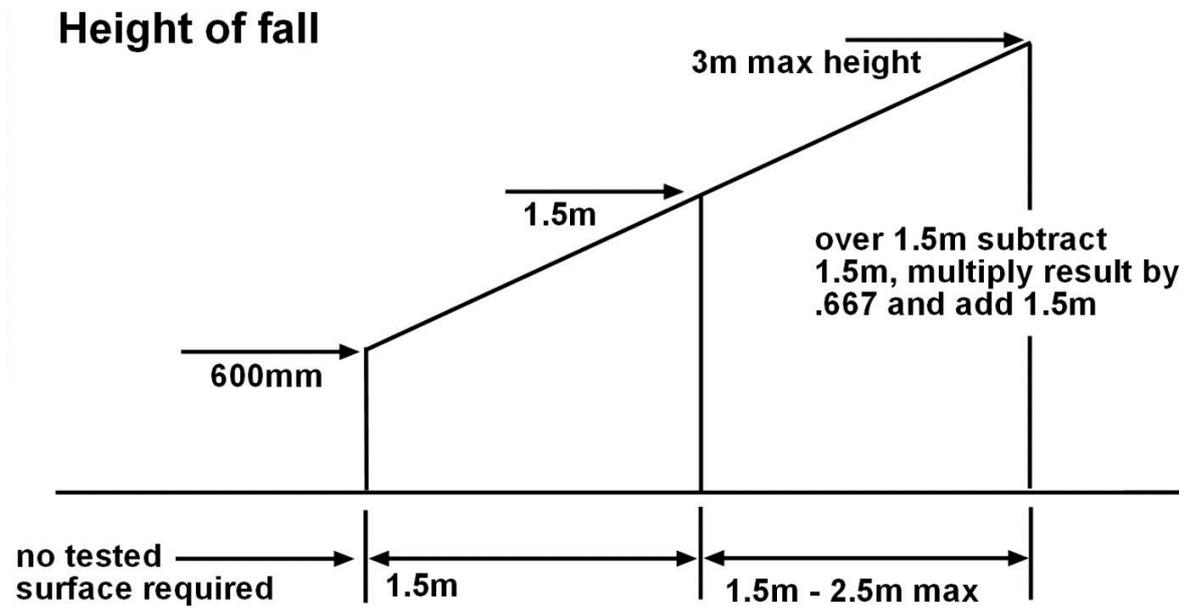
- Compliant loose fill surfacing should have no sharp edges or protrusions (no stones, metal or sharp wood fibres)
- Surfacing should have no entrapments
- Loose fills should be 200mm more than the depth required to meet the HIC reading (normally 300mm)
- Hard surfaces should only be used outside the impact area.
- Tested impact absorbing surfaces should be used where falls are over 600mm or where forced movement is possible.
- Under 600mm CFH and no forced movement Impact attenuated surfacing is not required, but some form of protective surface should be provided.
- No area required for equipment under 600mm but 1000mm minimum is recommended
- A compliant safety surface is required if a fall of more than 1000mm is possible from an overhead event to a platform.

### Use of grass

Grass may be used up to the fall height of 1500mm **providing** the risk assessment includes the following criteria:

- A depth test to 150mm indicates no stones or hard objects.
- Areas of wear are strengthened.
- The use of the grass surface is monitored.
- A good sward of grass is maintained.

**Dimensions of impact areas**  
 (Not applicable to swings and cableways/flying foxes)



Examples of how this works are:

fall height	surface distance	fall height	surface distance
1.5m	1.50m	2.3m	2.03m
1.6m	1.56m	2.4m	2.10m
1.7m	1.63m	2.5m	2.16m
1.8m	1.70m	2.6m	2.23m
1.9m	1.76m	2.7m	2.30m
2.0m	1.83m	2.8m	2.37m
2.1m	1.90m	2.9m	2.43m
2.2m	1.96m	3.0m	2.5m

Loose-fill materials have different requirements:

material	description	min.depth	max. fall height
bark	20 - 80mm particles	300mm	3000mm
wood chip	5 - 30mm particles	300mm	3000mm
sand	0.2 - 2mm particles	300mm	3000mm
gravel	2 - 8mm particles	300mm	3000mm

# General safety requirements

## Materials

Materials and product finishing treatments should meet Standard requirements or be suitable for their purpose

- **Flammability:** use flash resistant materials.
- **Timber:** should be resistant to ground decay by selection of the correct species, construction method or preservatives. Metal fastenings should not be corroded by the timber species used or by any paint or preservative.
- **Preservatives** should be to BS EN 351-1. No coal-tar oils (i.e. creosote)  
Weather-proofed plywood should meet BS EN 636-3
- **Metal:** metals should be protected against corrosion by severe climate, special natural conditions (salt water) or environmental pollution. Metal oxides or flaking shall be protected by a non-toxic coating
- **Fibre Glass :** glass fibres should not become exposed on glass reinforced plastics when tested to ISO 5470. There should be no UV degradation (if there is a risk of brittleness, the manufacturer must notify the purchaser of the replacement timescale.)
- **Toxic materials:** materials such as lead must not be used

## Design and Manufacture

The equipment must be suitable for the user and risks should be identifiable by the child. This may require separation by age group.

- **Accessibility:** adults must be able to gain access to help children
- **Grip requirements:** permitted diameter **16 - 45mm**
- **Grasp requirements:** maximum diameter **60mm**
- **Not easily accessible:** for children under three there should be 400mm from the safety surface to the lowest foot hold or 600mm from the top surface of a platform

## Finishing

- Timber species and synthetics should be splinter resistant.
- No protrusions or sharp edged components.
- Bolts should conform to Diagram 3.
- Welds should be ground smooth.
- Corners, edges or projecting parts over **8mm** should have a **3mm** radius
- No hard and sharp-edged parts (i.e.: razor blade effect caused by sheet steel)
- No crushing or shearing points
- Where equipment comes to a stop, it should be cushioned (i.e.: dampers on rocking items)
- Connections: nuts and bolts should not come loose by themselves and resist removal (The term 'resist removal' is our interpretation of the intention of the Standard). Timber connections should not rely solely on screws or nails  
N.B: Nails alone may not withstand the tests for structural stability (except for decking)
- Consumable components: these should be replaceable by the operator only.
- Leaking lubricants should not stain or impair the safety of the equipment.

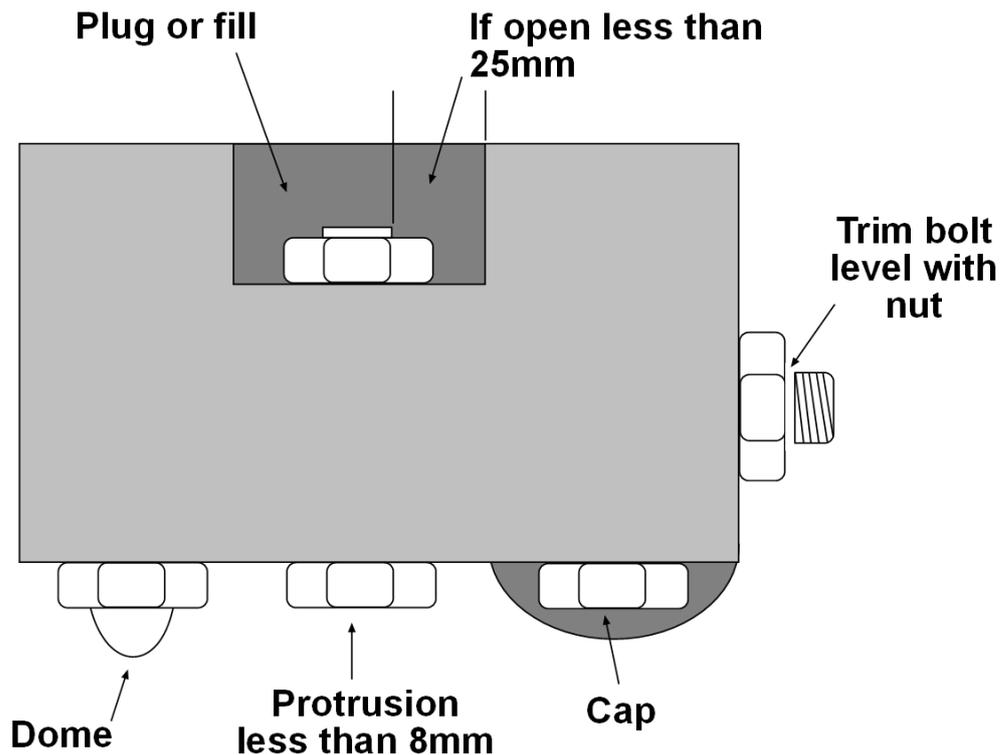


Diagram 3

## Ropes and chains

This section covers swinging, climbing ropes, chains and nets.

### Fibre Ropes

- Conform to EN 701 or 919 or have a material and load certificate.
- Ropes used by hands shall have a soft, non-slip covering.

### Wire ropes

- Non-rotating and corrosion resistant with no splayed wires outside the ferrule.
- Wire connector clip threads should protrude less than 8mm.
- Turnbuckles should be enclosed, have a loop at each end and be secured.

### Sheathed wire ropes

- When sheathed wire ropes are used each strand should be covered with synthetic or natural yarn.

### Chains

- Maximum opening of individual links: **8.6mm** in any one direction.
- Connecting links between chains must be less than **8.6mm** or over **12mm**
- Compliant chain does not require covering.

**NB: Covering non-compliant chain with synthetic tube can cause unnatural wear, hinder maintenance and hides potential sudden chain/fastening failure.**

### **Swinging suspended ropes**

- Not combined with swings in the same bay. Less than 2m long: over 600mm from static parts, over 900mm from static parts
- 2m - 4m long: over 900mm from swinging parts over 1000mm from anything other component
- Rope diameter: **25 - 45mm**
- Ropes should not form loops

### **Climbing ropes**

- Anchored at both ends and movement less than 20% of rope length
- Probe C should be capable of insertion through any loop.
- Single climbing rope diameter: **18 - 45mm**
- Nets should comply with Grip requirements

### **Heavy suspended beams**

Poles or planks over 25kg

- Ground clearance 400mm minimum at all times
- Change in profile: 50mm minimum radius
- Movement should be less than 100mm

# Entrapments

## Definitions

- Entrapment: a place from which children cannot extricate themselves unaided.
  - Crushing point: a place where the equipment moves to entrap a child.
  - Shearing point: a point where the equipment moves to create a cutting injury.
  - Bound opening: an opening the periphery of which is unbroken.
  - Non-bound opening: an opening with three sides (i.e: a space between a platform and two verticals).
- NB:** Head, neck and torso entrapments start at **600mm** above the ground or standing surface.

There are six probes: the **Torso Probe** (C), the **Large Head Probe** (D), the **Wedge Probe** and the two **Finger Probes**. A new probe (E) tests flexible bound openings. Only two probes are used for testing any opening depending likely direction of entry. The tests for under three has been removed from this new standard. There is also a toggle test to reduce the dangers of clothing toggles being caught. And a new ring gauge for use on rocking equipment only.. Full details of the test methods may be found in the Standard. Probe dimensions are given on page **33**.

## Entrapments of head and neck in completely bound, partially bound, shearing or moving openings:

- No head or torso entrapments whether entering head or feet first

## Test for all children (rigid or flexible openings)

- All cases ; if the torso probes (C or E) enters then the large probe (D) must also pass through to its full depth, not including the handle.
- The probes are not rotated and the taper is ignored.
- If the C or E probe fails to enter to its full depth, there is no entrapment.
- If Probe E is used on a flexible bound opening a pull of 20kg is required to assess the opening where the entrapment is.
- Steel cored rope may stretch in use, particularly when new. Re-testing may be advisable at a later date.

## Wedge entrapments

- If Portion B can be inserted flat to a greater depth than the thickness (**45mm**) then portion A should touch the bottom without touching the sides.
- Angles between 45° and 90° have a second test: if portion A can be inserted to less than Portion B1 it passes

## Toggle tests

This is to assess whether clothing can be trapped and is used where there is free space. There are tests for slides, fireman's poles and accessible roof ridges. This does not refer solely to anorak-type toggles.

**NB:** note the Testing Tool chain length has been shortened and the base size has changed.

**Slides:** For narrow slides, place on centre line, move forwards keeping pole vertical - toggle or chain should not be caught. Do not use force. The test is where the chain or toggle can be caught naturally. For wide slides, position at both sides of chute surface  
The test is applied for the whole chute length.

**Fireman poles:**

1. Position the device vertically at the edge of the platform nearest the pole - there should be no entrapment of the toggle
2. Remove toggle and chain, hold 1.8m above platform and re-test
3. Continue test down the pole to height of 1.2m from the ground

**Roofs:** Remove chain and toggle and apply to any openings in the apex or surface in a downwards motion to fail any entrapment.

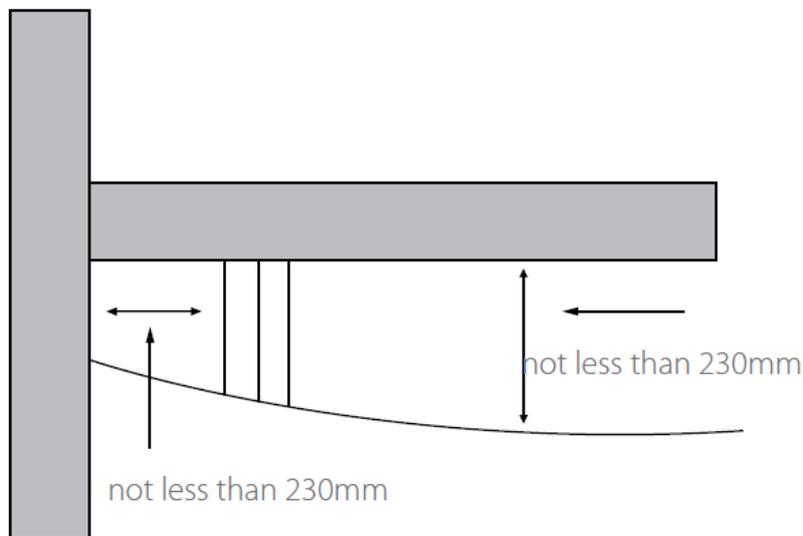
**Non-rigid member (i.e. ropes and chain)**

- Overlapping must not cause an entrapment

**NB:** wire ropes will stretch over time and may lead to entrapments

**Bridges**

The space between the flexible bridge and rigid sides should be not less than 230mm – see Diagram 4.



**Diagram 4**

## Entrapment of the whole body

These may occur in tunnels (not tube slides)

1. If tunnels are open at one end only they should:
  - slope less than 5°
  - be sloped upwards on entry
  - have an internal diameter over **750mm**
  - be less than **2m** long
2. If open both ends
  - slope less than 15°
  - have an internal diameter over **400mm** and be less than **1m** long

OR

  - have an internal diameter over **500mm** and be less than 2m long

OR

  - have an internal diameter over **750mm** with no length limit
  - slope greater than 15°
  - have provision for internal climbing (e.g. steps or handles)
3. Moving equipment suspended above the user should be at least **400mm** from the playing surface (not swings - see separate requirements)

## Entrapment of feet and legs

These may occur where there are holes in platforms, bridges etc.

- Inclined planes (not suspension bridges) less than 45° should have no gaps over **30mm** in the direction of movement

## Finger entrapments

These may occur in:

1. gaps where the movement of the child may cause a finger to become stuck
  2. open-ended tubes
  3. moving gaps
- Openings within the free space or with a lower edge over **1200mm** above the playing surface should be below **8mm** in one direction (i.e. a slot)
  - If the **8mm** probe enters, the **25mm** probe should also enter (not chains, see Page 12)
  - Probes should not encounter other entrapments when inserted to **100mm**
  - Tube ends should be securely enclosed and removable only with tools
  - Moving gaps should not close to less than **12mm**
  - Diagram 5 shows entrapment distances

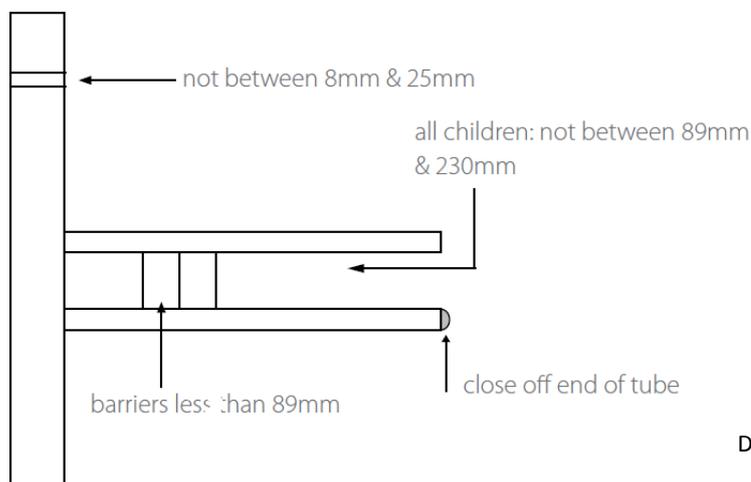


Diagram 5

## Handrails, guards and barriers

### Definitions

- **Handrail:** a rail to help the child to balance
- **Guard-rail:** a rail to prevent children falling
- **Barrier:** a guard-rail with non-climbable in-fill

### Handrails

Where required they should be between **600mm** and **850mm** above foot position.

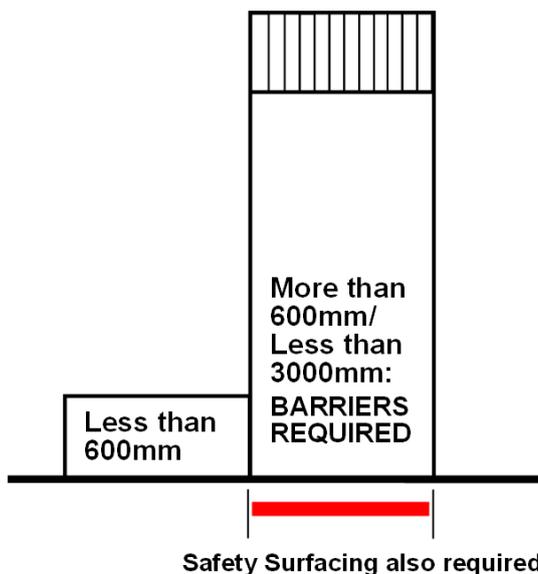
### Guardrails and barriers

- Platforms up to **600mm** – no barriers required +impact absorbing surface over **600mm**
- Equipment over **600mm** requires a **600-850mm** barrier

No bars, infill or steps which can be used as steps.

Tops should discourage standing or sitting

### Equipment easily accessible to all ages



### Equipment not easily accessible

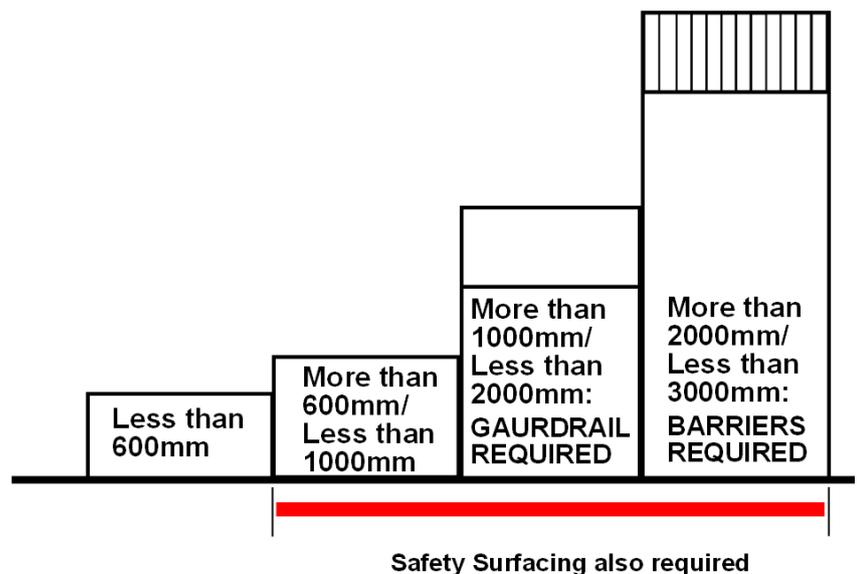


Diagram 6

### Open sided platforms

- At the access and exit openings to play events from a platform (e.g. a fire pole) the gap in the barrier shall be **500mm** unless there is a guard rail
- Width for stairs, ramps and bridges should be the same as the access item.
- For play events with an inclination of over 45° which are not easily accessible (e.g. a scramble net) the opening is **1200mm** maximum
- Steep play events (over 45°) should have **500mm** maximum openings and platforms under **2000mm** high

## Means of access

Probes should now be applied to accesses. All means of access should have no entrapments; be securely fixed; be level to  $\pm 3^\circ$  (ramps across width) and have a constant angle. It does not refer to play events used as an access i.e: arched climbers, scramble nets etc.

### Ladders

Ladders should:

1. Have rungs and/or sides up to **60mm** diameter (grasp) or have handrails **16-45mm** (grip).
  - Near vertical ladders i.e. within  $10^\circ$ : apply grip requirements to the rungs. Rungs require grip and sides require grasp.
2. Be evenly spaced (not between top rung and platform or bottom rung and the top of the safety surface).
3. be non-rotating and equally spaced
  - Timber fixing methods should be secured against removal
  - There should be a clear space behind the rung or step, when measured from the tread centre line, of more than **90mm** when measured at  $90^\circ$  to the ladder.
  - Ladder sides may be higher than the platform

### Stairs

Stairs should:

1. have at least three rises
2. be evenly spaced
3. have a minimum tread depth of **110mm**
4. A **30mm** maximum gap between tread front and next tread back - see Diagram 7

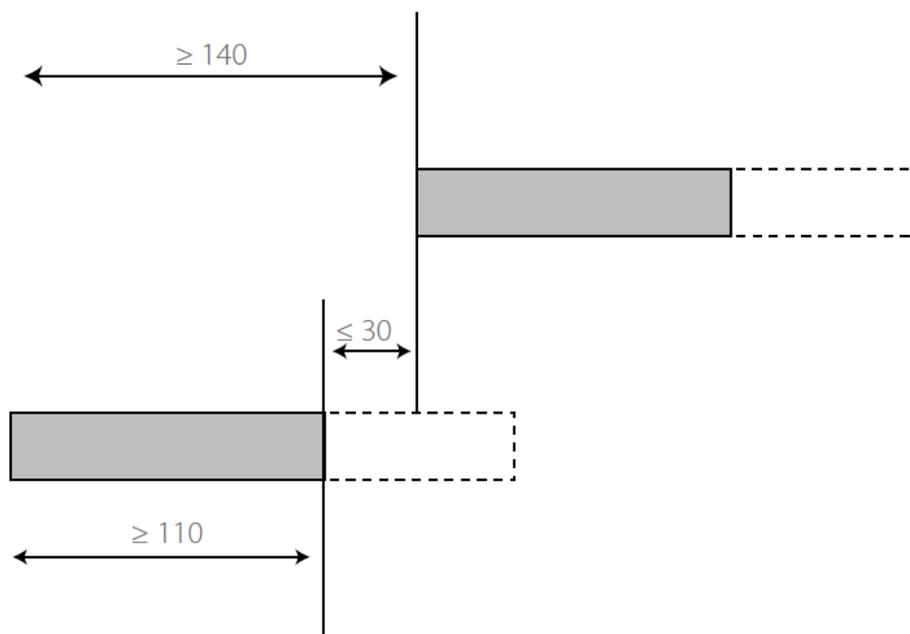


Diagram 7

- Stairs over 2m in vertical height should have intermediate platforms at less than 2m intervals, the same width and be over 1m long. They should change direction by  $90^\circ$  or be off-set (not on free-standing slides up to 2.5m)

- Guardrails and barriers should have **600mm** high handrails from the first step and meet grasp requirements
- Barriers are required above **600mm**
- Guardrails should be provided from the first step
- Guardrails and barriers should meet grasp requirements and hand rail requirements.

## Ramps

(normally inclined surfaces up to 38° from the horizontal with a constant angle)

Ramps should:

- have slip-resistant measures if accessible to all ages i.e. footholds
- Guardrails and barriers should have **600mm** high handrails from the first step and meet grasp requirements
- Barriers are required above **600mm**
- Guardrails should be provided from the first step.
- Guardrails and barriers should meet grasp requirements and handrail requirements.



# Swings

These requirements refer only to the four types of swings identified.

## Definitions

- **Swing height:** distance between pivot centre and top of safety surface
- **Swing suspension:** distance between pivot centre and seat surface
- **Ground clearance:** distance between lowest part of seat and safety surface
- **Seat height:** distance between top of seat and safety surface
- **Bay:** framed area in which the swing seat or seats hang.

## Types

**Type 1:** Traditional classic swing

**Type 2:** Swing with restricted movement

**Type 3:** Single point swing

**Type 4:** Contact swings (5 or 6 bay joined)

## Requirements

- No all-rigid suspension members (i.e. solid bar top to bottom)
- Design for Type one and two swings should be principally for use by seated children and Type three by standing children
- Two seats per bay maximum. A mix of cradle and belt seats is acceptable where there is only one bay available.
- Cradles should be designed so children do not slip through the frame
- Some additional types of swings have slightly different requirements. Information should be obtained from the supplier
- Type three swing chains should not twist round each other
- Type three swings require a secondary bearing support mechanism **NB** this may be internal
- Type four seats should provide a means of preventing users jumping forward off the seat (e.g. a lap belt).

## Dimensions

- Minimum ground clearance at rest: **350mm (400mm for Type 3 and tyres)**
- No maximum seat surface height but RoSPA recommends a maximum height of **635mm**
- Distance between seat and frame: 20% of swing suspension + **200mm**
- Distance between seats: 20% of the swing suspension + **300mm**
- If tilted at an angle of 30° the upper edge of a cradle seat should be level or behind the leading edge of the seat base unless impact requirements are met
- Pivot splay (separation distance) at crossbar: width between seat fixings + 5% of swing suspension length

## Siting

Swing sets for young children should be separated from those for older children and sited to avoid cross traffic

### Free space

- The free space is **500mm** from seat centre line measured horizontally to the front and **1000mm** either side with the seat at 60° to vertical. **NB** In our opinion safety surface edging should be outside the loose-fill surfacing area.
- For synthetic surfaces barriers or other obstacles must be **500mm** from the surfacing area in the main direction of movement.

### Surfacing requirements

Free height of fall

- FFH is calculated from the centre of the stationary seat surface at 60° (half swing suspension length + height of swing seat at rest).

### Forward and back

Different areas for synthetic and loose-fill surfaces in a box or pit)

- 1: synthetic:  $.867 \times \text{length of suspension member} + 1.75\text{m}$
2. loose-fill:  $.867 \times \text{length of suspension member} + 2.25\text{m}$

### Surfacing distances for Swings

Minimum distances from centre of seat to the edge

Length*	Synthetic	Loose Fill
1.5	3.05	3.55
1.6	3.14	3.64
1.7	3.22	3.72
1.8	3.31	3.81
1.9	3.40	3.90
2.0	3.48	3.98
2.1	3.57	4.07
2.2	3.66	4.16
2.3	3.74	4.24
2.4	3.83	4.33
2.5	3.91	4.42

\* Length of suspension member (pivot to seat surface at 635mm from ground)

### Surfacing side width Type 1 and Type 2 and Type 4

- **Seat width no greater than 500mm:** 1.75m minimum (i.e.: 875mm each way from seat centre)
- **Seat width greater than 500mm:** 1.75m minimum + difference between seat width and 500mm (50% each side of seat centre)
- **Areas for two seats** in one bay may overlap providing the distance between seats is 20% of the swing suspension + 300mm

### Surfacing side width Type 3

- Circular area with a radius equal to the Forward and Backward figure for Type 1 and 2 swings.

# Slides

This does not apply to water, roller and multiple slides with mats etc.

## Definitions

**Slide:** a slope which contains and guides the user

**Embankment slide:** a slide, the majority of which follows the land contours

**Attachment slide:** slide which has access from other items (i.e: a platform)

**Starting section:** the section where the child gets onto the slide

**Sliding section:** where there is forced movement

**Run-out:** section where the speed is reduced

**Guarding section:** protection against falls from the starting section

## Safety requirements

- Free-standing slides: the maximum vertical height which a stairway can reach without a change of direction is **2.5m**
- Starting section at the top of each chute: length **350mm** minimum, zero to 5° downwards at the centre line. **NB:** This can be a platform for attachment slides
- If the starting section is over **400mm** long, barrier requirements apply
- From a platform, the opening to the slide is the same width as the starting section
- For attachment slides over **1m** free fall height there should be a guarding section if the starting section protrudes beyond the platform with a height of at least **500mm** at one point
- For attachment slides over **1m** Free fall height there should be a guard-rail across the entrance to the slide at a height of between **600-900mm**
- Free standing slide starting section should have a guarding section equivalent to barrier requirements
- On free-standing slides over **2m** easily accessible requirements apply

## Sliding sections

- Maximum angle: 60° at any point and an average overall of 40°
- Angle changes over 15° should be radiused (curved). For the first 2m in height the radius is **450mm** and for the remainder the radius is over **1000mm**.
- The width of open and straight slides over **1500mm** long should be less than **700mm** or greater than **950mm**.
- Spiral or curved slides should have a width less than **700mm**
- Jointed slides should not allow entry of sharp objects between sections.

## Run-outs

- Run-outs of at least **300mm** are required if the sliding section is under **1500mm** long. Additional requirements over 1500mm long:

### Type 1: *Short run-out slide*

Over 1.5m and under 7.5m: equal or greater than **500mm** with a radiused end of **50mm**

Over 7.5m: greater than **1500mm** with a radiused end of **50mm**

### Type 2: *long run-out slide* (all lengths over 1.5m)

The run-out is a minimum .3 x sliding length.

- Average angle of run-outs:

**Type 1:** 10° **Type 2:** 5° (both downwards)

- Height of run-out:  
Less than 1.5m sliding length: maximum **200mm**  
Greater than **1500mm** sliding length: maximum **350mm**  
(There is no minimum run-out height)
- Chutes should have a side height of:  
all height up to: 1.2m: **100mm** minimum  
1.2m - 2.5m: **150mm** minimum  
Over 2.5m: **500mm** minimum
- Maximum side angle from slide bed: 30°
- Tops of sides should be rounded or radiused to at least 3mm

### Tunnel slides

- Tunnel slides should be a minimum **750mm** high and **750mm** wide or circular with a minimum diameter of 750mm
- Tunnels should start on or at the end of the starting section and be continuous over the sliding section but not over the run-out.

### Free space

- 1m radius centred on the mid-point of the slide.  
N.B: The 'can' principle in Diagram 1a means that the can is held at right-angle to the surface and moved down to give the free space - see diagram 1 page 6
- Multi-track slides may overlap their free spaces

### Surfacing requirements

Normal distances except for the run-out which should be:

- Type 1: **1m** each side and **2m** beyond
- Type 2: **1m** each side and **1m** beyond



## Cableways (Flying fox)

This refers only to wire cable systems and not to pipe trackway systems.

### Definition

- **Traveller:** the trolley and suspension mechanism holding the seat or handle

### Safety requirements

- Stop at the end or angle of cable should progressively slow down the traveller
- Angle of the swing should be less than 45°
- Traveller should not be removable except with tools
- No access to internal mechanism
- Suspension mechanism should be flexible and exclude the risk of strangulation

Or

Be installed at least 2m above the ground at the middle of the cable when loaded

- Where children hang by the hands, the grip should not be enclosed (i.e. a loop)
- Climbing should be discouraged onto the grip
- Hand grips should comply to grip requirements (**16 - 45mm**)
- Children should be able to get off the seat at any time (i.e. no loops or straps)
- A tail may be provided under the seat for pulling the traveller but should present no risk of entrapment or strangulation
- Maximum loaded (1 x 100kg adult) speed is 7m per second

### Dimensions of suspension mechanism

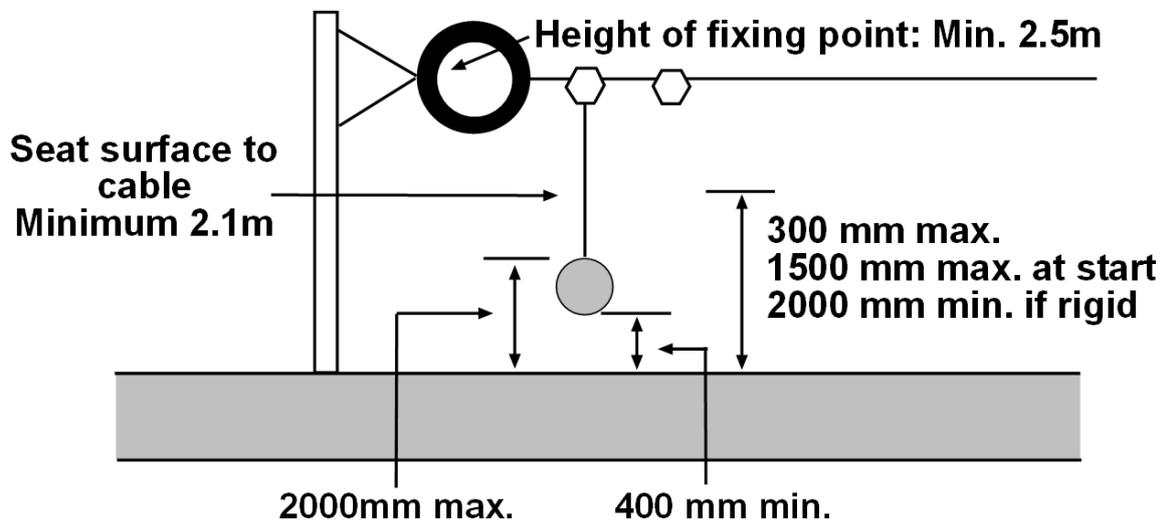


Diagram 8

### Free space

- If two cables are placed parallel the minimum distance between them is 2m

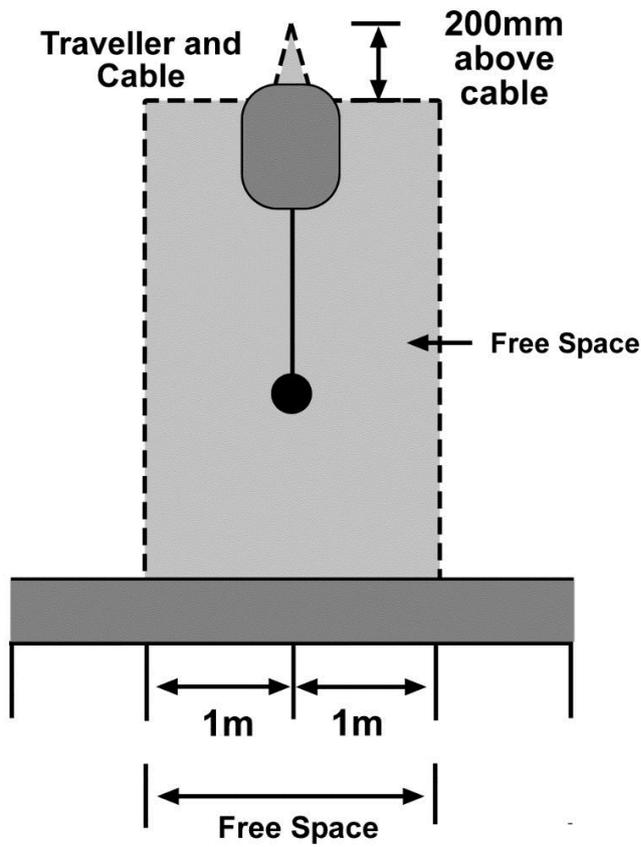


Diagram 9

### Impact areas

Suppliers must provide extra information (i.e: cable settings and permissible gradients) for this item in addition to that detailed on page 25 (Product information)

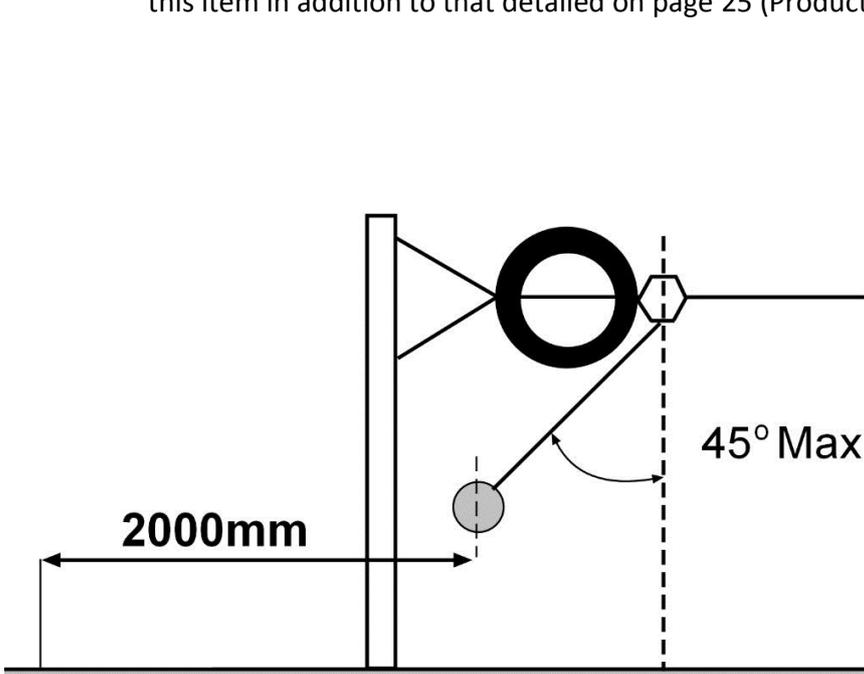


Diagram 10

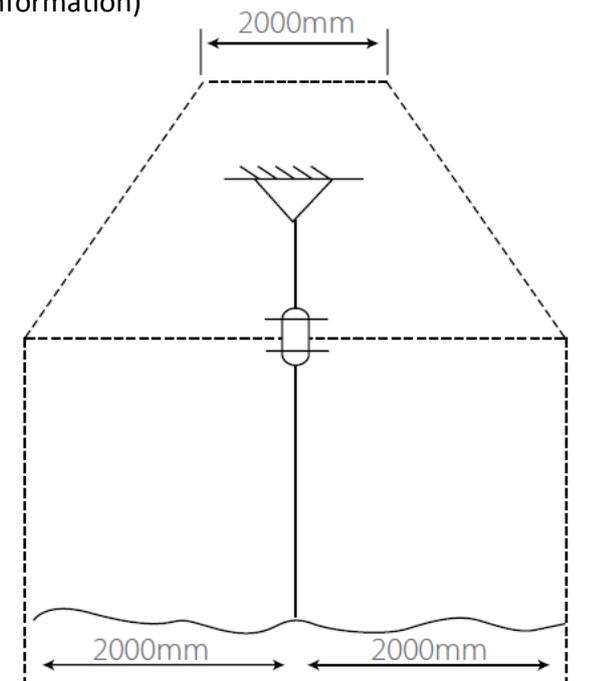


Diagram 11

## Spatial networks

The requirements are:

- There should be no straight path through the structure with a diameter greater than **650mm**
- If this exists the surface must meet the critical fall height requirements of the highest point
- For horizontal nets the mesh size should less than **450mm** diameter.
- The free height of fall is the highest point of direct fall to the safety surface beneath



# Rotating items

## Definition

Items which rotate around a vertical axis or one inclined up to 5°

## Types

**Type A:** Rotating chair

**Type B:** Traditional platform roundabout

**Type C:** Overhead rotating item with hanging grips

**Type D:** Track-driven roundabout

**Type E:** Large revolving inclined discs

**N.B:** Rotating items under **500mm** diameter are excluded.

## Safety requirements

- Maximum free height of fall: **1000mm** (For Type C: **1500 - 3000mm**)
- Maximum speed at periphery under reasonable use: **5m** per second. As no method is given, this cannot be tested to EN 1176.
- Hand grips should be between **16 - 45mm**

## Specific requirements

### Type A:

- Maximum diameter: **2000mm**
- Ground clearance: **400mm** minimum
- Minimum of three seats, spaced equally
- All components should be free from burrs and rounded with a minimum **5mm** radius
- Seats should conform to swing seat requirements for impact absorbency

### Type B:

- Platforms should be circular and enclosed
- All parts should revolve in the same direction
- No super-structure over the edge of the platform
- Mechanism should be enclosed
- If set flush in ground, there should be a maximum **6mm** gap between the edge and the ground if not set flush less than **20mm** max high
- If not set flush, ground clearance should be more than **400mm** or **60 - 110mm** maintained **300mm** from the edge

Protruding bolts underneath are covered by the protrusion requirements

## Roundabouts with protective skirts

- Protective skirts should be of rigid material and have no burrs or other defects. There are further detailed requirements in the Standard

### Type C:

- Hand-grips must be the same height and if below **1800mm**, flexible
- Fall height: between **1500mm - 3000mm** from the hand-grip
- Free space is **2000mm** when the flexible handgrips at 30°

#### Type D:

- Pedals and cranks should free-wheel
- All mechanisms should be enclosed
- Any openings in the enclosure should be less than **5mm**
- Distance between crank arms and other components should be at least **12mm**
- No shear points

#### Type E:

- Clearance of underside at lowest point: **300mm**
- Maximum platform height: **1000mm**
- Free space: **3000mm**
- Upper surface should be continuous, smooth and with no handles or grips
- Underside should be continuous, smooth and without any radial variations (i.e. spokes) or indentations

#### Free space

- Horizontal: **2000mm** all round
- Vertical head clearance from platform:
  - Sitting **1500mm**
  - Standing **1800mm**
- Small rotating items under **500mm** diameter are excluded but RoSPA suggests the same free space as for rocking items (**1000mm** between items at maximum movement)

#### Surfacing requirements

- There are no special extra requirements for surfacing areas
- Surfaces should be continuous underneath and level for at least **300mm**



## Rocking Equipment

### Definitions

- Rocking equipment which can be moved by the user and is pivoted from below
- Damping: any movement restricting device.

**N.B. Springs are treated as self-damping**

### Types

- **Type 1:** Traditional single central pivot up and down seesaw
- **Type 2a:** Typically a single spring rocker moving in more than one direction
- **Type 2b:** Typically a single spring rocker moving in more than one direction
- **Type 3a&b:** As 2a and 2b but with multi-springs
- **Type 4:** A multi-pivot rocking item
- **Type 5:** sweeping seesaw with both vertical and horizontal movement
- **Type 6:** Overhead single axis seesaw- overhead beam with hanging seats

### Safety requirements

type	max. free fall height	max. slope of seat/stand	ground clearance
1	1500mm	20°	230mm min
2a	1000mm	30°	optional
2b	1000mm	30°	230mm min
3a	1000mm	30°	optional
3b	1000mm	30°	230mm min
4	1000mm	20°	230mm min
5	2000mm		230mm min
6	2000mm		230mm min

\*Ground clearance not required when there is damping or motion mainly in a horizontal direction

- Throughout the range of movement gaps in all accessible joints should be less than **12mm**
- Progressive restraint at extremity of movement is required (not spring rockers and not when damped)
- Foot rests should be provided where the ground clearance is less than **230mm**
- Hand grips should be provided for each seat or standing position
- Foot rests and hand grips should be firmly fixed and non-rotating
- Peg type grips should have a ball or similar of a diameter of over **22mm** minimum
- **Test with Ring gauge – the grip should not protrude through the gauge**
- Hand grip diameter: **16-45mm** and maximum for toddlers of **30mm**
- Right angled corners on moving equipment should be **20mm** radius maximum

## Movement

**Type 1:** maximum horizontal movement: **140mm**

**Type 3a:** maximum sideways movement **5°**

**Type 4:** maximum horizontal movement; **600mm**

**Type 6:** free height of fall should not exceed **2000mm** when the seat is at 20°

## Falling space

**1000mm** between items at maximum movement, although 1250 is recommended.

## Surfacing requirements

There are no special extra requirements for surfacing areas. It is suggested **1000mm** minimum if under **600mm**. It is recommended that larger springy items should have **1500mm**.



# Installation, maintenance inspection and operation

Part 7 is guidance rather than a requirement (other than the supplier's documentation)

## Safety

- Appropriate safety systems must be established by the operator
- No access should be allowed to unsafe equipment or areas
- Records should be kept by the playground operator
- Effectiveness of safety measures should be assessed annually (a risk assessment)
- Signs should give owner details and emergency service contact points
- Entrances for emergency services should be freely accessible
- Information on accidents should be kept
- Staff and users should be safe during maintenance operations

## Installation

- Equipment should be installed safely and to the manufacturer's instructions.

## Foundations

- Should not present a hazard
- In loose-fill surfaces, foundations should be 400mm below the surface or, if tapered for water shedding, 200mm or, be covered by the equipment. There are no specific requirements for synthetic surfaces. (Diagram XX)

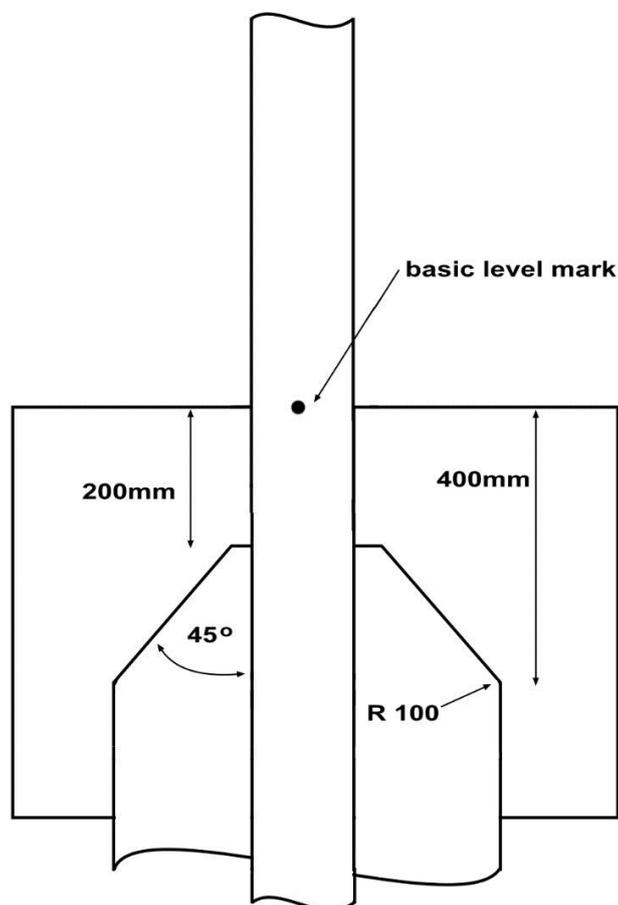


Diagram 12

## **Inspection**

- A post installation inspection should be carried out by an independent RPII
- Manufacturers will recommend the inspection frequency although high-vandalism or high-use sites may need a daily check.

**Routine visual inspections:** identification of hazards from vandalism, use or weather conditions (recorded inspections should be carried out daily or weekly according to the risk assessment)

**Operational inspection:** every 1-3 months or as recommended. Checks operation, stability, wear etc.

**Annual main inspection:** checks long-term levels of safety

- An inspection schedule should be prepared for each playground, listing components and methods.
- Appropriate action should be taken if defects are noted

## **Staff**

- Competence of personnel should be appropriate to the task
- Training is necessary
- Adequate information about equipment and about their responsibilities should be given to staff
- Specialised tasks should be carried out by qualified people (e.g. welding)

## **Documentation**

Playground records should include:

1. Certificates of tests or compliance with standards
2. Inspection and maintenance instructions
3. Operating instructions.
4. Operator's inspection and maintenance recommendations

## **Routine maintenance**

- Basic routine maintenance details should be supplied by the manufacturer and include security of fixings, painting and staining, surfacing maintenance, lubrication, cleansing

## **Corrective maintenance**

- This covers remedial work and repairs as required.
- Alterations should only be carried out after consultation and agreement with the supplier or a competent person.

## Product Information

The supplier now has to supply a range of product information in clear, simple, legible English. This is a requirement of the standard.

### Information

Information should include details of:

1. Free space
2. Surfacing requirements
3. Dimensions of largest part
4. Mass of heaviest part (in kg.)
5. Suggested user age range
6. Availability of spare parts
7. Standard compliance
8. If the equipment is intended for indoor or supervised use only
9. Delivery parts list
10. Full installation instructions
11. Post-installation instructions
12. Run-in period instructions
13. Inspection and maintenance instructions
14. Servicing instructions
15. Details of any special disposal requirements
16. Spare part numbers

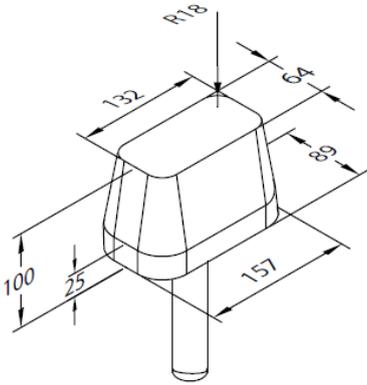
### Marking

Equipment should be permanently marked and include

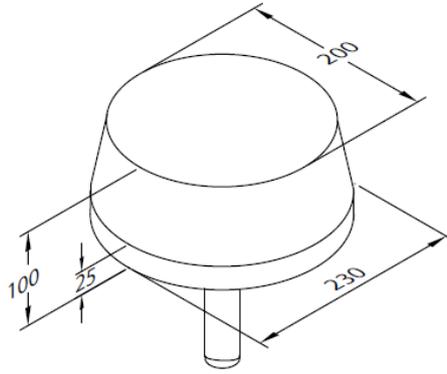
1. Manufacturer or authorised agent
2. Year of manufacture
3. Equipment reference
4. Basic safety surface level mark
5. Number and date of the Standard the equipment has been certified to.

This is a requirement of the Standard

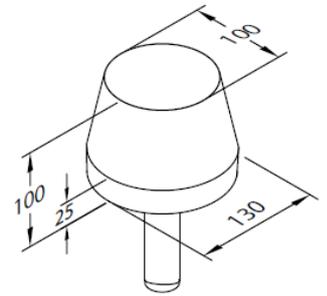
# EN1176 Probes



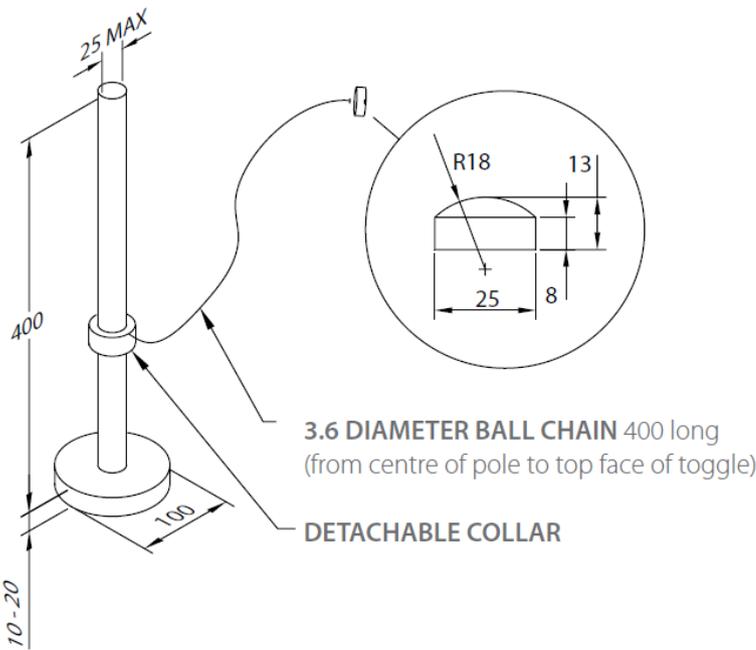
PROBE C TORSO



PROBE D LARGE HEAD

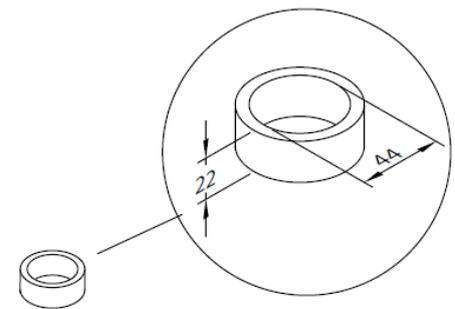


PROBE E

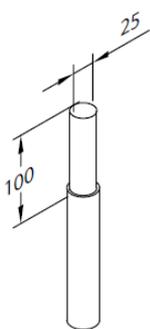


3.6 DIAMETER BALL CHAIN 400 long  
(from centre of pole to top face of toggle)

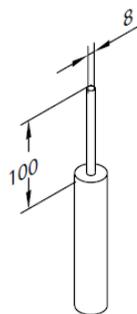
DETACHABLE COLLAR



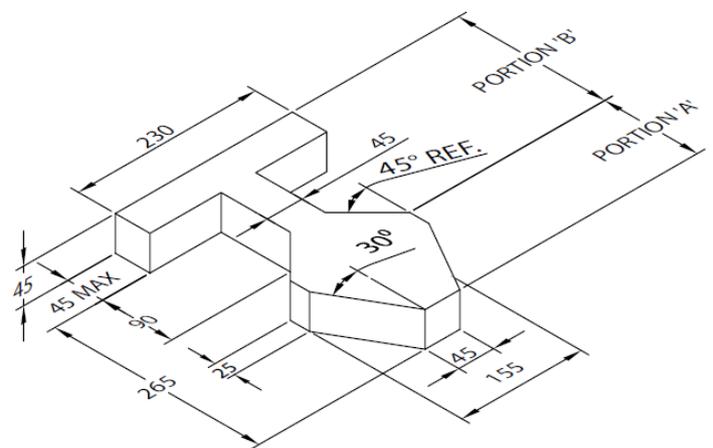
ROCKING EQUIPMENT RING GAUGE



25 DIAMETER FINGER ROD



8 DIAMETER FINGER ROD



HEAD AND NECK TEMPLATE

Please note: the finger rods are hemispherical at the ends

## New Zealand Specific Appendices

**These appendices are New Zealand specific**

**Appendix A:** This applies to Supervised Early Childhood Facilities only. We recommend that the NZS 5828: 2016 Standard is consulted directly with regard to this appendix.

**Appendix B:** Overhead equipment designed for use by suspension by the hands only without foot support, e.g. horizontal ladders, track rides, gladiator rings, parallel bars, turning bars etc is limited to a maximum free height of fall of 2200mm. This is measured from the hand grip of the event to the safety surface below.

Flying foxes, Spacenets and other spatial networks and single horizontal climbing ropes are exempt.

**Appendix C:** Only Chartered Professional Engineers holding qualifications recognised in New Zealand by the New Zealand Qualifications Authority are qualified to certify New Zealand manufactured equipment. These persons must be independent of the manufacturer or supplier.

Equipment can also be installed if it has a site specific Building Consent but must still comply with the Standard.

**Appendix D:** This is a list of related documents which apply when designing play equipment.

**Note:** Any Standard equivalent to any of the Standards listed in Appendix D shall be deemed viable alternatives.

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