

SPECIFIERS GUIDE TO EN 1176 PARTS 1 TO 7, PART 10 AND PART 11 PLAYGROUND EQUIPMENT AND SURFACING

INTRODUCTION



For the last 40 years SMP have been at the forefront of Playground Equipment Safety, having played an active role in supporting the preparation of previous national and European standards. This involvement has been maintained with the recent revision of EN1176 and EN 1177. With this a mind, and by popular request, SMP has produced this updated wall chart which highlights a few of the more relevant every-day aspects of the latest version of this European Standard. It is not intended as an alternative or even a substitute for EN1176, but an easy reference, and light-hearted look at a serious subject.



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Complete standards can be obtained from BSI Customer Services, 389 Chiswick High Road, London W4 4AL. [Tel: +44 (0) 20 8996 9001].

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PART ONE: GENERAL 1

General safety requirements and test methods.

INTRODUCTION:

Risk-taking, with the assessment of risks, is an important life skill that needs to be developed as we grow up. Playground equipment aims to offer children the opportunities to encounter acceptable risks, which they are able to foresee, as part of this essential learning experience. It is much better that children learn to understand the real consequences of an occasional mishap in a controlled play environment, than in other more dangerous places where they could come to greater harm. The purpose of this Standard is not to lessen this learning experience, but to ensure children are given some protection from dangers that they may not be expected to foresee.

SCOPE:

Deals with general safety requirements for playground equipment and surfacing. Additional safety requirements for specific pieces of equipment are additionally addressed in subsequent parts.

The Standard was drafted with full recognition of the need for supervision of young children and those who are less able or less competent. For playground equipment that is 'easily accessible' additional safety requirements are specified.

STRUCTURAL INTEGRITY:

When assessed by calculation or physical test all structural parts shall resist the worst case loading whether they be permanent or variable loads acting on the equipment.

HANDRAILS, GUARDRAILS AND BARRIERS:

Handrails:

Shall be at a height not less than 600mm and not more than 850mm above the foot position.

Guardrails:

Generally only permitted for equipment not easily accessible for standing surfaces of less than 2m above the playing surface. They shall be between 650mm and 850mm in height above the standing surface.

Barriers:

For easily accessible equipment barriers shall be provided when the standing surface is more than 600mm above the playing surface. They shall be at least 700mm in height.

For equipment not easily accessible barriers shall be provided for standing surfaces greater than 2m above the playing surface.

Barriers shall have no intermediate horizontal or near horizontal rails or bars that can be used as steps by children attempting to climb and fully surround the required surface except for controlled entrance and exit openings. Additional protection is required to 'steep play elements'.



PART ONE: GENERAL 2

GRIP AND GRASP:

The cross section of any support designed to be gripped (holding of the hand round the entire circumference of the support) shall have a dimension between 16mm and 45mm.

The cross section of any support designed to be grasped (holding of the hand round part of the circumference of the support) shall have a width not exceeding 60mm.

For suspended ropes (fixed at one end) the diameter shall be between 25mm and 45mm.



PROTECTION AGAINST ENTRAPMENT:

All test probes shall be made to the dimensions stated in Part 1 Annex D.

Head and Neck:

All accessible completely bound openings, with a lower edge more than 600mm above the ground or standing surface, which allow the passage of the small probes, shall also allow the passage of the large probe.

There are two small probes. One for feet first openings and one for head first, but as a rule of thumb this will fail fully bound gaps between 89mm and 230mm.

Bound openings should have no parts that converge in a downward direction at an angle of less than 60 degrees.

All partially bound and V shaped openings with an entrance 600mm or more above the ground shall be tested for neck entrapment using the specified template and test procedure. Different pass/fail criteria are provided depending on the orientation of the opening.

Clothing:

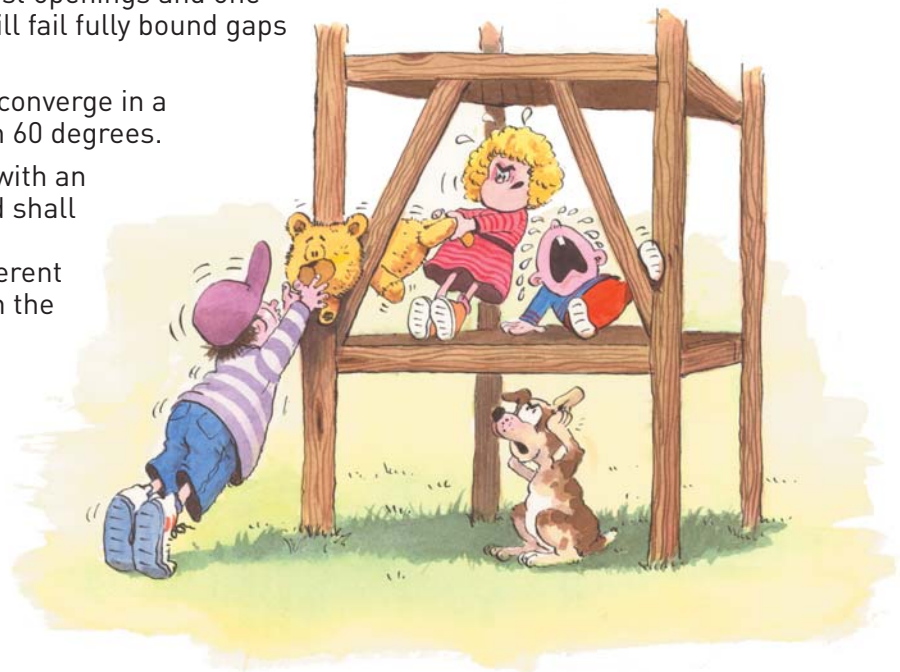
Slides, sliding poles and roofs shall be tested for toggle entrapment.

Whole Body:

Tunnels shall be greater than the diameters specified, depending on their length and inclination.

Fingers:

Openings within the 'Free Space' and holes which have a lower edge more than 1m above ground, which allow the 8mm finger rod to pass through, must also allow the passage of the 25mm finger rod.



PART ONE: GENERAL 3

PROTECTION AGAINST INJURIES DURING MOVEMENT AND FALLING:

Free Height of Fall:

The maximum Free Height of Fall permitted is 3m. This is measured in different ways depending on the type of use.

Minimum Space:

This is defined as the space required for the safe use of the equipment and will consist of the space occupied by the equipment, the Free Space (if any) and the Falling Space.

Free Space:

This is defined as the space in on or around the equipment that can be occupied by a user undergoing a movement forced by the equipment (e.g. sliding, swinging, rocking). It is specified as a cylinder of diameter 1m for sitting and standing use and 500mm for hanging use. The heights of the cylinder are 1.8m for standing, 1.5m for sitting and 2.1m for hanging (includes 300mm above the hand hold position).

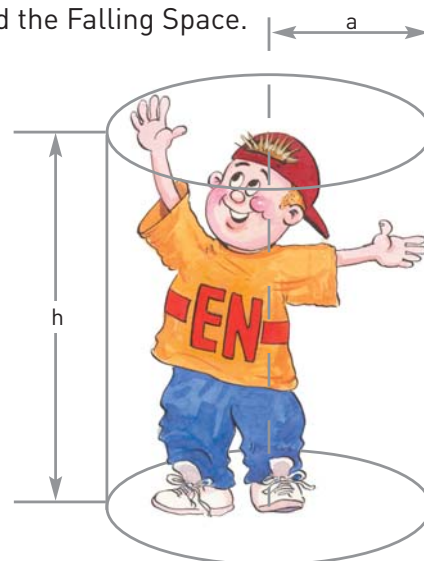
Falling Space:

This is defined as the space in, on or around the equipment that can be occupied by a user falling from an elevated part of the equipment. The extent of the Falling Space shall be 1.5m from a point directly below the elevated part of the equipment unless a greater Impact Area is required, in which case it will increase accordingly.

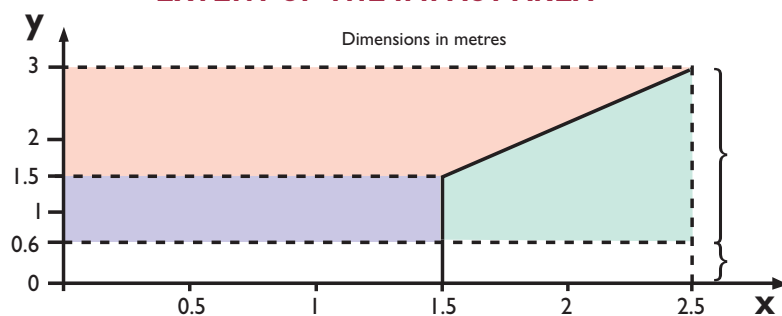
Impact Area:

This is defined as the surface area at the base of the Falling Space. This is required to have an Impact Attenuating Playground Surface, which has been fully tested to the requirements of EN1177 for all free heights of fall above 600mm. Below this threshold the surface has no requirements, unless the equipment has forced movement. Generally this is specified by the graph below but with specific requirements for specific types of equipment.

Different types of surface are available, including rubber based or loose particulate materials such as sand and bark. Grass may also be considered and more information on its use is given at a national level.



EXTENT OF THE IMPACT AREA



If $0.6 \leq y \leq 1.5$ then $x = 1.5$ (in metres)
if $y \geq 1.5$, then $x = 2/3 y + 0.5$

Key

- y free height of fall
- x minimum dimension of impact area
- a impact attenuating surface with requirements (4.2.8.5.2)
- b surface with no requirements, unless there is forced movement (4.2.8.5.3)

PART ONE: GENERAL 4

Equipment Separation:

The Standard concentrates on those spaces and areas needed to give some protection to users during use or should they accidentally fall from the play equipment.

The Falling and Free Spaces shall not contain any obstacles. In most cases there may be overlapping of Falling Spaces.

There shall be no overlapping of adjacent Free Spaces or an adjacent Free Space and Falling Space.

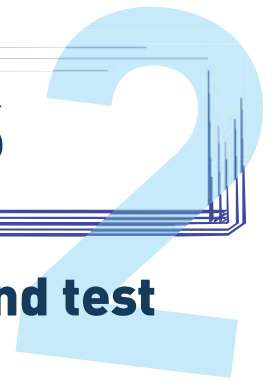
When designing play areas the space required for circulating between or around the equipment items, including desire lines and/or pathways, should be considered separately. The requirements for these will depend on the individual area and its associated features. Particular care is required with dynamic items.



CERTIFICATION:

The manufacturer/Supplier shall provide information concerning the safety of the playground equipment on offer, which shall include certification of conformity with this European Standard.

PART TWO: SWINGS



Additional specific safety requirements and test methods for swings.

GROUND CLEARANCE:

Traditional to and fro swings with one rotational axis shall have a seat ground clearance in the rest position of 350mm unless a tyre seat is used in which case it shall be 400mm.

MINIMUM SPACE BETWEEN THE SEATS OF SWINGS:

Shall be calculated to the standard requirements with a greater space required the higher the swing beam.

IMPACT TESTING OF SWING SEATS:

When seats, less than 900mm in diameter, are tested in accordance with the Standard there shall be no peak values of acceleration greater than 50g and the average surface compression shall not exceed 90N/m.

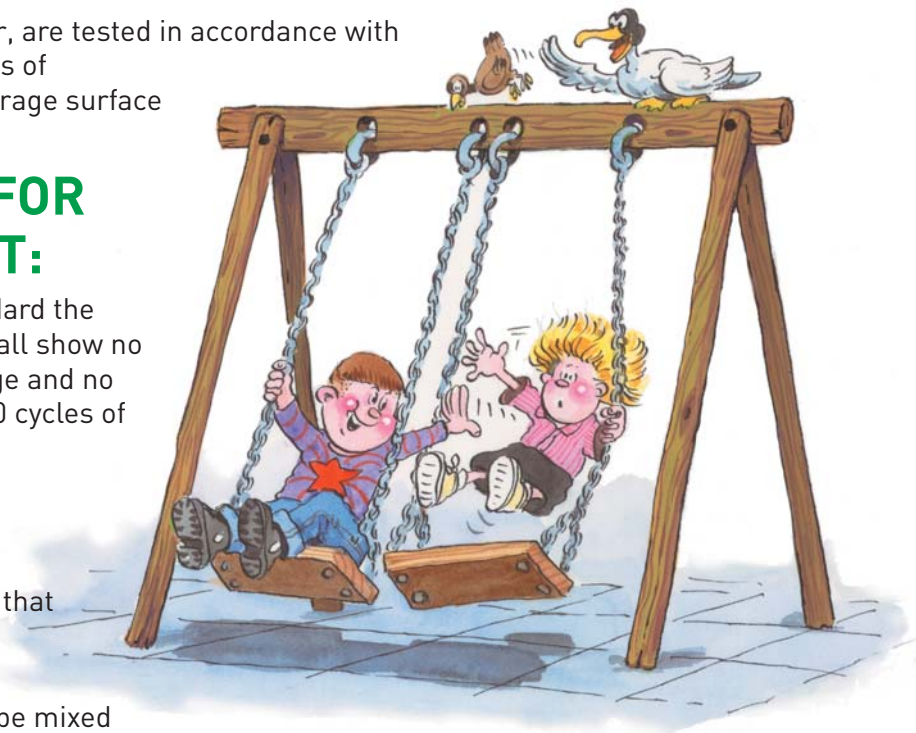
DYNAMIC LOAD TEST FOR SWINGING EQUIPMENT:

When tested in accordance with the Standard the components in the suspension system shall show no cracks, permanent deformation or damage and no connection shall be loosened after 100000 cycles of test.

FRAMEWORK:

Swings with more than two seats shall be divided by construction parts into bays so that there are no more than two seats per bay.

Cradle seats for young children shall not be mixed with flat seats designed for older children in the same swing bay.



PART THREE: SLIDES

Additional specific safety requirements and test methods for slides:

STARTING SECTION:

Each slide shall have a starting section of at least 350mm to allow the user to get into the sliding position. For attachment slides the platform may be used as the starting section.

SLIDE ANGLE:

The angle of inclination, to the horizontal, of the sliding section shall not exceed 60 degrees at any one point and shall not exceed an average of 40 degrees.

ACCESS RAIL:

All attachment slides with a free height of fall greater than 1m shall be provided with a rail across the opening. This is within specified height and range parameters.

RUNOUT SECTION:

Two types of runout section are permitted and both have a horizontal length, which increases with the length of the Sliding Section.



SURFACE OF THE SLIDE:

Should the slide surface be constructed from more than one piece of material it should be fabricated so as to eliminate gaps at the joints so that they inhibit the introduction of sharp objects such as razor blades and splinters. The preferred method of protecting against this problem is by manufacturing one piece slide surfaces.

PART FOUR: CABLEWAYS

Additional specific safety requirements and test methods for cableways.



STOPS:

When tested in accordance with the Standard the stop at the terminus of the cableway shall progressively slow down the traveller until it comes to rest, ensuring the seat is not swung through an angle of more than 45 degrees.

SEAT IMPACT TEST:

Seats shall be tested to the same impact requirements as swing seats.

SPEED:

When tested in accordance with the Standard the maximum speed of the traveller shall not exceed 7m/s.

PART FIVE: CAROUSELS

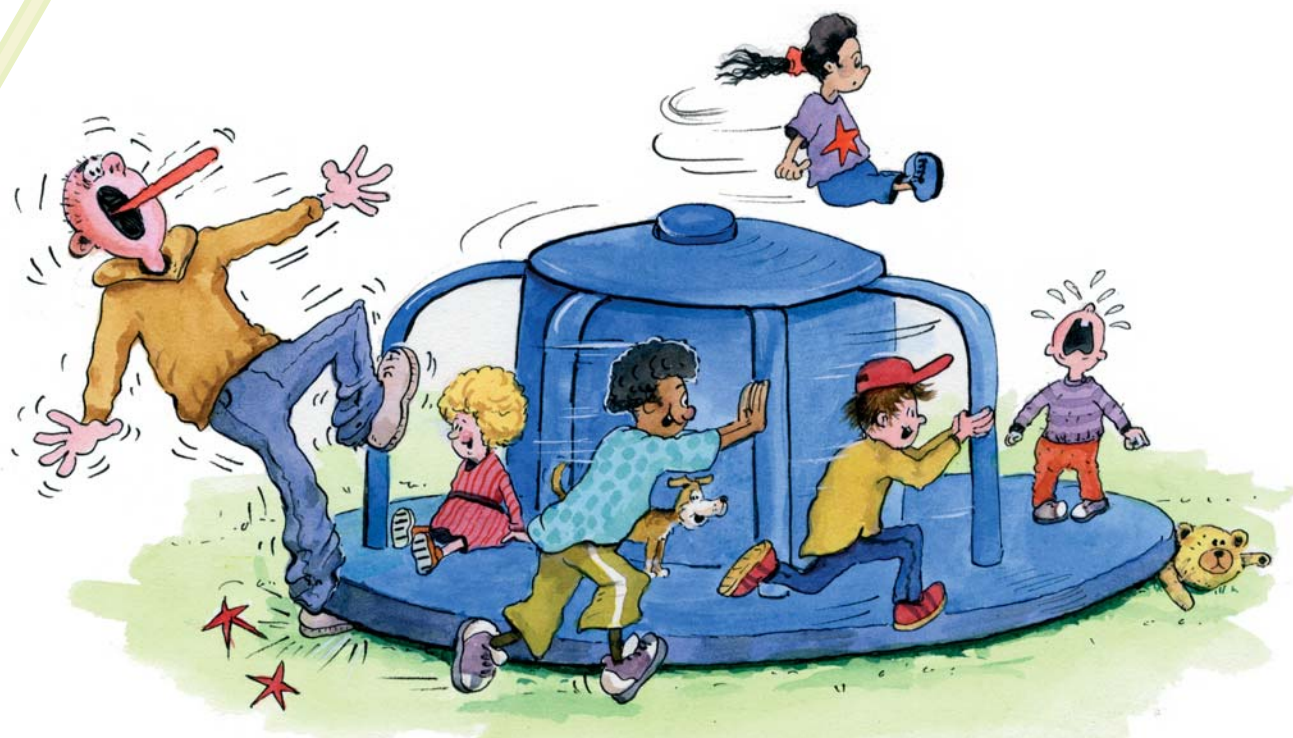
Additional specific safety requirements and test methods for carousels.

SCOPE:

Carousels greater than 500mm shall comply to this part of the Standard.

TYPES:

Many types of carousel are covered from traditional platforms to those with overhead holding-on positions.



GROUND CLEARANCE: (For traditional platform type Carousels)

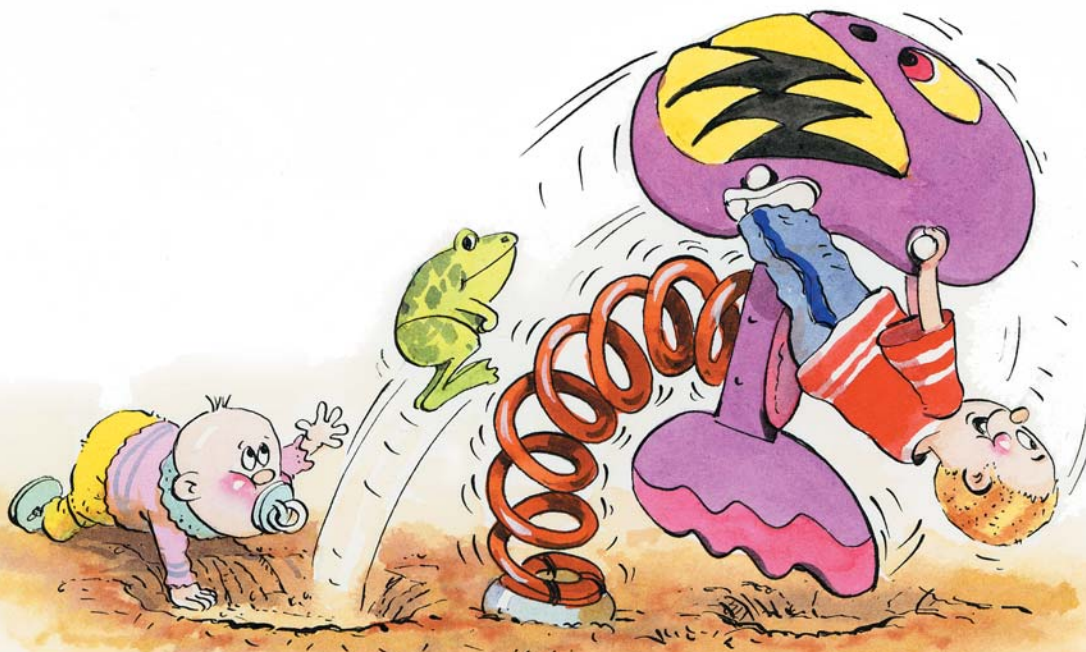
If flush with the ground there shall be no vertical gaps between the ground and the edge of the carousel greater than 8mm.

If not flush with the ground the underside of the platform shall be between 60mm and 110mm (which shall be maintained for at least 300mm towards the axis) or greater than 400mm unless the underside is designed to specific requirements of the Standard.

PART SIX: ROCKING

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Additional specific requirements and test methods for rocking equipment.



TYPES:

Many types of rocking equipment are covered from traditional seesaws to those with an overhead axis.

RESTRAINT OF MOTION:

The motion of all rocking equipment shall be progressively restrained towards the extremities of movement so that no sudden stop or sudden reversal of motion can occur. In addition to this certain types of rocking equipment (depending on the level of damping and other factors) also require a minimum ground clearance of 230mm.

LIMITS OF MOTION: (For traditional type seesaws)

When in motion the seat or stand position shall not exceed certain free fall heights depending on its type (1.5m for traditional seesaws) and shall not exceed a required maximum angle of slope (20 degrees for traditional seesaws).

PART SEVEN: OPERATION

Guidance on installation, inspection, maintenance and operation.

INSPECTION:

Routine Visual Inspection:

This identifies obvious hazards that can result from use, vandalism or weather conditions. For playgrounds subject to heavy use or vandalism a daily inspection of this type can be necessary.

Operational inspection:

This is more detailed to check the operation and stability of the equipment, especially for any wear and should be carried out every 1 to 3 months or as indicated by the supplier of the equipment.

Annual Main Inspection:

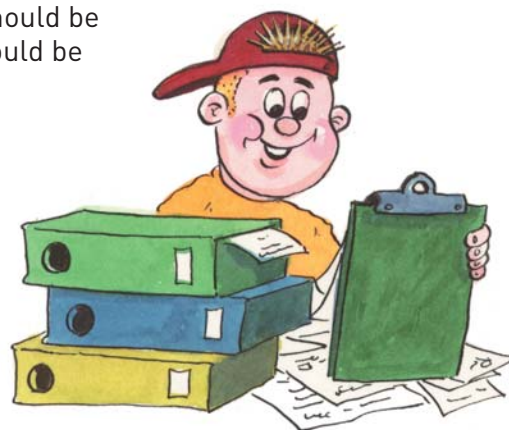
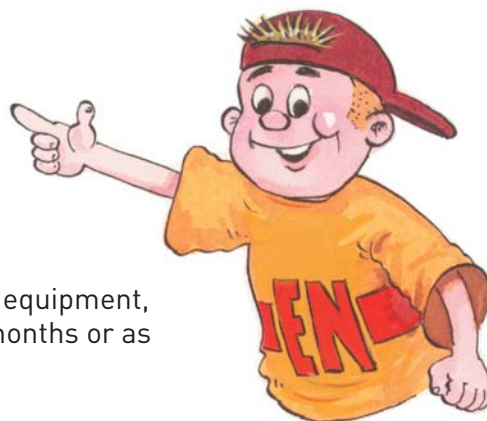
This establishes the overall level of safety of the equipment and should be carried out by a competent person at intervals not exceeding every 12 months.

MAINTENANCE:

If serious defects, which put safety at risk, are discovered they should be corrected without delay. If this is not possible, the equipment should be secured against use, e.g. immobilisation or removal.

DOCUMENTATION:

Records should be kept of all actions taken as part of the safety management of the play area which includes all the original documentation supplied with the equipment such as the certificate of conformance to this European Standard.



PART TEN: ENCLOSED

Additional specific requirements and test methods for fully enclosed play equipment.

SCOPE:

This part of the Standard applies to fully enclosed play equipment, which is defined as: "Equipment and Structures, including components and constructional elements with, or on which, children can play, that are within a three dimensional enclosure with specified entrances and exists." This is particularly applicable to the types of play structure that are often constructed indoors with containment walls made of netting.

FLAMMABILITY:

All materials used in the construction of fully enclosed play equipment shall conform to certain requirements.

EVACUATION:

Evacuation routes are required to conform with certain requirements for size and the maximum distance to an exit. The number of exits is dependant on the capacity of the play structure.



PART ELEVEN : SPATIAL

Additional specific requirements and test methods for spatial network.

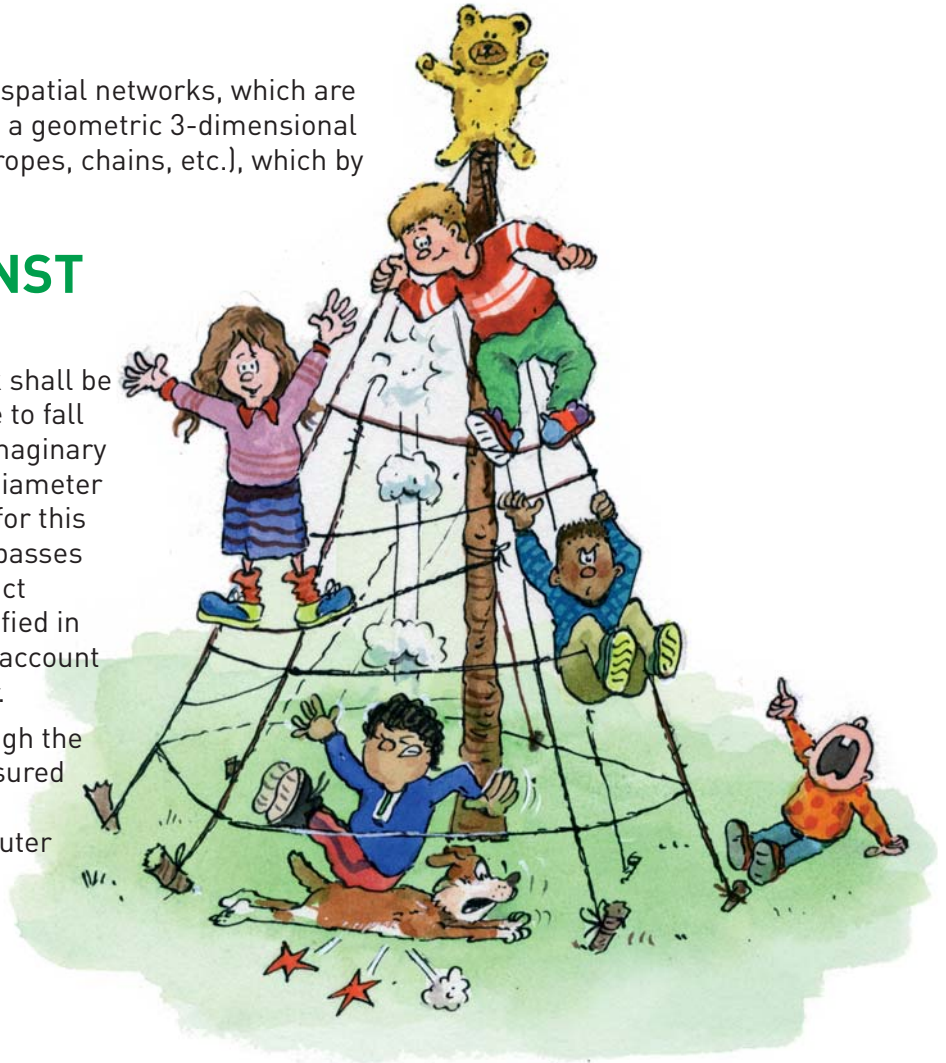
SCOPE:

This part of the Standard applies to spatial networks, which are defined as: "Climbing equipment as a geometric 3-dimensional assembly of flexible elements (e.g. ropes, chains, etc.), which by its design will yield."

PROTECTION AGAINST FALLING:

The mesh sizes of a spatial network shall be assessed to confirm if a user is able to fall directly through the structure. An imaginary cylindrical body is specified with a diameter of 650mm and a height of 1800mm for this assessment. If the cylindrical body passes through, the falling height and impact attenuating surfacing shall be specified in accordance with part 1, to take into account the possible movements of the user.

Where the body does not pass through the maximum free height of fall is measured from the highest foot position of an unimpeded fall, which is often the outer edge of the spatial network.



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