

# **A Guide to New Zealand Standard NZS 5828:2004**

## **PLAYGROUND EQUIPMENT & SURFACING**

**July 2013**

**A Guide to New Zealand Standard  
NZS 5828 :2004**

NZS 5828 :2004 has adopted and combined:

**BS EN1176, Parts 1-7: 1998  
BS EN1177: 1998  
and BS 7188: 1998**

together with five New Zealand specific appendices  
into one document.

This booklet has been modified from the document:

**“A Guide to the European Playground Equipment  
and Surfacing Standards’**

By Rob Davies & Peter Heseltine

This booklet is, for the most part, a direct copy of what is known as the RoSPA document produced Rob Davies and Peter Heseltine.

Written permission has been given to Kevin McFadden of Playground People Ltd by Peter Heseltine to modify and use this document to make it suitable for use in New Zealand. It has been modified to suit the New Zealand situation for NZS 5828:2004 as a free service for Council staff.

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

The gesture will, we are sure, result in a clearer understanding of NZS 5828:2004 for those who do not require technical standard. This in turn will lead to safer playgrounds for our children.

This document in no way replaces NZS 5828:2004

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The interpretations are those of the authors. Other interpretations are possible. Where there is a dispute, reference should be made to the published Standard or any appropriate Standards New Zealand technical committee which may be established.

The European Standards EN 1176 and EN 1177 came into effect on January 1, 1999 and are applicable throughout the European Union.

NZS 5828:2004 consists of BS EN 1176 Parts 1-7:1998, BS EN1177:1998 and BS 7188:1998 plus New Zealand specific appendices.

**NZS 5828 : 2004 is comprised of the following documents:**

**BS EN 1176 Playground Equipment** is published in seven parts:

Part 1: General safety requirements and test methods

Part 2: Additional specific safety requirements and test methods for swings

Part 3: Additional specific safety requirements and test methods for slides

Part 4: Additional specific safety requirements and test methods for runways

Part 5: Additional specific safety requirements and test methods for carousels

Part 6: Additional specific safety requirements and test methods for rocking equipment

Part 7: Guidance for installation, inspection, maintenance and operation

**BS EN 1177 Impact absorbing playground surfacing:** Safety requirements and test methods

**BS 7188 Impact Absorbing Playground Surfaces:** Performance Requirements and Test Methods

Appendix A: Supervised Early Childhood

Appendix C: Overhead Equipment

Appendix E: Related Documents

Appendix B: Transition

Appendix D: Certification methods

This booklet attempts to explain in everyday terms for the interested lay person the main requirements and to identify changes from the former standards where these may be assessed on site. It does not replace the Standards. In the event of legal claims or disputes, reference should be made to the full Standards, copies of which are available from Standards New Zealand, Private Bag 2439, WELLINGTON.

The main changes from the existing AS/NZS standards are in the areas of the free height of fall of overhead equipment and safety surfacing areas. There are some dimensional changes in other areas. There are a number of new requirements. A significant change related to under-three year-olds: specific requirements for access, guarding and entrapment are made for equipment accessible to them.

**Under-threes are expected to be under supervision when using the playground.**

NZS 5828:2004 harmonised existing standards (BS EN1176 Parts 1-7:1998, BS EN1177:1998 and BS 7188:1998). Five New Zealand specific appendices are added.

NZS 5828:2004 is not retrospective or, currently, as with previous standards, a legal requirement but represent "best practice" in the event of an accident claims. Their limitations should be recognised: mere compliance will not automatically create a safe playground. Like previous playground standards they are intended to be used intelligently.

Equipment produced before SNZ 5828:2004 should meet Standards existing at the time or have undergone third party testing, for example by carrying a TÜV certificate or written confirmation of compliance by a Chartered Professional Engineer.

Where there are differences between the new and old standards, our advice is DON'T PANIC! Equipment which has been perfectly safe under the previous standards for 20 years did not suddenly become dangerous the day after publication of NZS 5828:2004.

New equipment should meet NZS 5828:2004 one year after publication of the Standard. Testing houses and Registered Structural Engineers will use NZS 5828:2004 in assessing compliance. The same applies to the provision of impact absorbing surfaces.

Some elements of NZS 5828:2004 are open to opinion. In the event of a dispute, information and guidance on interpretation may be sought from Standard New Zealand's Technical Committee. 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".**

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. others that affect the manufacturer or supplier have not been given. Additional definitions are included in each part.

- **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.
- **Climbing equipment:** items on which children cannot stand unaided but must hold on
- **Playing surface:** the ground
- **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:** used by more than one user at a time
- Ladders, stairs and ramps: primary means of access, the difference between them being detailed on Page 16
- **Impact area:** the area where the child will strike the surface or another item or part of equipment (see also Section on surfacing - Page 6)
- **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
- **Family of products:** modular or multi-play equipment
- **Not easily accessible:** accesses designed to discourage unaided use by children under 36 months.
- **Overhead equipment:** overhead components designed to support a child by the hands only (eg: horizontal ladder, ring ladders etc)
- **Cluster:** separate items designed to be grouped together (ie: adventure trails).

N.B: Space between individual items must be appropriate to the intended age.

It is made up of three parts:

- space occupied by equipment
- free space (only applies where there is 'forced' movement" and this distance should be stated by the supplier)
- falling space (surfacing area). Free spaces may not overlap, falling spaces may overlap but free spaces + 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 - Diagram 1a)

Standing A: 1000mm B: 1800mm

Sitting A: 1000mm B: 1500mm

Hanging A: 500mm B: 220mm

Some equipment may have different distances

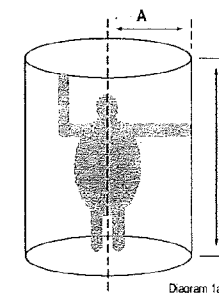


Diagram 1a

#### 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)
- 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 events 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 6)
- Platforms with fall heights of more than 1m between them require impact absorbency

#### PROTECTION AGAINST INJURIES DUE TO OTHER TYPES OF MOVEMENT

No unexpected obstacles (Diagram 1b)

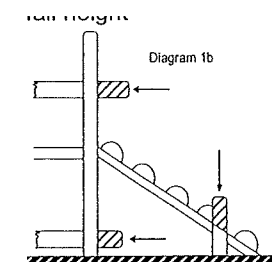


Diagram 1b

A variety of materials are allowed, for example: rubber tiles, mats, wet-pour, loose-fills. 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. See Diagram 2 opposite.

## DEFINITIONS

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

**Type of use:** Standing (from foot to surface)  
Sitting (seat to surface below)  
Hanging (hand support to surface below)

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

## INFORMATION

- Surfacing suppliers must supply:
  - correct installation instructions
  - maintenance instructions
  - inspection procedures

## SAFETY REQUIREMENTS

- Surfacing should have no sharp edges or protrusions
- Surfacing should have no entrapments
- Loose fills should be 200mm more than the depth required to meet the Hie reading (normally 300mm)
- Hard surfaces should only be used outside the impact area
- Impact absorbing surfaces should be used where falls over 600mm are possible
- Topsoil or turf may be used up to 1m
- No area requirement under 600mm. It is suggested a 1m minimum

Test methods may be found in the section BS EN1177 :1998

## DIMENSIONS OF IMPACT AREA (NOT APPLICABLE FOR SWINGS AND CABLE RUNWAYS)

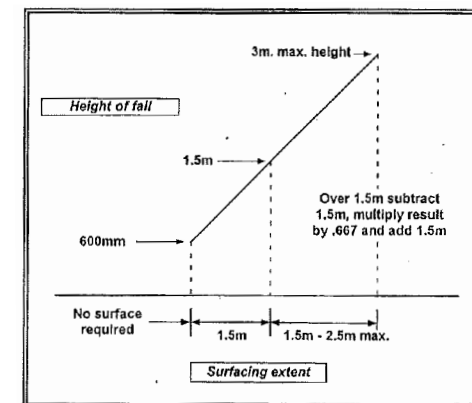


Diagram 2 (Surfacing areas)

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	2.50m

Loose-fill materials have different requirements:

Material	Description	Min. depth	Max. fall height
Bark	20 - 80 mm Particles	300mm	3000mm
Wood chip	5 - 30 mm Particles	300mm	3000mm
Sand	0.2 - 2 mm Particles	300mm	3000mm
Gravel	2 - 8 mm Particles	300mm	3000mm
Eng. wood fib.	5 - 50mm Particles	300mm	4500mm

The main changes relate to tighter specifications on materials, the requirements for grip and grasp, the finishing of the equipment.

## MATERIALS

- Materials and product finishing treatments should meet Standard requirements or be suitable for their purpose
- **Flammability:** use flash resistant materials
- **Timber:** 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.
- **Synthetics:** 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 time-scale)
- **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 surface to the lowest foot hold or 600mm from the top surface of a platform

## TYPES

Specific requirements are given for some types of equipment (i.e: slides, swings etc). Other types are permitted under the general requirements.

## FINISHING

- Timber species and synthetics should be splinter resistant
- No protrusions or sharp edged components
- Bolts should conform to Diagram 3

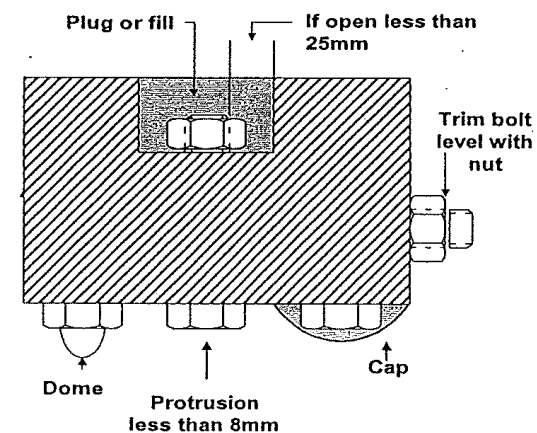


Diagram 3

- If necessary, grind welds 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 (ie: 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



A new section covering swinging and climbing ropes and chains but not 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

### SWINGING SUSPENDED ROPES

Not combined with swings in the same bay. Rope diameter: 25 - 45mm  
Less than 2m long: over 600mm from static parts

2m - 4m long: over 900mm from swinging parts over 1000mm from anything

### CLIMBING ROPES

Anchored at both ends and movement less than 20% of rope length  
Single climbing rope diameter: 18 - 45mm (nets comply with Grip requirements)

There are seven probes: the Torso Probe (C), the Large Head Probe (D), Probe 1 (A), Probe 2 (8), the Wedge Probe and the two Finger Probes. Only two probes are used for testing any opening depending on age and likely direction of entry. There is also a toggle test to reduce the dangers of clothing toggles being caught. Full details of the test methods may be found in the Standard.

### 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 with four sides (i.e: a tunnel or net)
- **Non-bound opening:** an opening with three sides (i.e: a space between a platform and two verticals)

**N.B:** Head, neck and torso entrapments start at 600mm above the ground or standing surface.

### PROBE DIMENSIONS

Probe dimensions are given in Appendix A

### ENTRAPMENT 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 CHILDREN OVER 3

- Rigid completely bound openings (feet first): if small probe (A) enters to its full depth then large head probe (D) must pass through to the depth of probe not including the handle.
- All other cases: if small probe (8) enters to its full depth then large head probe (D) must pass through to the depth of probe

**N.B:** Ignore the taper.



**N.B:** Common sense suggests this test should not be used unless it can be guaranteed that children under three will never use the equipment. Use the tests for all children.

### TESTS FOR ALL CHILDREN

All cases: if the torso probe (C) enters then the large head probe (D) must also pass through to its full depth, not including the handle.

N.B If the torso probe (C) fails to enter to its full depth, there is no entrapment.

### 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.

### TOGGLE TESTS

This is to assess whether clothing can be trapped and is used on slides, fireman's poles and accessible roof ridges. This does not refer solely to anorak-type toggles.

Slides: For narrow slides, place on centre line, move forwards keeping pole vertical - toggle or chain should not be caught. Do not use force.

For wide slides, position at both sides of chute surface  
The test is applied for the whole chute length.

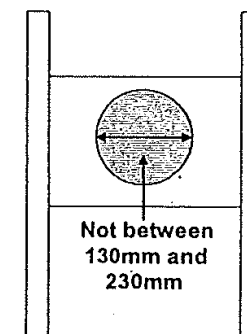
- Fireman poles:
1. Position the device vertically at the edge of the platform nearest the pole - there should be no entrapment of the toggle
  2. Remove toggle and chain, hold 1.8m above platform and re-test
  3. Continue test down the pole to height of 1.2m from the ground

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

**N.B:** Consideration is being given to the toggle test being applied to any area of forced movement. (i.e: a roundabout)

### OTHER CASES

Rigid circular openings (not tunnels) (Diagram 4)



### NON-RIGID MEMBERS (I.E: ROPES AND CHAINS)

As for rigid circular openings but overlapping must not create an entrapment.

### BRIDGES

The space between the flexible bridge and rigid sides should be not less than 230mm

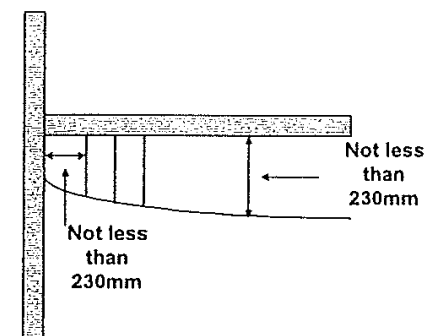


Diagram 5

### ENTRAPMENT OF THE WHOLE BODY

These may occur:

- in tunnels, for example (not tube slides)
- 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

- If open both ends
- slope less than 15°
  - have an internal diameter over 400mm & be less than 1m long
  - or**
  - have an internal diameter over 500mm & be less than 2m long
  - or**
  - have an internal diameter over 750mm with no limit on length
- slope greater than 15°
  - have an internal diameter over 750mm with no length limit
  - have provision for internal climbing (e.g: steps or handles)
- 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

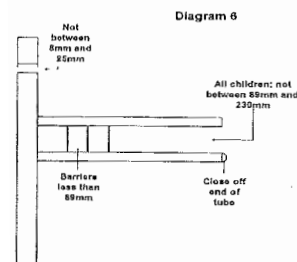
These may occur where there are holes in platforms, bridges etc.

- Inclined planes (not suspension bridges) less than 45° should have no gaps over 30mm (There are no requirements for suspension bridge gaps other than the main entrapment requirements)

#### FINGER ENTRAPMENTS

These may occur in:

- gaps where the movement of the child may cause a finger to become stuck
  - open-ended tubes
  - 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 10)
  - 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 6 shows entrapment distances



The changes in this area relate to the different requirements for under and over- three year-olds and differing requirements for guard-rails and barriers. Heights have decreased. Surfacing should be appropriate to the free-fall height.

#### DEFINITIONS

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

#### HAND-RAILS

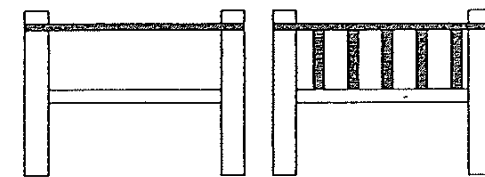
Where required they should be between 600 and 850mm above standing surface.

#### EQUIPMENT FOR UNDER 3's

- Platforms over 600mm require a barrier with a minimum height of 700mm high + impact absorbing surfacing.

#### EQUIPMENT FOR OVER 3's

- Platforms up to 1000mm - No barriers or guard-rails required + impact absorbing surface over 600mm (can be grass up to 1m)
- Platforms 1000-2000mm: 600 - 850mm high guard-rail + impact absorbing surfacing
- Platforms 2000-3000mm: 700mm high barrier + impact absorbing surfacing



Guard-rail

Barrier

Diagram 7

No bars, infill or steps which can be used as steps.  
Tops should discourage standing or sitting

The main change in this area is that the 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** (Normally angled $60^\circ$ - $90^\circ$ to the horizontal)

- Ladders should:
  1. have rungs and/or sides up to 60mm diameter (grasp) or have hand-rails 16-45mm (grip). Near vertical ladders ie: within  $10^\circ$ : apply grip requirements. Rungs require grip and sides require grasp
  2. be evenly spaced (bottom rungs can be omitted to discourage young children)
  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** (normally angled between $15^\circ$ and $60^\circ$ to the horizontal)

- Stairs should:
  1. have at least three rises
  2. be evenly spaced
  3. have a minimum tread depth of 140mm
  4. have the back of the tread aligned with the next tread front
- 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)
- Hand-rails are required on stairs over 1m &  $45^\circ$  & meet hand-rail requirements
- Under-three's equipment should have handrails from the first step

#### **RAMPS** (normally inclined surfaces up to $38^\circ$ from the horizontal)

- Ramps should:
  1. have slip-resistant measures if accessible to all ages i.e: footholds
  2. have barriers at least 700mm high for under three's if the ramp is over 600mm above surface
  3. under-three's equipment should have handrails from the lowest point

The main changes relate to requirements for new types of swings, dimensions and surfacing areas.

#### **DEFINITIONS**

- **Swing height:** distance between pivot centre and ground surface
- **Swing suspension:** distance between pivot centre and seat surface
- **Ground clearance:** distance between lowest part of seat and ground
- **Seat height:** distance between top of seat and playing surface

#### **TYPES**

Type 1: Traditional classic swing

Type 2: Swing with restricted movement

Type 3: Single point swing

#### **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. Do not mix cradle and flats seats in same bay
- 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

#### **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  $30^\circ$  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. N.B: In our opinion a barrier should be outside the loose-fill surfacing area

## 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 (RoSPA: 635mm))

Forward and Back

Different areas for synthetic and loose-fill surfaces in a box or pit (see page 21)

- 1: synthetic: .867 x length of suspension member + 1.75m
2. loose-fill: .867 x length of suspension member + 2.25m

Side width Type 1 and Type 2:

- Seat width no greater than 500mm: 1.75m minimum (ie: 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

Side width Type 3

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

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

Plastic slides and tunnels from moulds conforming to the existing Standard may be used for five years from 30 April 2004. See **Appendix B**. From that date on these may not be installed. .

## 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 ( <b>i.e: a platform</b> )
Starting section:	the section where the child gets onto the slide

## 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. N.B: This can be a platform for attachment slides
- If the starting section is over 400mm long, platform requirements apply
- From a platform, the gap to the slide is the same width as the slide
- For attachment slides over 1m free fall height there should be starting section barriers which should have a height of at least 500mm at one point
- For attachment slides over 1m FFH there should be a guard-rail across the entrance to the slide at a height of between 700-900mm
- Free standing slide starting section guard-rails should be at least 700mm above the starting section at one point where FFH is over 1m
- Barriers extend to the top of attachment slides

Sliding sections

- Maximum angle: 60° at any point and an average 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

## RUN-OUTS

- Run-outs of at least 300mm are required if the sliding section is under 1.5m long.  
Additional requirements:  
Type 1: 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: (all lengths over 1.5m) run-out is .3 x sliding length

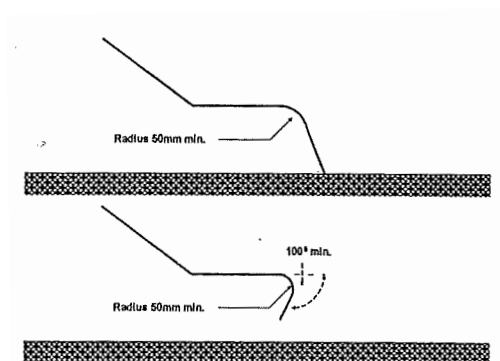


Diagram 8 (Type 1 only)\*

\*If the sliding zone is over 1500mm, the maximum height is 350mm and if under the maximum height is 200mm

- 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 1.5m sliding length: maximum 350mm
- Users should come to a stop on the run-out section (Type 2 only)
- Chutes should have a side height of:  
fall 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 should be a minimum 750mm high and 750mm wide
- 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

## 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

From Page 18

## SURFACING DISTANCES FOR SWINGS

Minimum Surfacing Distance from Seat Centre to 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)

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

## DEFINITION

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

## SAFETY REQUIREMENTS

- Stop at end should progressively slow down the traveller
- 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
- 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 16 stone adult) speed is 7m per second

## DIMENSIONS OF SUSPENSION MECHANISM

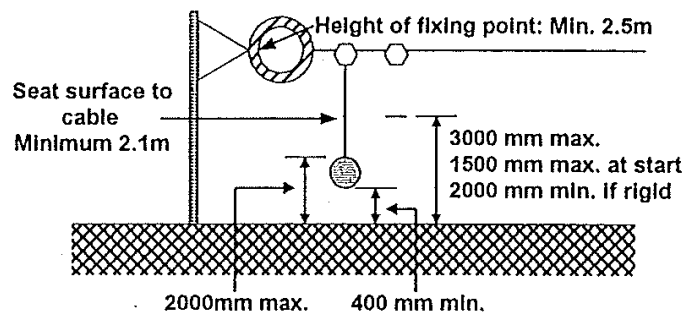


Diagram 9

## FREE SPACE

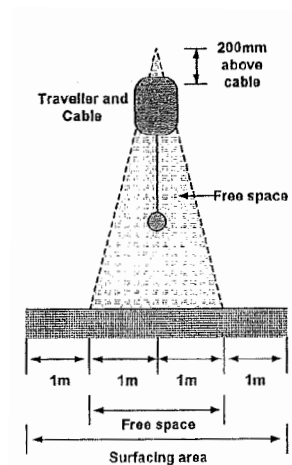


Diagram 10

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

## IMPACT AREAS

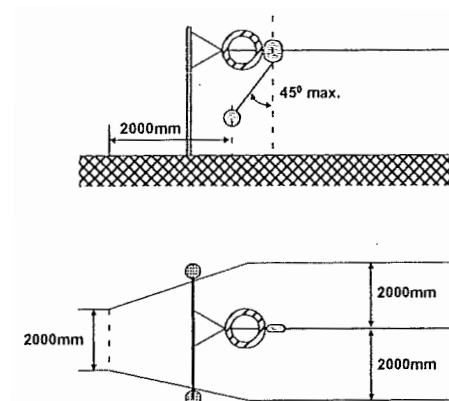


Diagram 11

Suppliers must provide extra information (i.e: cable settings and permissible gradients) for this item in addition to that detailed on page 31



The main changes are in clearer separation into different types. A change in the clearance between the underside and the ground will affect older items. The change should provide greater safety.

## DEFINITIONS

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

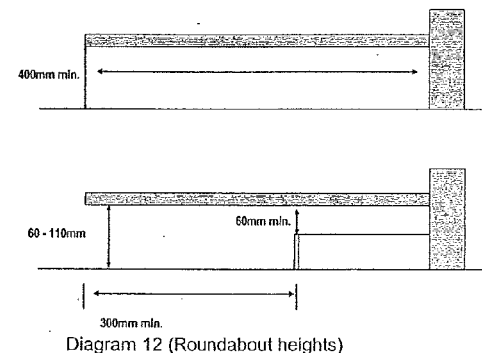
- Maximum free height of fall: 1000mm (For Type C: 1500 - 3000mm)
- Maximum speed at periphery under reasonable use: 5m per second. As no method is given, this cannot be tested to EN 1176.
- Hand grips should be between 16 - 45mm

## SPECIFIC REQUIREMENTS

- Type A: Maximum diameter: 2m  
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:

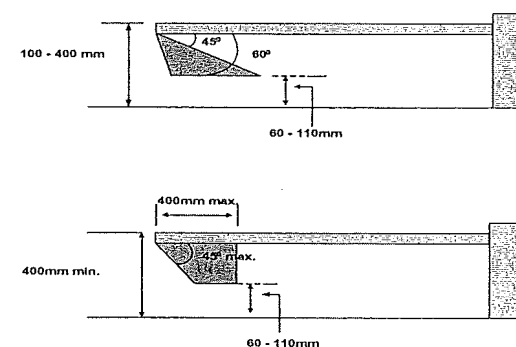
Platforms should be circular and enclosed  
All parts should revolve in the same direction  
No super-structure over the edge of the platform  
Mechanism should be enclosed  
If set flush in ground, there should be a maximum 6mm gap between the edge and the ground if not set flush:



Protruding bolts underneath are covered by the protrusion requirements

Roundabouts with protective skirts

- Where a skirt is fitted the dimensions in Diagram 13 apply (this may change)





- Protective skirts should be of rigid material and have no burrs or other defects
- The bottom edge should be flared towards the inside or protected

Type C: Hand-grips must be the same height and flexible  
Fall height: between 1500mm - 3000mm from the hand-grip

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: 1m  
Free space: 3m  
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

Free space: Horizontal: 2m all round  
Vertical head clearance from platform: sitting 1.5m  
standing 1.8m

Small rotating items under 500mm diameter are excluded but RoSPA suggests 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

The main changes relating to clearer separation of different types of rocking items.

### DEFINITIONS

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

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

### TYPES

- 1: Traditional single central pivot up and down seesaw
- Type 2a: Typically a single spring rocker with main movement in 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

### SAFETY REQUIREMENTS

Type	Max. free fall height	Max. slope of seat/stand	Max. seat/stand height	Ground clearance <sup>(1)</sup>	Foot rests	Hand grips
1	1500mm	20°	1000mm	230mm min.	Optional	Required
2a	1000mm	30°	550mm	Optional	Required	Required
2b			780mm	230mm min.	Optional	
3a	1000mm	30°	550mm	Optional	Required	Required
3b			780mm	230mm min.	Optional	
4	1500mm	20°	1000mm	230mm min.	Required	Required
<sup>(1)</sup> Not required when damped						

- Throughout the range of movement gaps in all accessible joints should be under 12mm
- Progressive restraint at extremity of movement is required (not spring rockers)
- 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
- Hand grip diameter. 16 - 45mm (for toddler items: 30mm maximum)
- Right-angled corners on moving equipment should be 20mm radius minimum (i.e: a bird's beak)
- Type 1: maximum horizontal movement: 140mm  
Type 3a: maximum sideways movement 5°  
Type 4: maximum horizontal movement; 600mm

### FALLING SPACE

1000mm between items at maximum movement.

### SURFACING REQUIREMENTS

There are no special extra requirements for surfacing areas. It is suggested 1m minimum if under 600mm

The main changes cover the foundations of equipment when being installed, some site recommendations and the documentation required from the supplier. 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 14)

### INSPECTION

- Manufacturers will recommend the inspection frequency although high-vandalism or high-use sites may need a daily check Diagram 14

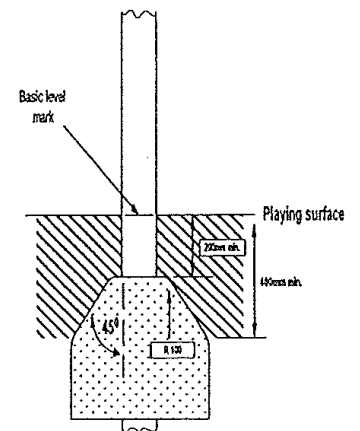


Diagram 14

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 (for example, 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
5. design and tender documents

## 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.

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

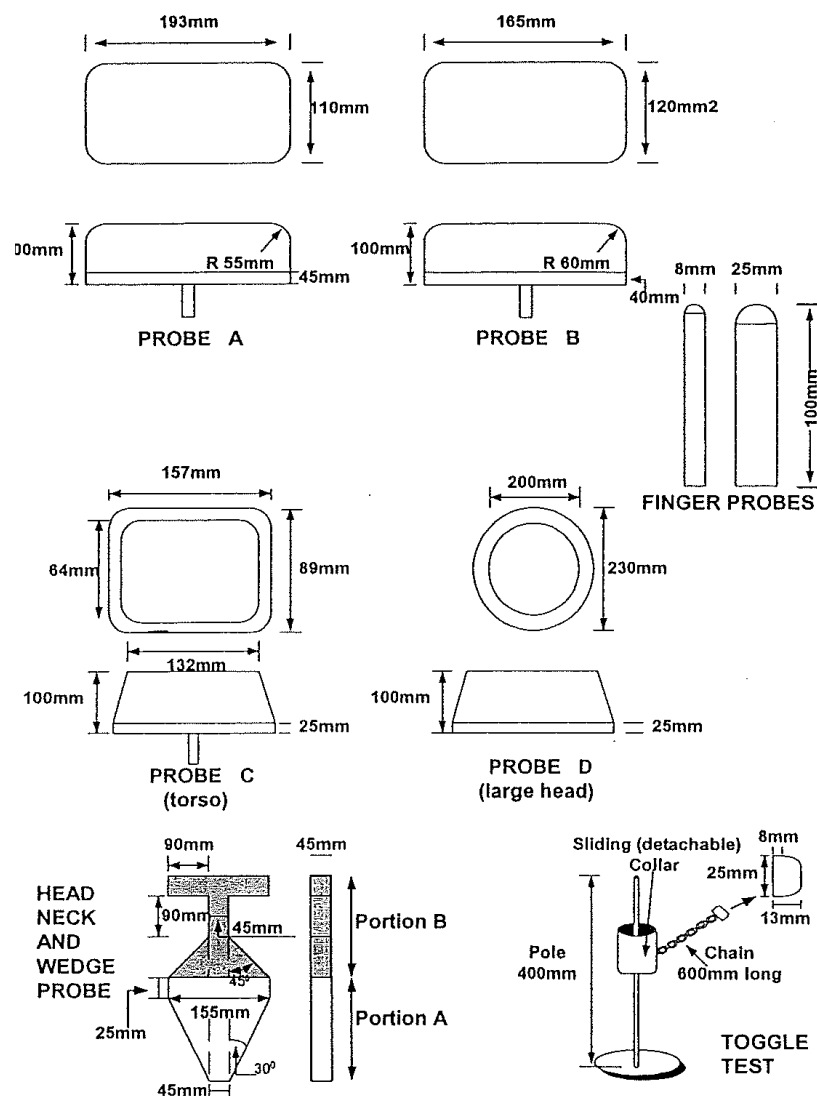
## INFORMATION

- 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 level mark
  5. Number and date of EN 1176

- This is a requirement of the standard



**Appendix A:** This applies to Supervised Early Childhood Facilities only. We recommend that the NZS 5828: 2004 Standard is consulted directly with regard to this appendix.

**Appendix B:** Because tooling for plastics are so expensive, plastic slides and tunnels, compliant with existing AS/NZS Standards, may be installed for up to five years from 30th April 2004

**Appendix C:** Overhead equipment designed for use by suspension by the hands only without foot support, i.e: monkey bars, horizontal ladders, track rides etc but excluding runways, 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.

**Appendix D:** Only Chartered Professional Engineers holding qualifications recognised in New Zealand by the New Zealand Qualifications Authority or accredited testing agencies and laboratories are qualified to certify New Zealand manufactured equipment

These persons, agencies and laboratories must be independent of the manufactured or supplier.

Equipment certified compliant with BS EN1176 Parts 1-7:1998 in Europe will fully comply with NZS 5828:2004, provided the overhead event free height of fall is equal to or less than 2200mm as per Appendix C.

**Appendix E:** 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 E shall be deemed viable alternatives.

Accessibility	8	Plywood	8
Appendices	33	Preservatives	8
Barriers	15	Probe dimensions	32
Bolts	9	Product information	29
Bridges	13	Radius	9
Cable runway free space	23	Ramps	16
Cable runway mechanism	22	Rocking falling space	28
Cable runway requirements	22	Rocking safety requirements	27
Cable runway surfacing	23	Rocking surfacing areas	18
Cable runway	22	Ropes (climbing)	10
Chains	10	Ropes (swinging)	10
Circular openings	13	Rotating chairs	24
Connections	9	Rotating free space	26
Consumable components	9	Rotating safety requirements	24
Definitions	4	Rotating surfacing areas	26
Documentation	29	Roundabouts (pedal)	26
Entrapment (feet & legs)	14	Roundabouts	24
Entrapment tests (all)	12	Roundabouts(overhead)	26
Entrapment tests (over 3's)	11	Sheathed wire ropes	10
Entrapments	11	Slide chutes	19
Falling space	5	Slide free space	20
Fibre ropes	10	Slide run-outs	20
Finger entrapments	14	Slide safety requirements	19
Finishes	8	Slide surfacing areas	21
Foundations	29	Staff	29
Free space	5	Stairs	16
Giant rotating discs	26	Surface areas	7
Grasp requirements	8	Surfacing distances	7
Grip requirements	8	Surfacing information	6
Guardrails	15	Surfacing	6
Handrails	15	Swing dimensions	17
Hard surfaces	6	Swing free space	18
Inspections	29	Swing requirements	17
Ladders	16	Swing siting	18
Loose-fill depth	6	Swing surfacing areas	21
Loose-fill requirements	7	Swing surfacing	18
Lubricants	9	Synthetic materials	8
Maintenance	29	Timber preservation	8
Marking	29	Toggle tests	12
Material requirements	8	Toxic materials	8
Metal protection	8	Tunnels	13
Minimum space	5	Wedge entrapments	12
Obstacles	5	Wire connectors	10
Operating safety	29	Wire ropes	10

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