Resistance to indentation

Ladders, high heels etc can apply local point loadings to the playground surface. In the tests, a standard load is applied for 15 minutes to a standard cylindrical indenter. Residual indentation is measured at intervals up to 24 hours afterwards.

Three samples of each of the seven standard thicknesses of **Playtop®** were tested. Residual indentation after 24 hours ranged from 0.02 mm to 2.32 mm - well below the permitted maximum of 5.0 mm. There was no cracking, splitting or perforation in any case.

Ease of ignition

Playground surfaces must resist ignition if exposed to a local source of fire as a result of accident or vandalism. In the test, a standard stainless-steel nut heated to 900°C is placed on the surface.

Three samples of **Playtop®** were tested. The greatest radius of the effects of ignition was 20 mm, against a permitted maximum of 35 mm. This is classified as LOW.

Tensile tests

Tensile strength and elongation at break provide a useful indication of the strength and cohesion of the rubber matrix against competitive products.

Tensile strength (MPa ± 1%) : 0.68 MPa **Elongation at break** (% ± 1.5) : 83%

4 Maintenance and repair

With its continuous, jointless surface, Playtop® needs exceptionally little maintenance. Because the right thickness of material is always in the right place, no raking is needed, nor the extra allowance of material required for bark or sand. Any foreign objects are clearly visible on the surface and cannot create hidden hazards beneath it. And there are no gaps to tempt inquisitive children or provide weak points for vandals. The surface itself is porous, and if it is laid on a porous base, rainwater will drain away almost instantly.

Maintenance

The only routine maintenance required is removal of visible litter. Always remove leaves etc before they form a mush that is trodden into the surface. Where there are overhanging trees, pressure washing and/or treatment with proprietary moss and weed killers will keep the surface clean and quick-draining, and maintain its slip-resistance. This will be needed once a year at most. In winter, salt may be used as a de-icer. Use cold-water pressure washing to wash away salt residues when spring comes.

Repairs

Effective, lasting repairs to the continuous material can be made using essentially the same techniques as the original construction - either to build up localised heavy-wear areas after long use or to rectify damage caused by accident or vandalism. For relatively small areas, we offer repair kits containing the necessary materials together with detailed instructions for mixing, installing, curing and Health & Safety precautions. Larger repairs should be done by us.

If gaps develop where the resilient surface adjoins rigid edgings, they can be filled with a proprietary gunnable sealant.

Paint damage

If paint is spilled on the surface or sprayed as graffiti do **NOT** apply solvents without consulting us, since they can seriously damage the impact-absorbing material. We can sometimes recommend a suitable solvent. However, it is usually better to paint over the surface or to resurface the damaged area with a skin of the original rubber material.

Playtop® SAFER SURFACING

www.playtop.com

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Certificate No. FS32264

Association of Play Industries

Principal Contractor

08.04 English

Playtop® SAFER SURFACING

TECHNICAL DATA

1 Assessing required thicknesses and areas

This section summarises the requirements of the two relevant European Standards. EN 1176 : 1998 specifies safety requirements for different types of playground equipment, while EN 1177 : 1998 specifies safety requirements and test methods for impact-absorbing playground surfacing.

Specifying the right thickness

Playground operators must choose a surface with a Critical Fall Height rating that matches or exceeds the maximum possible 'free height of fall' from their play equipment. EN 1177 : 1998 defines the Critical Fall Height test. An instrumented 'headform' representing a child's head is dropped from various heights onto the test specimen, and its deceleration is monitored. The greatest height of fall that keeps maximum deceleration below the permitted limit gives the rated Critical Fall Height for the product. Under low play equipment with free heights of fall under 0.6 m, the surface is only required to have 'some impact-attenuating properties'. We recommend 20 mm thickness here and for general run-about areas. But **NOTE**, because 20 mm of **Playtop®** requires a separate structural layer but 40 mm can be laid directly on a dynamic (crushed-stone) base, the 40 mm thickness may sometimes be cheaper. Please ask us for alternative quotations.

The Critical Fall Height ratings for our standard thicknesses of **Playtop®** are:

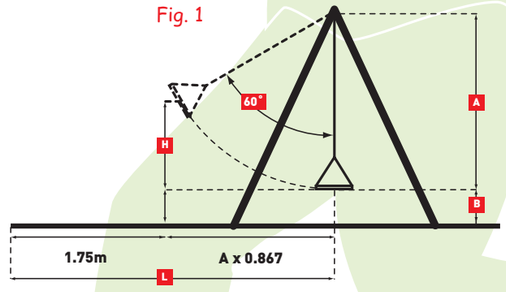
Thickness	20 mm	40 mm	50 mm	60 mm	80 mm	100 mm	140 mm
Critical Fall Height	0.6 m	1.3 m	1.4 m	1.6 m	2.0 m	2.5 m	3.0 m

Assessing the fall height

The maximum free height of fall for a piece of play equipment is defined as follows:

- For equipment on which the child stands, it is the height of the foot platform above the ground, regardless of higher guard rails.
- For equipment from which the child hangs, it is the height of the hand support above the ground.
- For equipment on which the child sits, it is the height of the seat above the ground.

Fig. 1



BUT if there is any possibility that a normally adventurous child can use guard rails, supports or seats to climb to higher parts of the structure, such as a roof, the height of the highest attainable point must be taken. For swings, the height **(H)** of the seat when 60° from the vertical is taken. **H = B + $^1/_2$A** (see Fig.1).

Assessing the area to be protected

The higher a piece of play equipment is, the further away a child could fall. And special rules apply to swings, slides, runways and carousels whose use involves horizontal movement.

Fig. 2

Static and rocking equipment

For static equipment, rocking equipment and seesaws, the protected area should extend at least 1.5 metres round the equipment. This applies to fall heights from 0.6 metres up to 1.5 metres. The distance then rises linearly to 2.5 metres round the equipment at the maximum permitted fall height of 3 metres (see Fig.2).

Swings

For conventional swings:

The **width** of the protected area should be 1.75 metres, centred on the seat. If the seat is wider than 500 mm, increase width by the amount it exceeds 500 mm.

The **length (L)** of the protected area should extend 1.75 metres beyond the horizontal limits of the swing's movement. On each side, **L = (A x 0.867) + 1.75 metres** (see Fig.1).

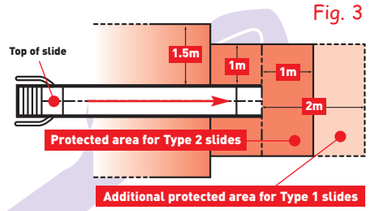
For single-point swings:

The protected area should be circular, centred on the rest position, with a radius **(R)** given by the same formula as above, thus allowing for a 60° angle of swing in any direction. **R = (A x 0.867) + 1.75 metres.**

Slides

For the ladder, starting section and upper part of the sliding section down to a height of 0.6 metres, the standard rules apply: the protected area round the slide should extend between 1.5 and 2.5 metres, depending on the free height of fall (see Fig.2). Below 0.6 metres, the protected area should extend at least 1 metre on each side, and this should continue into the run-out area beyond the slide end for a distance of either 1 metre (Type 2 slides) or 2 metres (Type 1 slides) (see Fig.3). We can tell you which Type you have. The whole protected run-out area is taken to have a fall height of 1 metre to compensate for speed of arrival, and thus requires 40 mm thickness of **Playtop®**.

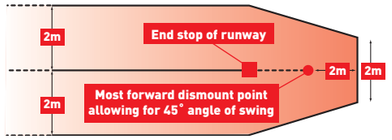
Fig. 3



Runways

For cable runways down which children travel under gravity, either seated or hanging by their hands, the protected area should extend 2 metres on either side of the runway's centre line. At the arrival end, it should extend 2 metres beyond the most forward dismount position. A 45° forward swing beyond the end-stop is the standard allowance. The protected area should taper in width from 4 metres level with the end-stop down to 2 metres at the extreme position (see Fig.4).

Fig. 4



Carousels

The Standard applies to carousels over 500 mm in diameter. For most types, the protected area should extend 2 metres out from the outer edge of the carousel to allow for centrifugal force. For carousels of the 'giant revolving disk' type, the protected area should extend 3 metres out. Some safety inspectors may allow the protected area to be reduced round small and/or low carousels.

Where the free height of fall exceeds 0.6 metres, the normal Critical Fall Height rules apply. But most carousels are lower than this, and the only requirement is for 'some impact-attenuating properties'. We recommend 20 mm of **Playtop®** laid over existing hard surfaces, or 40 mm laid direct on loose stone in new construction. Surfacing under the carousel and surrounding it must be at the same level, but no inward extent of protective surfacing is specified. We recommend 300 mm in from the outer edge for most carousels, but for types with overhead grips from which children hang, surfacing should extend in to the central support.

2 Substructure specifications

Although Playtop® can be installed as a package contract, some playground operators may wish to install the substructure themselves, leaving just the specialised work of mixing and laying the porous-rubber upper layers to us. This section gives basic details of substructure specifications - we can provide more detail on request.

Existing hard surfaces

Playtop® can be laid on most existing hard surfaces of concrete, bituminous macadam or asphalt in sound condition. Provided the surface is firm and even, it can usually be treated to achieve a suitable substructure. However, to avoid problems, please always refer to us for approval. Note that the finished surface will only drain freely if the existing hard surface is porous. Where there is existing play equipment on the site - especially moving equipment such as swings or carousels - the ground clearance under it must usually be maintained. This may mean raising the equipment or lowering the existing surface to allow for the thickness of **Playtop®**.

New construction

An important cost advantage of **Playtop®** is that the very strong porous-rubber surface can usually be laid directly onto a dynamic (crushed-stone) foundation layer, without the considerable extra expense of an engineered structural layer. A structural layer is needed only when the thickness of the rubber is 20 mm, for example on run-about areas of a playground or under low-level play equipment. But it may be cheaper to increase rubber thickness to 40 mm to avoid building a structural layer (see Section 1).

Foundation layer

The aggregate used to construct the foundation layer should be graded crushed rock, compacted and regulated to a finished thickness to suit site conditions. The foundation layer should be laid with local deviations no greater than 10 mm under a 3-metre straight edge in any direction. This specification applies both to foundation layers for direct application of **Playtop®** and where there is to be an intervening structural layer.

Structural layer

Where a structural layer is needed (under 20-mm thickness of **Playtop®**) we recommend a porous construction of open-textured bituminous macadam, so that the surface will drain freely. This may be laid as a single course with minimum consolidated thickness 50 mm, using aggregate of 10 mm nominal size. Alternatively, two courses may be laid. First a base course of minimum consolidated thickness 40 mm using aggregate of 20 mm nominal size, followed by a top course of minimum consolidated thickness 20 mm using aggregate of 6 mm or 10 mm nominal size. The macadam should be laid with local deviations no greater than 8 mm under a 3-metre straight edge in any direction. A steel-wheeled roller should be used to compact the area while the materials are in a workable condition. Compaction should continue until the roller leaves no marks. Particular attention should be given to the location and standard of all joints.

If an impervious base is specifically required, the top course should be a dense bituminous macadam or hot rolled asphalt.

The structural layer should be completed at least 14 days before **Playtop®** is installed.

Perimeter detail

The surface is normally retained by edgings. Hydraulically pressed precast concrete edgings are best, although pressure-treated timber edgings, block pavings or engineering bricks may also be used. Edgings should be set in a concrete bed and haunch and set above the level of the substructure by the required thickness of **Playtop®** and any structural layer. They should be laid to an accurate line and level and to a tolerance compatible with the finished surface level. If **Playtop®** is to surface only part of an existing hard area, it may be possible to cut a chase at the perimeter to assist bonding and allow the top surface to form a gentle ramp rather than a dangerous trip-edge.

3 Additional tests

As well as the Critical Fall Height test specified by the European Standard (see Section 1), we have submitted Playtop® to the four ancillary tests for playground surfaces specified by British Standard BS 7188 : 1998. Other countries have similar Standards. Mechanical performance was also tested. An independent specialist laboratory, The Centre for Sports Technology, carried out the tests. Full reports and formal certificates may be viewed on request.

Resistance to abrasive wear

Resistance to abrasion is crucial to the life expectancy of a playground surface. Some areas - e.g. under swings and round carousels - are abraded in ordinary use. The tests measure the loss of material when a standard abradant wheel abrades four specimens, one freshly produced and three artificially aged by different methods.

	Requirement	Unaged	Air Aged	Water Aged	UV Aged
Wear index	<1	0.76	0.71	0.91	0.99
Wear ratio	1 to 3	1.15	1.03	1.58	1.33

Slip resistance

Slip resistance is important in preventing ground-level accidents. In the tests, a standard skid-resistance instrument measures the dynamic friction of the surface when dry and when wet. Three samples of each of the seven standard thicknesses of **Playtop®** were tested. Figures for dry slip resistance ranged from 80 to 119 and for wet slip resistance from 52 to 79 - all well above the permitted minimum of 40.