

# Floors for Indoor Sports



## Introduction

This Guidance Note discusses the range of floor surfaces available for indoor sports facilities and offers guidance on selection. It covers the various requirements of different sports and the extent to which some surfaces may be considered 'multi-sport' surfaces, together with design, cost and construction implications. The choice of an appropriate sports floor surface is crucial to the overall success of a facility, its popularity with users, the extent to which it complies with the rules of various sports, and other objectives that may be set.



**BS 6399: Part 1** requires sports floors to withstand a distributed load of  $5\text{kN/m}^2$  and a  $3.6\text{kN}$  short-term concentrated load.

## Key issues

### Priority sports

In specialist facilities it may simply be a question of selecting the ideal surface for a single sport. Frequently, however, the decision is more complex involving the need to prioritise a range of sports, levels of play and the extent of use. The right decision will require a clear understanding of the objectives and proposed programming of the facility. While some surfaces are acceptable for a number of indoor sports no one surface will suit them all, so a degree of prioritisation and compromise is likely to be necessary in selecting multi-sport surfaces.

### Load bearing and wear requirements

Sports floors must be able to safely withstand the loadings from users and equipment. BS 6399 defines the minimum requirements. The load bearing implications of temporary spectator seating can have a significant influence on the selection of a sports floor surface and its supporting structure. Additionally, 'resistance to wear' requirements for sports such as roller skating and 'impact damage' from equipment are important factors to be borne in mind.

### Non-sporting use

Social or commercial activities may also need to be considered and care must be taken to ensure that sporting requirements are not compromised to an unacceptable level if a general purpose floor surface is proposed. The surface must meet an appropriate sports standard if it is to be used for playing sport.

Additional activities that may need to be accommodated in an indoor sports facility include:

- dances and discos
- concerts
- school assemblies
- examinations
- exhibitions
- community activities.

### Risk of physical injury

Contact with the floor surface can cause physical injury: bruising or bone fracture as a result of severe body impact, muscle fatigue or strain from repeated foot impact, and twisting of joints from restricted foot movement. Prolonged, intensive use of the sports floor requires optimal surface characteristics to minimise the potential for injury while allowing maximum sports development. This can generally be achieved through moderate levels of friction, stiffness and shock absorption appropriate to the activities taking place on the floor.

### Stable environmental conditions

Many sports flooring systems are susceptible to changes in temperature and relative humidity, and it is essential that any environmental variations likely to occur in the facility are identified to prevent possible irreparable damage.

### Internal visual environment

The floor surface is a major visual element in the sports facility and will have a significant impact on the internal environment. The colour, reflectance and other characteristics of the surface material need to be carefully considered in order to create an attractive internal environment that gives maximum enjoyment to all users.

### Other safety and ecological issues

It is vital to ensure that the floor surface will not release toxic or carcinogenic substances. The surface must be manufactured from 'green' materials from a sustainable source or from recyclable materials. A positive environmental profile must be sought with consideration given to total energy usage during the floor's lifetime. Additionally, the floor must be:

- hygienic and free from dust or vapour
- easy to clean and maintain
- resistant to accidental damage.



Sports floors must be suitable for the range of body contact appropriate to the particular sport.



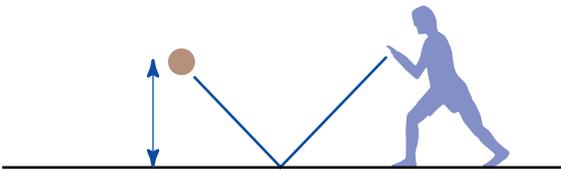
Sports floors must withstand the demands from a variety of sports equipment.



Roller skating can cause high loadings and wearing conditions.

**Sport performance**

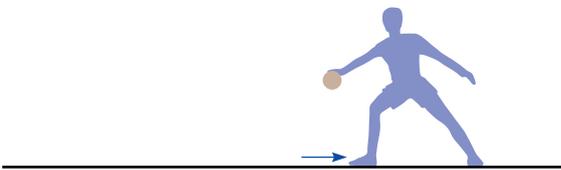
The sport performance qualities required of the floor surface vary from sport to sport and relate to the interaction of the ball and/or the player to the surface. The analysis can be complicated, involving the measurement of different physical characteristics with specialist scientific equipment and comparison with agreed standards. The subject can be summarised as follows:



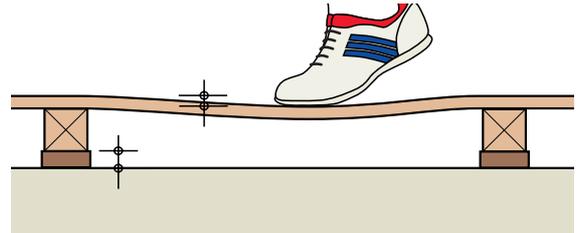
The levels of vertical and angular rebound and spin characteristics must be appropriate for the proposed sport(s).



All sports require the surface to be sufficiently flat, level and consistent so that play is unaffected by variables in the floor.



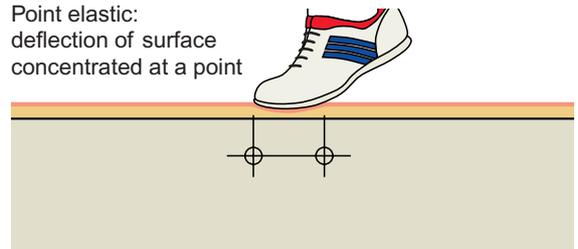
For most sports the degree of friction between the player's shoes and the surface needs to be high enough to prevent slipping, but not so high as to restrict foot movement either in a continuous direction or when turning, or prevent the controlled sliding of the foot that is required in some sports.



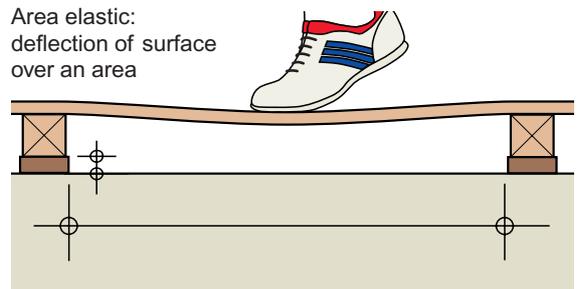
**Stiffness: resistance to deflection under load.**

The interaction between the surface and the player when running, landing or falling is complex, involving the stiffness of the surface and its shock absorbency, the force of impact between the player and the floor surface, and the energy returned or lost to the player. For most sports a moderate level of stiffness is desirable.

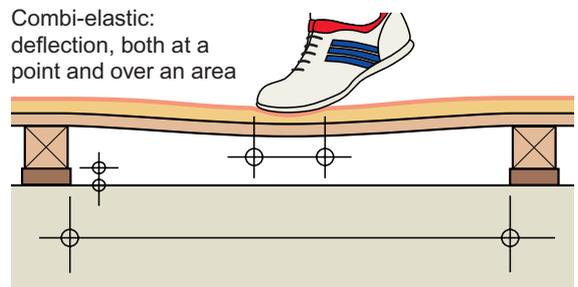
**Point elastic:**  
deflection of surface concentrated at a point



**Area elastic:**  
deflection of surface over an area



**Combi-elastic:**  
deflection, both at a point and over an area



**Types of elasticity.**

Sport	Performance parameters							Materials					Use			Comments	
	Heavy-duty	Spike-resistant	Stiffness	Energy absorption	Resilience, ball/surface	Rolling resistance	Spin	Friction	Concrete	Coated macadam	Timber	Composite materials	Textiles	Polymers	Need mats or roll-down surface		Suitable for multi-sport surface
Archery																	
Athletics (indoor training facility)	●	●	●	●			●				●	●	●	●	●	●	●
Sports hall athletics														●	●	●	
Badminton			●	●			●			●	●	●	●			●	
Basketball			●	●	●		●			●	●	●	●			●	
Billiards and snooker								●	●	●	●	●	●				●
Indoor bowls						●						●			●	●	●
Boxing			●	●			●			●	●	●	●		●	●	●
(Climbing Walls)										●	●			●	●	●	●
Cricket	●	●	●	●			●	●				●	●	●	●	●	●
Cycling	●	●			●		●	●	●	●	●	●	●			●	●
(Fitness rooms)										●	●	●	●		●	●	●
Fencing			●				●			●	●	●	●	●	●	●	●
Five-a-side football/training	●	●	●	●	●		●			●	●	●	●			●	●
Golf practice												●			●	●	
Gymnastics			●	●			●			●	●	●	●	●	●	●	●
Handball			●	●	●	●	●			●	●	●	●			●	●
Hockey (indoor)	●	●	●	●	●		●			●	●	●	●			●	●
Ice sports			●				●						●			●	●
Lawn tennis			●	●	●		●			●	●	●	●		●	●	●
Martial arts			●	●			●			●	●	●	●	●	●	●	●
Movement and dance			●	●			●			●	●	●	●	●	●	●	●
Netball			●	●	●		●			●	●	●	●	●	●	●	●
Rackets			●	●	●		●			●	●	●	●			●	●
Raquetball			●	●	●		●			●	●	●	●			●	●
Real tennis			●	●	●		●			●	●	●	●			●	●
Rugby fives			●	●	●		●					●	●			●	●
Riding and equestrian	●	●	●				●						●			●	●
Roller skating and roller hockey	●	●			●			●	●	●	●	●	●		●	●	●
Skiing							●						●	●		●	●
Squash			●	●		●	●			●	●	●	●			●	●
Table tennis							●	●		●	●	●	●		●	●	●
Tenpin bowling			●		●					●	●	●	●			●	●
Trampolining								●		●	●	●	●		●	●	●
Tug-of-war							●			●	●	●	●	●	●	●	●
Volleyball			●	●			●			●	●	●	●		●	●	●
Weightlifting	●						●			●	●	●	●			●	●
Weight training			●	●			●			●	●	●	●			●	●
Wrestling			●	●			●			●	●	●	●			●	●

● Included in BS 7044

Overview of sports' requirements.

### Performance standards

The selection of sports floor surfaces can be problematic. There are strong traditions in some sports favouring particular types or manufacturers of flooring. On the other hand commercial pressures encourage manufacturers to continually update and develop their product ranges. The market place for sports surfaces is not constant. The development of reliable testing methods and universally agreed performance standards is a slow process, often perceived as an over-complex approach to procuring the right sports floor for a particular situation. However, these performance standards and testing methods remain the only objective way to specify sporting requirements and ensure compliance.

#### **British Standard 7044: Artificial Sports Surfaces, Part 4 – Specification for Surfaces for Multi-sports Use**

This standard provides a reasonable compromise between achievement of the optimal conditions for sports performance and the reduction of injuries and resistance to wear and ageing. It should be regarded as a minimum requirement for sports surfaces in the UK and independent test results should be available from suppliers to demonstrate their products' compliance. In view of the usual expectation that prolonged and extensive training and varying levels of competition will take place in all sports facilities it is important that floors should be specified with an appropriate level of energy absorption. In the multi-sport situation the classification of the floor as 'impact energy-absorbing', as stipulated by BS 7044, is usually regarded as the best option. However, the 'pass or fail' nature of this classification is a problem that can cause anomalies with sport-specific standards.

#### **Sport-specific standards**

Specific performance standards have been developed for athletics, association football, bowls, basketball, cricket, hockey and tennis. It

may be appropriate for these sport-specific standards to take precedence over BS 7044 in specialist facilities or where one sport is given priority in a multi-sports hall.

#### **Unified European standards**

Work is currently under way to integrate flooring standards across the European Union. The earliest anticipated date for the replacement of BS 7044 with the new unified European standards is 2002.

#### **Legal implications**

There is increasing evidence that performance test and standards data are being used in personal injury claims. Specifiers and sports floor managers must ensure that sports floors attain the correct specifications for their intended use.

#### **Other national standards**

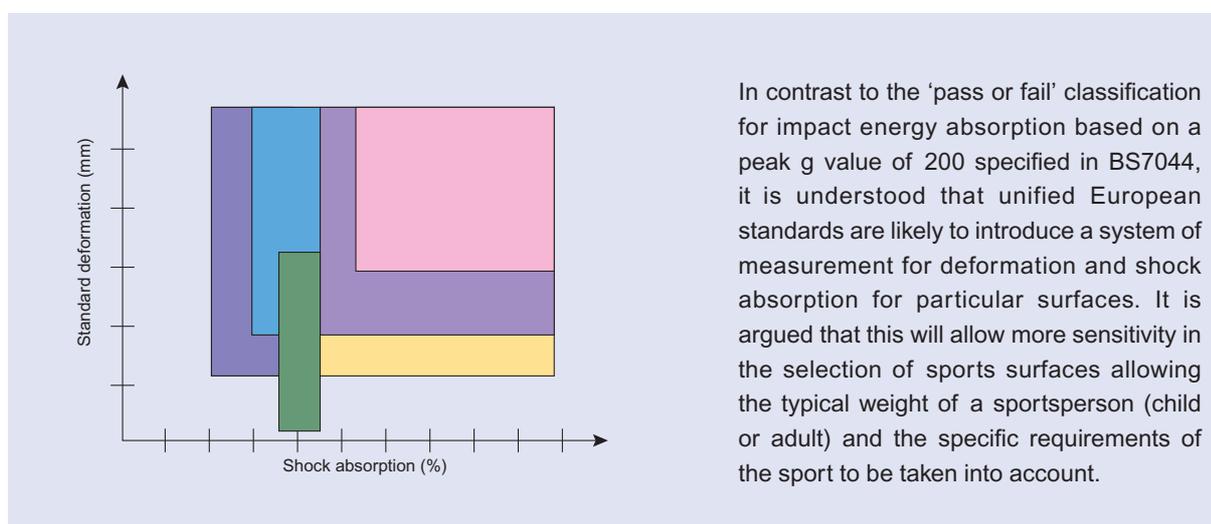
The German industrial standard (Din 18032:2) is a general guide for sports floors in multi-purpose sports centres. The standard is derived from a construction point of view rather than from sports' requirements and there can be problems with interpretation. For example, the standard measures energy absorption and deformation with a 20kg standard mass and a relatively short drop of 55mm. These criteria differ significantly from the reality of adults using the floor. Many other countries have their own performance specifications and care must be taken when evaluating imported products. Until unified European standards come into force it is recommended that BS 7044 test results are used in the UK as the basis for comparing products.

#### **Approved lists of products**

Some sports organisations such as the World Bowls Board and the International Hockey Federation operate approval schemes for specific products based on their compliance with relevant performance standards.

Requirement	Property	Sport	Performance
Ball/surface interaction	Rebound resistance	Basketball	50% to 70%
		Handball	40% to 60%
		Netball	45% to 65%
		Soccer	25% to 50%
	Velocity change of rolling ball	Football	0.10m/s to 0.35m/s
Person/surface interaction	Traction coefficient		1.1 to 2.0
	Slip resistance		Between 60 and 140
	Peak deceleration		Peak g of 200 from drop height of less than 1m or shall be designated 'not impact energy-absorbing'
Durability	Abrasion resistance (wheel)		Loss not greater than 0.3g/1000 revs of abrasion machine and not through surface layer (method 1)
	Abrasion resistance (blade)		Loss not greater than 0.2g/2000 revs of metal abrasion blades (method 2)
	Fatigue resistance		No signs of cracking, tearing or delamination
	Low temperature impact resistance		No signs of cracking or distortion for class 0
	Spike resistance		Grade 2 rating for 6mm, 9mm and 12mm
	Resistance to indentation		3mm max for classes 0 and 1 after 1500 mins
Environmental resistance	Critical flux value		Surface shall have a critical radiation flux of 5kW/m <sup>2</sup> or be designated 'flammable'

Extracts from BS 7044: Key requirements for indoor sports surfaces.



Principles of classification likely to be used in unified European standards.

**Types of sport surface**

**Timber**

Timber is one of the most widely used materials in the construction of sports floor surfaces and is available in a variety of forms including:

- strips
- blocks
- composite boarding such as plywood or medium-density fibreboard (MDF)
- composite tiles made from timber particles and cement.

Timber also acts as a versatile material for the supporting system in the form of joists or battens, with or without a resilient layer or pads attached to the underside of the battens to make it semi-sprung. Such supporting systems may have other sheet or in situ finishes laid on top.

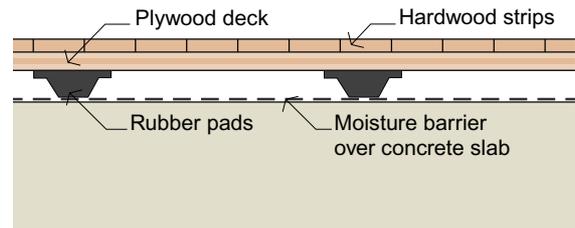
Timber can also be laid over a cellular plastic sheet in the form of a floating floor or, as in the case of wood blocks, bedded directly onto the sub-floor. The timber floor can also form a substructure for sheet floor finishes. It can be laid in an unfinished state or supplied from the factory with a surface finish, or sealed on-site.

Hardwood strips and blocks should be of 'selected' quality to achieve uniformity of colour. Commonly, species such as beech and maple are chosen for their lightness of colour and hardness.

Timber is durable but not naturally water-resistant. When laid over a sub-floor, directly or suspended, timber floors must be protected from moisture in the sub-floor by a damp-proof membrane (DPM) additional to that required by the building regulations. Lateral movement in the timber floor arising from varying humidity levels must be addressed by provision of a perimeter expansion gap, even at positions such as doorways. Advice must be obtained from flooring companies regarding the need for ventilation to any underfloor space and recommendations for cleaning the floor must also be fully understood. Some authorities claim water penetration to be the most common cause of all sports floor failures.

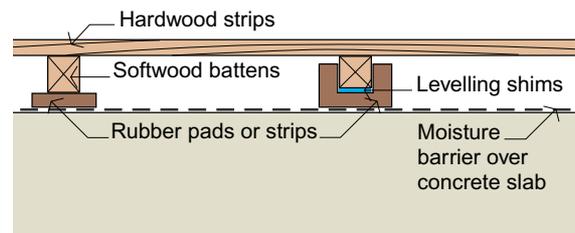
Hardwood on plywood:

Hardwood strips on a two-layer deck of plywood supported on rubber shock pads over a moisture barrier on a concrete sub-floor.



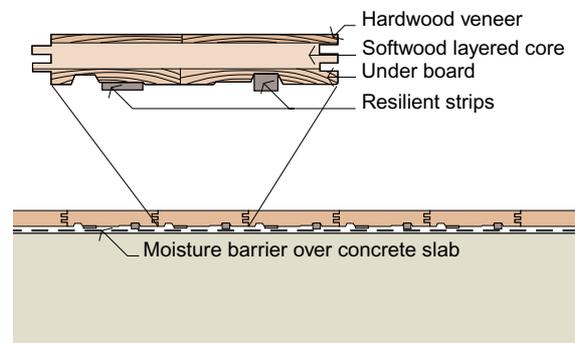
Solid hardwood on battens:

Hardwood strips supported by softwood battens on rubber strips or pads over a moisture barrier on a concrete sub-floor.



Hardwood veneer on softwood core:

Laminated timber planks with interlocking joints on rubber strips over a moisture barrier on a concrete sub-floor.



**Floating floors.**



Area elastic, impact energy-absorbing floor. Sealed, water-resistant MDF boarding forms the playing surface.



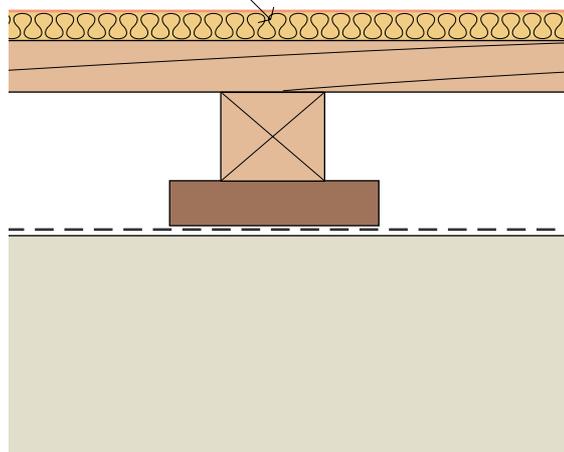
Contrasting colours facilitate court markings and contribute to a bright environment.

### Sheet floors

Vinyl, linoleum, rubber and composites are widely used materials for sports floor surfaces and are available in sheet- or tile-form in a variety of thicknesses. Without a foam backing or supporting system they rely heavily on the quality of the sub-floor on which they are laid and care must be taken to avoid showing irregularities in the underlying surface. Thin plastic sheets come with or without a 3–4mm backing of cellular plastic or rubber. This can enhance softness which may be an advantage for barefoot activities and lying on the floor, but can limit opportunities for activities such as roller skating that need a stiff surface without drag. However, plastic sheet materials and linoleum are also available with a thicker cellular layer of fibre-reinforced polyurethane, providing a floor with a combination of 'area elastic' and 'point elastic' characteristics.

Alternatively, sheet material may provide a hard-wearing surface to a semi-sprung system. Resilient sheet floors must be laid in accordance with BS 8203.

Sheet materials generally need an impact energy-absorbing supporting system



Sheet materials (even with foam backing) are generally unsatisfactory as multi-sport surfaces unless combined with an area elastic, impact energy-absorbing support system that conforms to BS 7044 or the specific performance standards for individual sports.

### In situ polymeric

These materials are mixed on-site and form a continuous playing surface without joints. The underlay can be a cellular plastic, prefabricated sheet or in situ resin-bonded material. The polymeric coatings are then applied as a 'wet-poured' application in various thicknesses to build up the final surface. The final surface, which can range from 1–4mm thick, usually has a matt finish and is available in a wide range of colours. Surfaces with a thickness of 4mm may be suitable for use with spiked shoes. This type of surface is usually considered point elastic but synthetic mesh material can be integrated into the underlayers to achieve a measure of 'area elastic' performance. Alternatively, as with sheet materials, an in situ polymeric surface layer can be laid over a timber surface elastic and impact energy-absorbing supporting system.



A seamless polyurethane sports floor finish constructed from two 1mm-thick layers over a reinforcing mesh on top of resilient prefabricated granulated rubber sheets that are bonded to the subsurface. The playing surface is given a matt finish and court markings are applied with polyurethane paint.

### Textile

Many types of textile floor surface are available, including:

- heavy woven fabric
- felt
- flock
- velour
- fibre-bonded, needle-punched and fine pile carpet
- knitted, woven or tufted carpet.

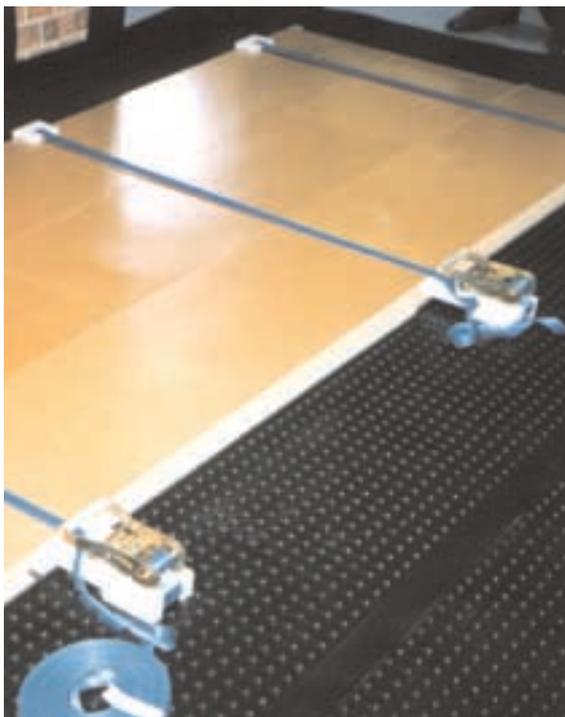
The characteristics of textile surfaces vary considerably dependent on the material and construction used, particularly durability and friction qualities such as slip-resistance and ball-roll. Textiles tend to be used more as specialist than multi-sport surfaces and lend themselves to use as temporary surfaces. Additionally, their warmth and tactile qualities make them suitable for activities such as gymnastics and aerobics and for weight training areas, whilst the sound absorption qualities are an advantage in teaching situations.



Spike-resistant polymeric surface.



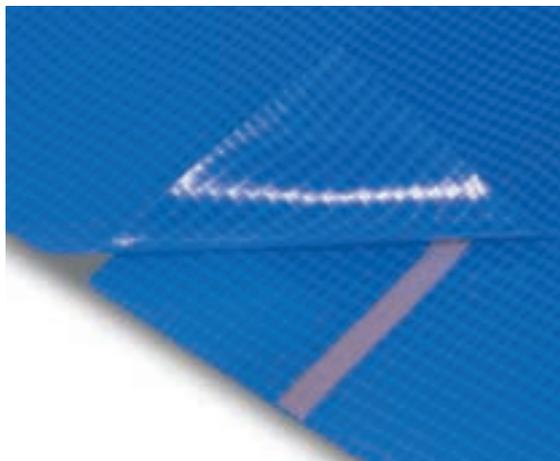
Typical construction features



Sealed, moisture-resistant MDF panels with glued interlocking joints and integral resilient strips. The panels are clamped together during the glueing/ setting process. A studded polymeric sheet is laid underneath to insulate the floor system from moisture in the sub-floor and to allow ventilation.



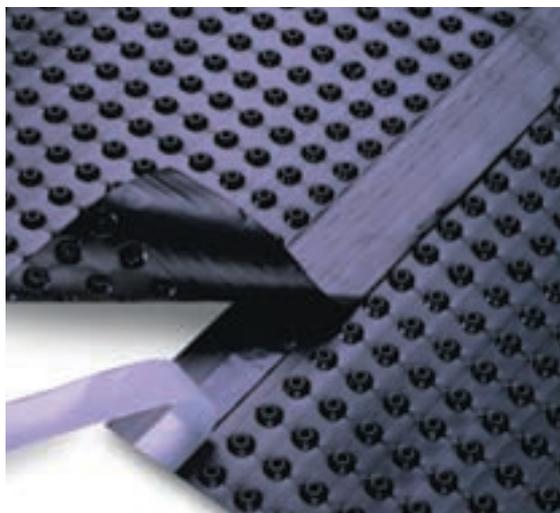
Removable section in polymeric floor for volleyball posts.



Reinforced moisture barrier with glued joints.



Plywood decking fixed to battens suspended on rubber pads to conform to BS 7044.

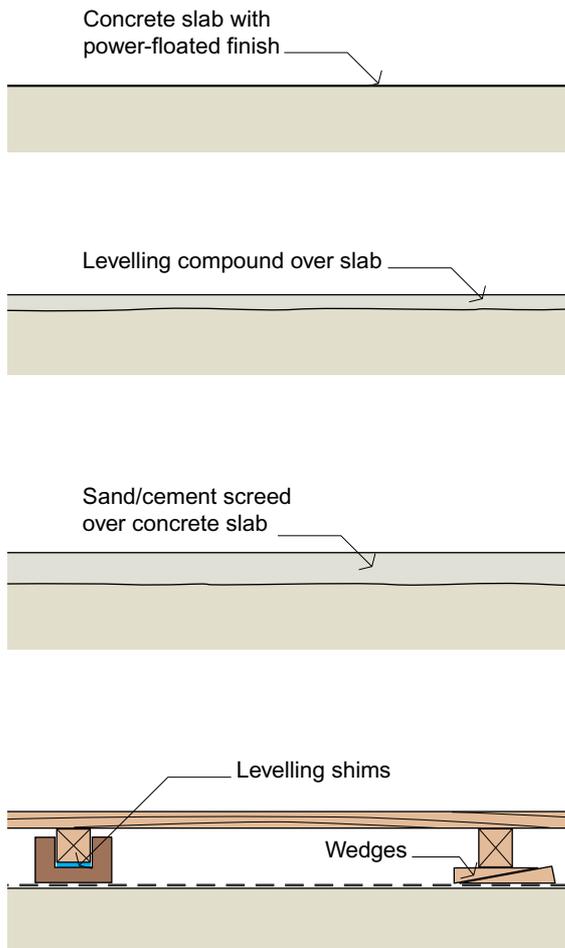


Continuous glued joint in a heavy-duty moisture barrier with studded air gaps to allow ventilation to the perimeter.

**Construction**

**Sub-floor**

Sub-floor requirements for different floor finishes need to be established at an early stage in the selection and design process. Some products require a screed finish over the structural floor-slab, while others can be laid directly on the slab. The thickness of the floor finish, the degree of evenness and flatness together with standards of workmanship will all be key factors. Generally, to meet the criteria the floor must be flat  $\pm 3\text{mm}$  at any point where the difference in level of an adjacent point on a 3m grid does not exceed 4mm, and not greater than 2mm under a 300mm straight edge.



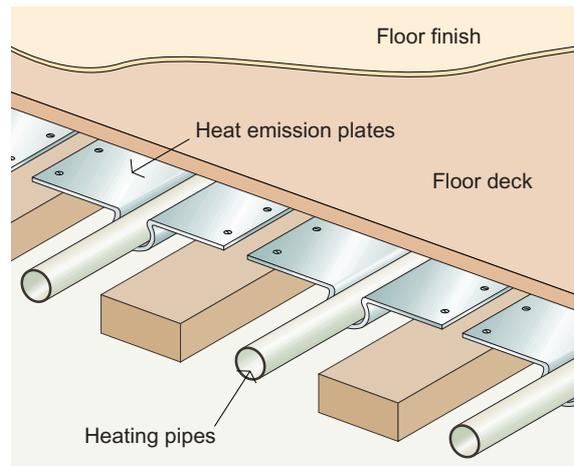
Levelling techniques.

**Surface treatments**

Chemical hardening solutions, curing membranes and power-floating/trowelling directly finished concrete can affect adhesion. When a floor finish is to be bonded directly onto a concrete slab advice on a specification for surface preparation should be sought from the adhesive or flooring manufacturer.

**Underfloor heating and other services**

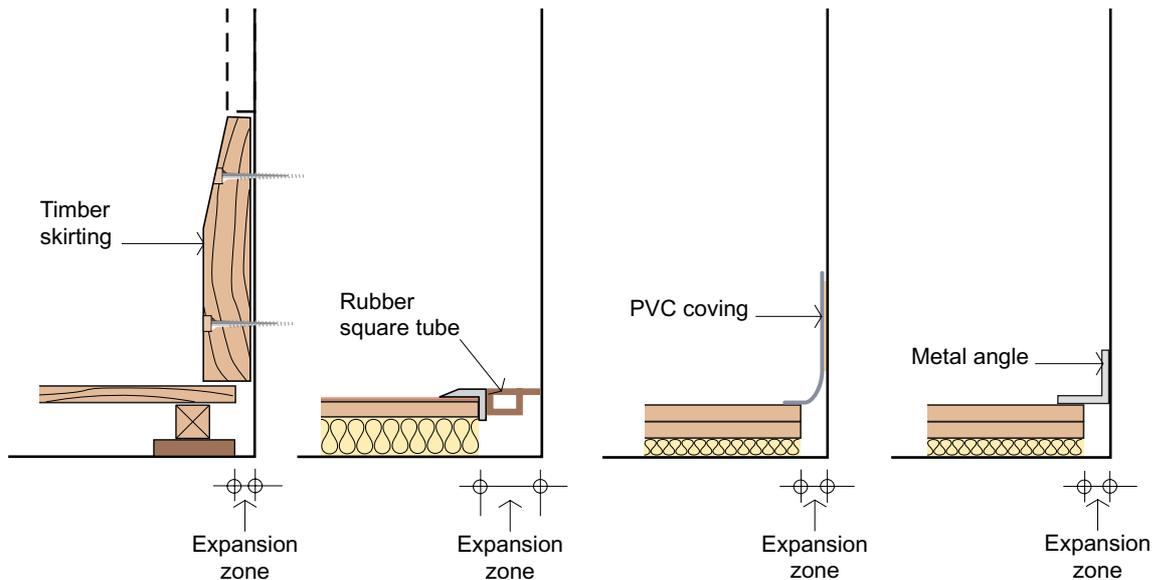
Some systems may accommodate underfloor heating pipes and other services within the voids of the sports floor system as an alternative to providing them in the screed. If this approach is taken the implications of differential heating, curing and ageing must be thoroughly investigated with suppliers. For example, PVC components should not normally be subjected to temperatures above 27°C.



One method of underfloor heating.

**Programming**

Sub-floors must incorporate an effective DPM laid in accordance with BS 8204. The building programme must ensure sufficient drying time to achieve a level of relative humidity less than 75%. Dependent on the thickness of the screed or slab a concrete floor can take from two months to one year to dry out sufficiently. At the design stage, consider the use of a surface DPM if timescales do not allow sufficient drying time or the use of a sandwich DPM is inappropriate.



### Skirting details.

Before the sports floor is installed it is essential to ensure that the building is weather-tight and ventilated and that all wet trades, including plumbing, have been completed and tested. The floor manufacturer must be consulted on the precise details but, as a general guide, the following conditions should be in place:

- The temperature must be stabilised at not less than 13°C.
- The moisture content of walls must not exceed 8%.
- The moisture content of the sub-floor must not exceed 5% or 75% relative humidity.



Section of sports floor perimeter allowing for variance in expansion and contraction.

### Site-specific risks

The location of the sports building may pose specific risks that influence the selection of the floor surface and the detailing of the floor and associated elements. For example, the building may be in a flood plain or an area with a high water-table, or in an area that is vulnerable to mining subsidence.

### Skirting details

Most floor systems, particularly those using timber-based materials, need an expansion joint around the perimeter to allow for movement caused by changes in temperature or moisture levels. A cover-piece or skirting board will usually be required as shown in the details above. When sports such as roller skating and hockey are proposed, the skirting board component can also provide some protection against impact damage. An angle on the top of timber skirtings or on the sharp upper edge of metal skirtings can cause hockey balls to fly into the air and must be avoided if hockey is a priority sport.

**Costs**

The cost of sports floors can be affected by fluctuations in international market conditions for materials, transport costs and labour rates. Very few flooring products are sourced entirely from within the UK. The market strategies of individual suppliers will also come into play and in order to obtain best value for money, competitive tenders must be sought based on the performance specifications required by BS 7044. It is also essential that any other associated cost factors are considered so that the full cost picture is understood. Manufacturers must be asked to state:

- **Requirements for levelling the sub-floor:**

The costs of providing a levelling screed or applying a power-floated screed to the structural sub-floor can be expensive and time-consuming and must be allowed for in building contracts.

- **Requirements to achieve a specified moisture level in the sub-floor and other building elements before the commencement of installation work:**

It can take months for a structural sub-floor to fully cure and naturally dry out to the required moisture level. The time required must be allowed for in the original building programme to avoid extending the contract and incurring increased costs. Alternatively, heating could be employed to speed up the process. For systems using timber-based products a damp-proof membrane is essential and in some cases this will require natural or forced ventilation.

- **Requirements for permanent heating and ventilation:**

Some flooring systems have specific requirements for heating and ventilation in order to maintain dimensional stability.

- **Requirements for installation work:**

The sequence and organisation of the installation work will vary from system to system.

- **Requirements for the storage of materials:**

The working conditions within the building may need to be precisely controlled. Flooring materials can require special storage conditions on-site in order to acclimatise to the building's internal environmental conditions.

- **Requirement for finishing off and cleaning:**

Some systems require heavy sanding of the surface before application of the final surface treatment. Methods of dust control and secondary cleaning must be fully understood.

- **Overall depth of system in relation to structural design:**

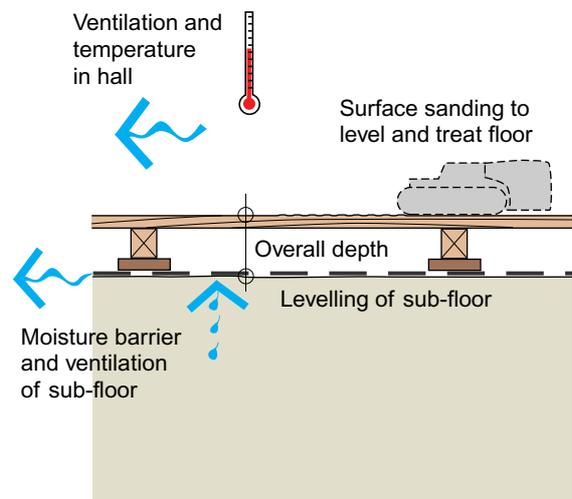
The depth of floor finish could have an influence on the economics of the overall design.

- **Requirements for movement joints.**

- **Requirements for cleaning and maintenance when the surface is in use.**

- **Life expectancy of the surface.**

Typically, the floor's surface construction will be in the range of 5–10% of the total construction costs of the sports hall.



Key causes of additional costs.



### Key features of a multi-sports hall floor

Beech or maple, either solid or veneer, and various composition and synthetic materials provide suitable sports surfaces for the typical multi-sports hall. Required features can be summarised as follows:



Access panel for underfloor services or sockets for sports equipment.

- area elasticity
- impact energy-absorbing (BS 7044: Part 4)
- reinforced supports for roller skating
- 40–50% light reflectance.

### Equipment

Most sports hall equipment is either free-standing or suspended from walls or ceilings. However, some equipment requires the installation of permanent sockets in the floor that must be covered with a flush non-slip plug when not in use. Examples include:

- hockey rebound boards
- volleyball posts
- tennis posts
- gymnastics equipment
- anchors for fencing pistes
- golf practice nets
- five-a-side football rebound boards.



Colour contrast with the walls, which also require a 50% reflectance factor, is important to define the floor limits.

It may be necessary to thicken the sub-floor to accommodate the sockets which usually need to be drilled at least 150mm into the slab – care must be taken to avoid damaging the DPM. Potential damage to underfloor heating systems must also be borne in mind. Consider court layouts at an early stage in the design process so that the socket position can be established and proper allowance made in the detailing. Additionally, allow for thermal and moisture movement when detailing the floor sockets.

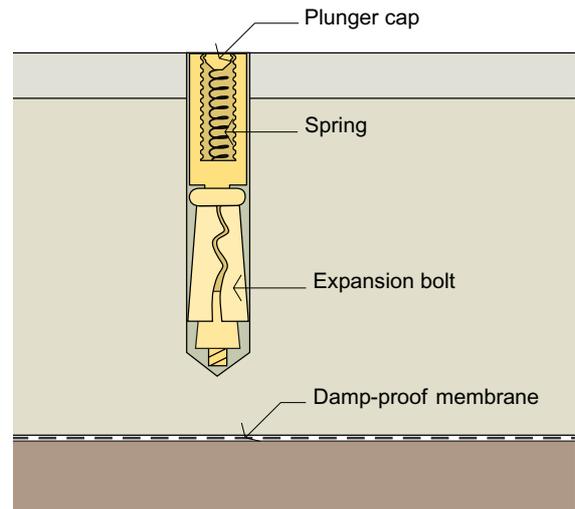
### Colour and court markings

The colour of the sports floor must be chosen in the context of the overall colour scheme and lighting requirements. The light reflectance value should be between 40–50% and visual contrast with the wall surface and court markings is required. A matt finish is preferable.

Court marking lines are painted on most sports floors. PVC tape is not usually used, except on temporary courts, whilst inlaid lines are an option for a limited number of sports floor products.

These techniques can be combined, with permanent inlaid or painted marks being used as guides for tape markings or, alternatively, permanent markings can be applied for the facility's most popular sports activities.

Paint should be selected and tested to suit the type of floor and manufacturers will supply or



Typical expansion bolt socket.

recommend a proven paint and give guidance on its use. Two-part polyurethane is often used because of its durability. All lines should be masked out to a high standard prior to painting. Line widths must be  $\pm 2\text{mm}$  and overall dimensions within 0.1%.

Most sports require white lines for major competitions although yellow is used for handball and, sometimes, hockey and basketball. For multi-sports halls a range of colours is required to avoid confusion.

The layout of court markings needs to be considered carefully to avoid line markings



Floor markings should be carefully planned to avoid overlapping lines.

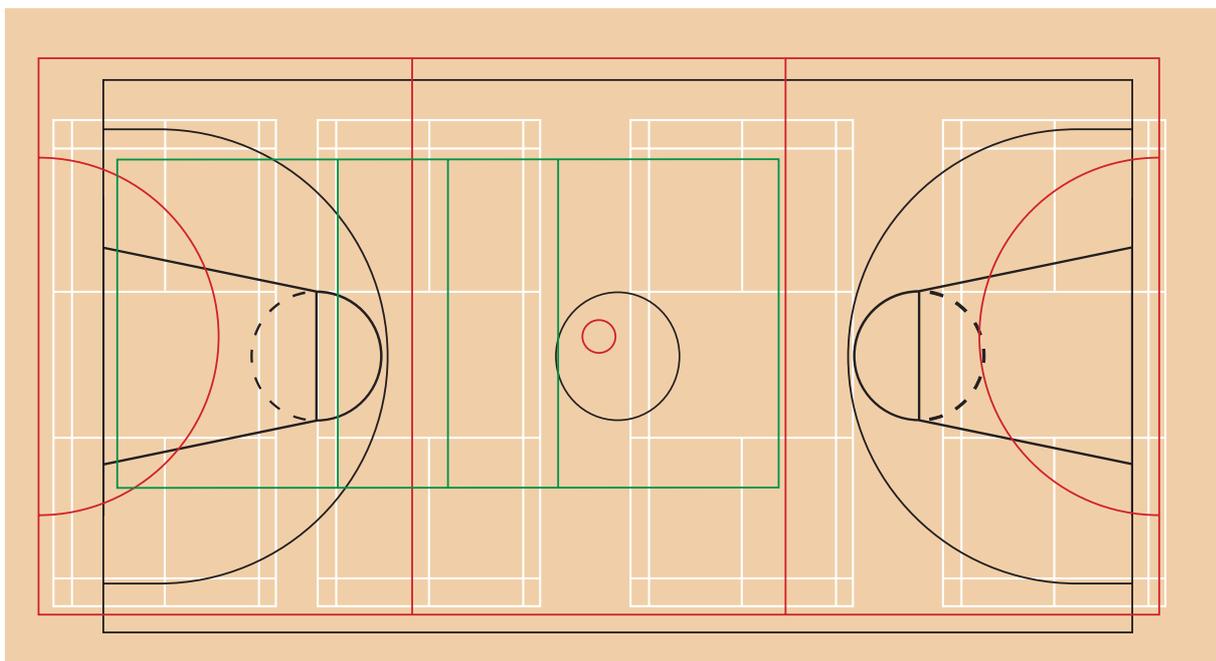
being too close to each other or coinciding. Manufacturers can usually recommend specialist firms to undertake this work or may include it as an element of the floor installation. Computer-drawn layouts can be useful aids when deciding the details of the court layout.

Sport	Line colour	Width
Hockey	Blue or other	50mm
Indoor hockey	Light blue	50mm
Netball	Red	50mm
Volleyball	Green or other	50mm
Five-a-side football	Other	50mm
Basketball	Black	50mm
Tennis	Yellow	50mm
Badminton/ short tennis	White	40mm

Recommended court marking colours and widths.



Paint and surface preparation must be matched with the surface type to ensure good wearing characteristics.



Typical 33 x 18m multi-purpose sports hall layout showing computer-aided drawing for client approval prior to installation work.

### Portable sports surfaces

Activities such as cricket practice and indoor bowls require surfaces that are incompatible with the requirements of other activities undertaken in multi-sports halls. Placing a portable floor surface over a multi-sport surface is one way of accommodating particular activities on an occasional basis. Additionally, they can provide the required conditions for major, one-off competitions. It should be noted that standard portable equipment can be used successfully in association with portable courts, with the exception of volleyball which requires posts to be located in floor sockets.

The terms 'portable' and 'roll down' can be misleading due to the extent and weight of surface area involved. The laying, lifting and storage of such surfaces can be laborious and time-consuming and, therefore, expensive. If this approach is adopted it is important to consider the interaction between the existing floor and the portable floor to ensure that the combination is stable and meets the same performance standard requirements as the permanent floor.



Portable badminton court laid for a tournament.



Roll down cricket wicket over a multi-sports floor.



The choice of an appropriate sports floor surface is critical to the overall success of a facility.

Sport England aims to lead the development of sport in England by influencing and serving the public, private and voluntary sectors. Our aim is:

**more people involved in sport**

**more places to play sport**

**more medals through higher standards of performance in sport**

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