

# Outdoor recreational multi-sports equipment — Specification

ICS 97.220.40

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# Committees responsible for this Product Assessment Specification

Technical Committee SW/65 was consulted in the preparation of this Product Assessment Specification.

This Product Assessment Specification, having been prepared under the direction of the Sector Committee for Engineering, was published under the authority of the Standards Committee and comes into effect on 15 December 1998

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The following BSI references relate to the work on this standard:  
Committee reference SW/65

ISBN 0 580 28241 4

## Amendments issued since publication

| Amd. No. | Date | Comments |
|----------|------|----------|
|          |      |          |
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## Foreword

This Product Assessment Specification (PAS) has been prepared at the request of manufacturer interest to provide a specification compiling text from BS EN 1176-1:1998, *Playground equipment — Part 1: General safety requirements and test methods*, BS EN 1270:1998, *Playing field equipment — Basketball equipment — Functional and safety requirements, test methods* and BS EN 748:1996, *Playing field equipment — Football goals — Requirements and test methods*.

There is no alteration to the technical content of the text taken from these three standards and no additional technical requirements are included.

This PAS is not a British Standard although BSI Technical Committee SW/65 were consulted in the preparation of this specification.

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### Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 24 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

## 1 Scope

This specification contains general and safety requirements and test methods for outdoor recreational multi-sports equipment intended for permanent installation, usually including facilities for basketball, football and hockey.

The safety requirements are also applicable to any integral seating or surrounds, e.g. barriers.

The safety requirements are intended to protect the user from hazards that he or she may be unable to foresee when using the equipment as intended or in a manner that can be reasonably anticipated.

## 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this specification. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS 7501:1989, *General criteria for the operation of testing laboratories*.

BS EN 59, *Glass reinforced plastics — Measurement of hardness by means of a Barcol impressor*.

BS EN 335-2:1992, *Durability of wood and wood-based products — Definition of hazard classes of biological attack — Part 2: Application to solid wood*.

BS EN 350-2:1994, *Durability of wood and wood-based products — Natural durability of solid wood — Part 2: Guide to natural durability and treatability of selected wood species of importance in Europe*.

BS EN 351-1:1995, *Durability of wood and wood-based products — Preservative-treated solid wood — Part 1: Classification of preservative penetration and retention*.

BS EN 636-3, *Plywood — Specifications — Part 3: Requirements for plywood for use in exterior conditions*.

BS EN 701, *Fibre ropes for general service — General specification*.

BS EN 919, *Fibre ropes for general service — Determination of certain physical and mechanical properties*.

BS EN 1021-1, *Furniture — Assessment of the ignitability of upholstered furniture — Part 1: Ignition source: Smouldering cigarette (ISO 8191-1:1987 modified)*.

BS EN 1021-2, *Furniture — Assessment of the ignitability of upholstered furniture — Part 2: Ignition source: Match flame equivalent (ISO 8191-2:1988 modified)*.

ISO 1834, *Short link chain for lifting purposes — General conditions of acceptance*.

DD ENV 1991-2-2, *Eurocode 1: Basis of design and actions on structures — Part 2-2: Actions on structures — Actions on structures exposed to fire*.

DD ENV 1991-2-3, *Eurocode 1: Basis of design and actions on structures — Part 2-3: Actions on structures — Snow loads*.

DD ENV 1991-2-4, *Eurocode 1: Basis of design and actions on structures — Part 2-4: Actions on structures — Wind actions*.

ISO 5470, *Rubber or plastics coated fabrics — Determination of abrasion*.

ISO 8793, *Steelwire ropes — Ferrule — Secured eye terminations*.

## 3 Definitions

### 3.1

#### crushing point

place where parts of the equipment can move against each other, or against a fixed area so that persons, or parts of their body, can be crushed

### 3.2

#### shearing point

place where part of the equipment can move past a fixed or other moving part, or past a fixed area so that persons, or parts of their body can be cut

### 3.3

#### entrapment

hazard presented by the situation in which a body, or part of a body, or clothing can become trapped

NOTE The user is not able to free him/herself and injury is caused by the entrapment.

## 4 Safety requirements

### 4.1 Materials

#### 4.1.1 General

Materials shall conform to the requirements in 4.1.2 to 4.1.6.

Materials should be manufactured in a workmanlike manner.

NOTE The provisions relating to certain materials in this standard do not imply that other equivalent materials are unsuitable in the manufacture of children's playground equipment.

The selection of materials and their use shall be in accordance with the appropriate European Standards.

Special attention should be given to potential toxic hazards of surface coatings.

Materials shall be selected and protected such that the structural integrity of the equipment manufactured from them is not affected before the next relevant maintenance inspection.

Particular care should be taken in the choice of materials where equipment is to be used in extreme climatic or atmospheric conditions.

Where very low or very high temperatures can be anticipated care should be taken with material selection to avoid possible hazards through direct skin contact.

When choosing a material or substance for equipment, consideration should be given to the eventual disposal of the material or substance having regard to any possible environmental toxic hazard.

#### 4.1.2 Flammability

To avoid the risk of fire and associated hazards, materials known to produce surface flash shall not be used. Particular attention should be paid to newly developed products whose properties might not be fully known.

**NOTE 1** Surface flash is the rapid spread of flame over the surface of a material without combustion of the basic structure at that time.

When tested in accordance with BS EN 1021-1 and BS EN 1021-2 no flaming debris shall fall from the sample during the test.

**NOTE 2** Attention is drawn to national and local building regulations regarding flammability for equipment installed both indoors and outdoors.

**NOTE 3** Flammability of materials other than fabrics is of concern, but suitable test methods to cover this are not yet available.

#### 4.1.3 Timber and associated products

Timber parts shall be designed in such a way that precipitation can drain off freely and water accumulation is avoided.

In cases of ground contact, one or more of the following shall apply:

- a) the use of timber species with sufficient natural resistance in accordance with classes 1 and 2 of the natural resistance classification given in 4.2.2 of BS EN 350-2:1994.
- b) construction methods, e.g. post shoe;
- c) use of timber treated with wood preservatives in accordance with Figure A.1 of BS EN 351-1:1995 and in accordance with hazard class 4 of BS EN 335-2:1992.

Consideration shall also be given to other factors which can be unsuitable, such as splintering, poisoning etc.

Apart from those species conforming to 4.1.3 a), all components made of timber and associated products that affect the stability of the structure and are in constant contact with the ground shall be treated in accordance with 4.1.3 c).

When selecting metal fastenings, consideration shall be given to the species of timber and chemical treatments used as some will accelerate corrosion of metals if there is contact.

Plywood shall be in accordance with BS EN 636-3 and shall be weatherproofed.

#### 4.1.4 Metals

Metal parts shall be weatherproof against atmospheric conditions.

Metals that produce toxic oxides that scale or flake shall be protected by a non-toxic coating.

#### 4.1.5 Synthetics

When tested in accordance with ISO 5470, the layer beneath the gel coat of glass-reinforced plastics shall not become exposed.

**NOTE** The purpose of this requirement is to ensure that children are not exposed to glass fibres.

When tested in accordance with BS EN 59, the resin of glass-reinforced plastics surfaces shall achieve the Barcol hardness quoted by the manufacturer.

Synthetic materials should be ultra-violet resistant.

If, in maintenance, it is difficult to determine at what point material becomes brittle, manufacturers shall give an indication of the time period after which the part or equipment should be replaced.

#### 4.1.6 Dangerous substances

Dangerous substances shall not be used in equipment in such a way that they can cause adverse health effects to the user of the equipment.

**NOTE** Attention is drawn to the provisions of Directive 76/769/EEC. Such materials include, for example, asbestos, lead, formaldehyde, coal tar oils, carbolineums and polychlorinated biphenyls (PCB).

### 4.2 Design and manufacture

#### 4.2.1 Structural integrity

Structural integrity of the equipment, including stability, shall be assessed by one of the following unless otherwise stated in 5.1 or clause 6:

- a) calculation, carried out in accordance with Annex A and Annex B;
- b) physical testing, in accordance with Annex C; or
- c) a combination of a) and b).

When calculations are carried out in accordance with Annex B no limit states shall be exceeded at combinations of loads as given in B.2.

When tested in accordance with Annex C, the equipment shall not show any cracks, damage or excessive permanent deformation.

For some equipment, these specific calculations or tests are not always appropriate, but the structural integrity shall be at least equivalent.

For a family of products, the structural integrity for the worst case of the intended combinations shall be proved.

Each structure shall resist both the permanent and variable loads acting on equipment and parts of equipment as described in Annex C.

NOTE 1 No allowance for accidental loads, i.e. loads produced by fire, collision by vehicles or earthquake need be made for equipment.

NOTE 2 The loads associated with fatigue are in general much smaller than the loads in combination with the appropriate load factors when calculated according to B.2. Therefore equipment in general need not be verified for fatigue.

Structural parts shall resist the worst case loading condition.

NOTE 3 In order to achieve this, it can be necessary to remove that part of the user load causing favourable effects, as shown in Figure 1.

#### 4.2.2 Finish of equipment

Wooden equipment shall be made of wood that has a low susceptibility to splintering. The surface finish of equipment made of other materials (e.g. glass fibre) shall be non-splintering.

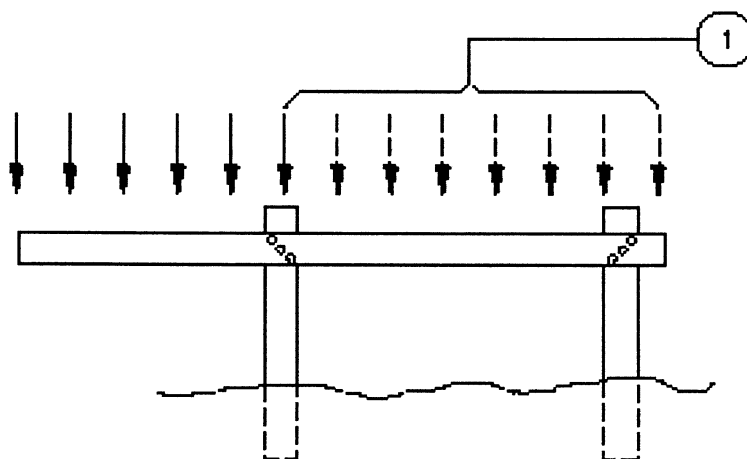
There shall be no protruding nails, projecting wire, rope terminations or pointed or sharp-edged components.

Rough surfaces should not present any risk of injury.

Protruding bolt threads within any accessible part of the equipment shall be permanently covered, e.g. dome-headed nuts. Nuts and bolt heads that project less than 8 mm shall be free from burrs. All welds shall be ground smooth.

NOTE Figure 2 shows examples of protection for nuts and bolts. Corners, edges and projecting parts within any accessible part of the equipment that project more than 8 mm, and which are not shielded by adjacent areas that are not more than 25 mm from the end of the projecting part, shall be rounded off. The minimum radius of the curve shall be 3 mm.

There shall be no hard and sharp-edged parts within any accessible part of the equipment.



1 – Remove this part of the load because of favourable effects

**Figure 1 — Example of removal of that part of the user load which causes a favourable effect**

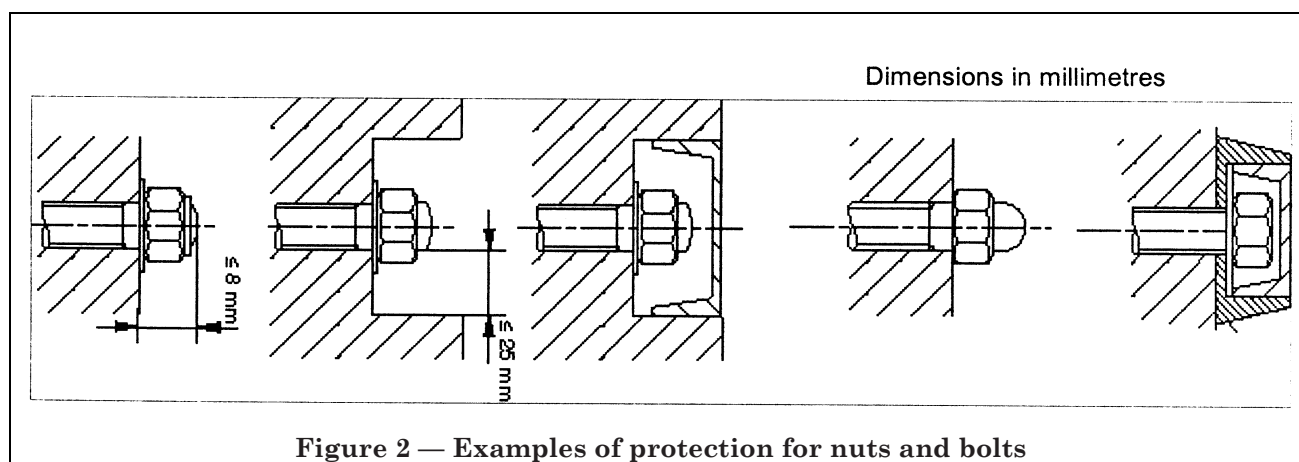


Figure 2 — Examples of protection for nuts and bolts

#### 4.2.3 Moving parts

There shall be no crushing points or shearing points between moving and/or stationary parts of the equipment, in accordance with 4.2.4.

Impact forces shall be damped.

#### 4.2.4 Protection against entrapment

##### 4.2.4.1 General

When choosing materials, the manufacturer should take into account the entrapment hazards that can occur through distortion of materials during use.

NOTE Test methods for entrapment are given in Annex D.

Bound openings shall have no parts that converge in the downward direction at an angle of less than 60°.

##### 4.2.4.2 Entrapment of the head and neck

Equipment shall be constructed so that any openings do not create head and neck entrapment hazards either by head first or feet first passage.

NOTE Hazardous situations in which this type of entrapment can be encountered include the following:

- a) completely bound openings through which a user can slide head first or feet first;
- b) partially bound or V-shaped openings; and
- c) shearing or moving openings.

When tested in accordance with D.2.1, if accessible and completely bound openings with a lower edge more than 600 mm above the ground or standing surface allow passage of the small probe(s), the large probe shall also be able to pass through.

Partially bound and V-shaped openings with an entrance at 600 mm or more above the ground shall be constructed so that either:

- a) the opening is not accessible when tested in accordance with D.2.2; or
- b) if accessible when tested in accordance with D.2.2:
  - 1) the template apex contacts the base of the opening during the test [see Figure D.4 a)]; or

- 2) the template contacts the sides of the opening at a height of less than 600 mm above the ground [see Figure D.4 b)].

Rigid circular openings shall have an internal diameter of less than 130 mm and more than 230 mm.

Non-rigid members (for example ropes) shall not overlap if, by doing so, they create openings that do not conform to the requirements for completely bound openings.

Openings between the flexible parts of suspended bridges and any rigid side members shall be not less than 230 mm in diameter under the worst case condition of loading (see 4.2.1). Both loaded and unloaded situations shall be considered.

##### 4.2.4.3 Entrapment of clothing

Equipment should be constructed so that hazardous situations, including:

- a) protrusions; and
- b) spindles/rotating parts,

in which clothing entrapment can be encountered, are not created.

Special consideration should be given when using elements of circular cross-section to avoid clothing entanglement.

NOTE 1 This can be achieved by use of spacers or similar devices.

Spindles and rotating parts shall have means of preventing entanglement of clothing or hair.

NOTE 2 This can be achieved by use of suitable covering or shields.

##### 4.2.4.4 Entrapment of the foot or leg

Level surfaces intended for running/walking should not contain any gaps likely to cause foot or leg entrapment.

#### 4.2.4.5 Entrapment of fingers

Equipment should be constructed so that hazardous situations, including:

- a) gaps in which fingers can be trapped whilst the remainder of the body is moving or continues in motion involuntarily;
- b) open-ended tubes or pipes; and
- c) variable gaps (excluding chains),

in which this type of entrapment can be encountered, are not created.

Openings and holes which have a lower edge more than 1 200 mm above the playing surface when tested in accordance with **D.3**, shall conform to one of the following requirements:

- 1) the 8 mm finger rod (see Figure D.5) shall not pass through the minimum cross-section of the opening and the profile of the opening shall be such that the rod cannot be locked in any position when set in motion as given in **D.3.2**; or
- 2) if the 8 mm finger rod passes through the opening, the 25 mm finger rod (see Figure D.5) shall also pass through the opening, provided that the opening does not permit access to another finger entrapment site.

The ends of tubes and pipes shall be closed off to prevent the risk of finger entrapment.

The closures shall not be removable without using tools.

Gaps whose dimensions change during use of the equipment shall have a minimum dimension in any position of 12 mm.

#### 4.2.5 Protection against injuries due to movement

The space in, on or around the equipment that can be occupied by the user shall not contain any obstacles that the user is not likely to expect and which could cause injuries if hit by the user.

NOTE Examples of such obstacles are shown in Figure 3.

#### 4.2.6 Connections

Connections shall be secured such that they cannot come loose of their own accord unless specifically designed so to do.

Connections shall be safeguarded so that they cannot be undone without tools.

#### 4.2.7 Consumable components

Components subjected to wear or designed to be renewed during the life of the equipment, for example bearings, shall be capable of being replaced.

Replaceable components should be protected against unauthorized intervention and should require little maintenance. Any lubricants leaking out should not soil the equipment or adversely affect its safe use.

#### 4.2.8 Ropes

##### 4.2.8.1 Wire ropes

Wire ropes shall be non-rotating and shall be made from galvanized or corrosion-resistant wire.

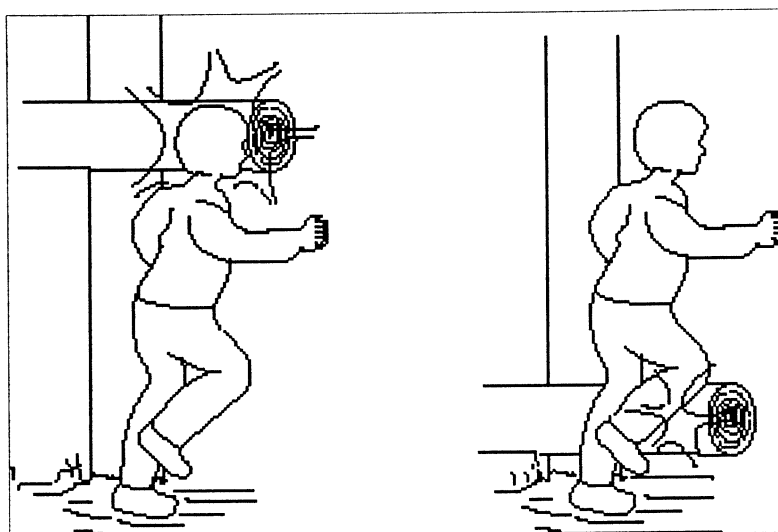


Figure 3 — Unexpected obstacles