SPORT ENGLAND

Design
Guidance Note

**Creating sporting opportunities in every community**

# Badminton

BADMINTON ENGLAND
*Play it. Love it. Live it.*

December Revision 003

# Badminton

**Design Guidance Note**

## Foreword

Sport England believes that good facilities are fundamental to developing sporting opportunities for everyone, from the youngest beginner to the international class athlete. The buildings, whether large or small, can encourage civic pride and assist the process of revitalising deprived neighbourhoods. Facilities that are well designed, built to last and well maintained are a pleasure to use and give an ample return on the time and money invested in their construction and day to day use.

Good design needs to be based on a sound understanding of such issues as the current trends and practices within individual sports, the wider leisure industry and the lessons to be learnt from previously built schemes.

Good design needs to be embraced within the earliest vision statement for a particular project and enshrined in the initial briefing stage through to the final detailed specifications and operational arrangements.


***Sport England's Design Guidance Notes aim to:***

- ***Increase awareness of good design in sports facilities.***
- ***Help key building professions, clients, user representatives and other stakeholders to follow best practice.***
- ***Encourage well designed sports facilities that meet the needs of sports and are a pleasure to use.***

Sport England Design Guidance Notes aim to promote a greater general understanding of overall design concepts, an appreciation of technical issues and the critical factors that need to be considered in reaching the appropriate solution for a particular project. They also advise where further information, advice and expertise may be found and point to benchmark examples.

## Contents



## 1.0 Introduction

This Design Guidance has been written specifically with Badminton as the primary consideration. The modern game demands special playing conditions that many halls could easily have provided at the design stage, but which would now be more expensive to achieve through alterations. Although some technical terms are used throughout this document they have been kept to the minimum so that the professional designer and the club player can both gain from this information.

Badminton is one of the most popular sports in the U.K. and is frequently the most popular sport in multi-sport halls. Therefore, if operators create the best possible conditions for Badminton this will have a significant positive impact on usage and user satisfaction which, in turn, will boost business and return on investment.

Sports halls are often built using the badminton court as a standard to describe the size of the building required e.g. a five court hall refers to a hall the right size to accommodate five badminton courts, but it may also accommodate other sports such as netball, basketball, five-a-side football, volleyball and cricket practice nets.

Badminton requires a "run-off" space around the court, similar to other sports, and particular height requirements above and around the court. Badminton has the most exacting visual requirements so that players are able to sight a fast moving shuttlecock: the lighting requirements are very specific; there should be no natural daylight, and the colour of the walls must create a suitable background for sighting the shuttle. The hall should be warm with controlled ventilation and a resilient floor to prevent injuries.

For this document the design criteria for Badminton are divided into four level of play categories [1] - see Table 1 below. The criteria are aspirational in that an existing facility which does not meet them might still be used for badminton coaching and development. However, new build projects should meet the appropriate specification, especially if they are seeking funding from BADMINTON England or Sport England.

The advice given in these notes will provide the best conditions for playing the game. Professional designers may consider that there are other ways of achieving the same results, and alternatives would be considered, but these must be approved by BADMINTON England and Sport England before commitment and construction.

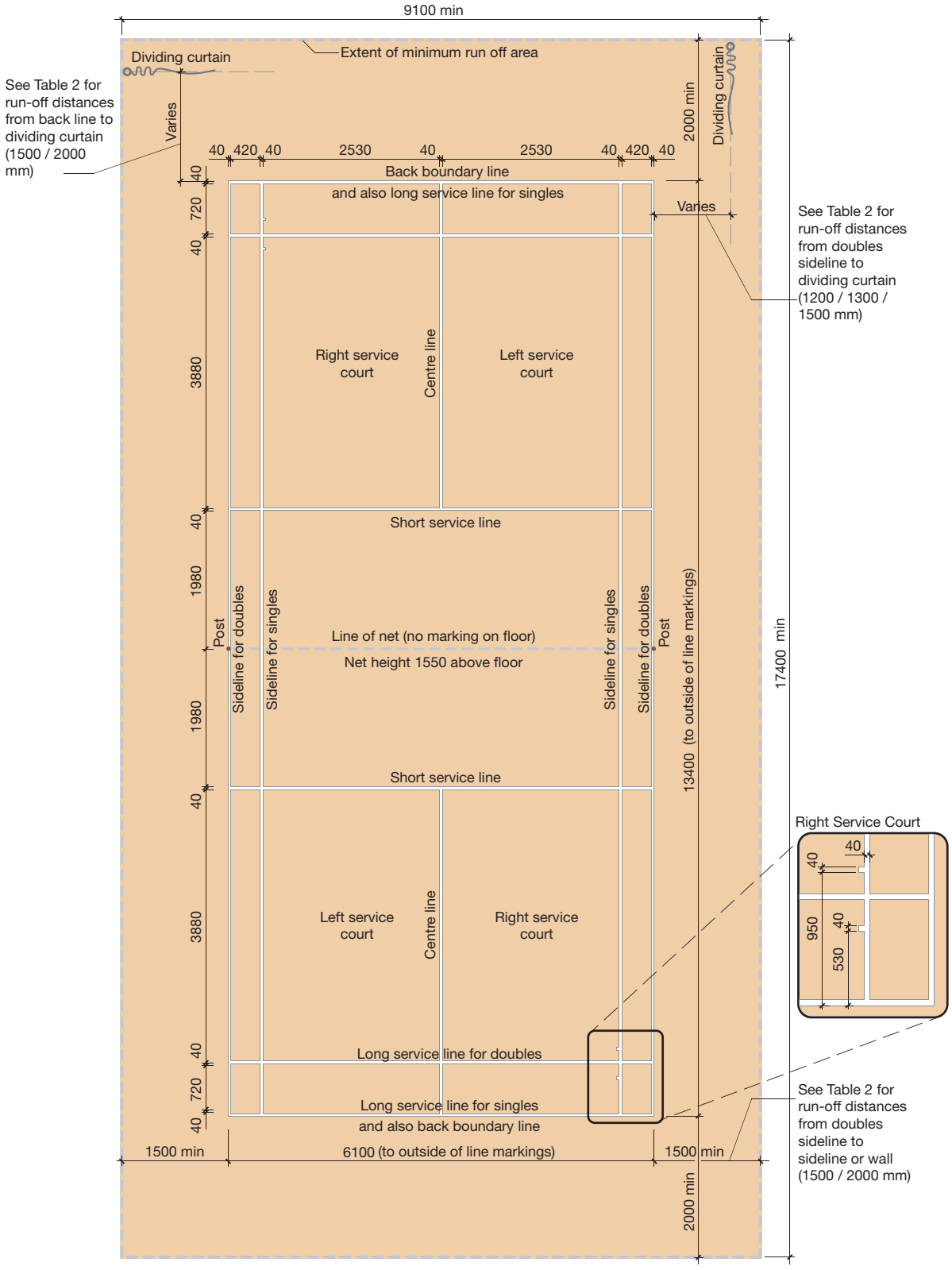
| | | |
|---|---|---|
| **International** | | |
| (Equivalent to CIBSE Class 1) | Suitable for competitive play and training up to National level. | The standard expected for accreditation as a High Performance Centre (HPC). |
| **Premier** | | |
| (Equivalent to CIBSE Class 2) | Suitable for competitive play and training up to Junior National and Senior County level. | The standard of facility that a Premier Club should have access to as the lead club in a Performance Centre (PC). |
| **Club** | | |
| (Equivalent to CIBSE Class 2) | Suitable for competitive play and training up to Junior County level. | The minimum standard of facility for a Premier Club and the standard of facility that hub clubs / hub schools within a Community Badminton Network (CBN) should have access to. |
| **Community** | | |
| (Equivalent to CIBSE Class 3) | Suitable for local league / club and recreational play. | The recommended minimum standard of facility for a Badminton Club. |

**Table 1 The four level of play categories** [1]

[1] The four level of play categories have been developed by the National Governing Bodies for the various sports and Sport England to provide a consistent terminology for the levels of play of all sports.

## 2.0 Court dimensions

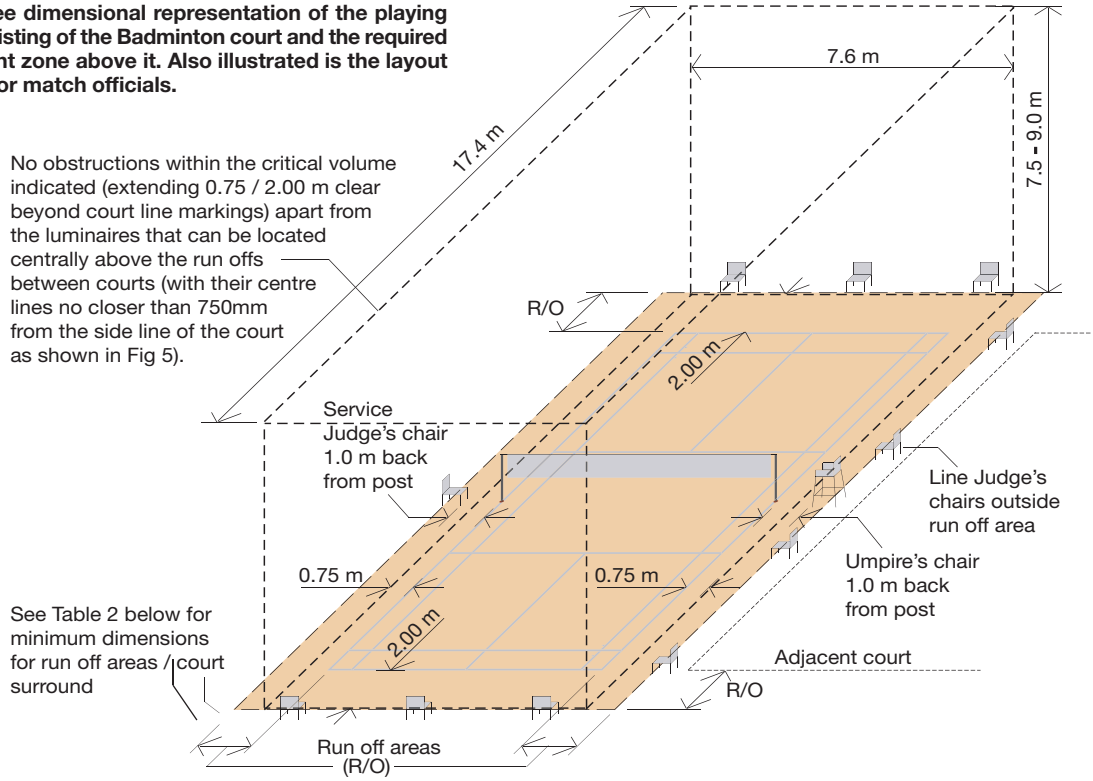



Note: All dimensions are in millimetres

**Fig. 1 Badminton court dimensions showing the 6.1 x 13.4 m court and the minimum run-off areas**

**Fig. 2 Three dimensional representation of the playing area, consisting of the Badminton court and the required clear height zone above it. Also illustrated is the layout of chairs for match officials.**




## 3.0 Space between courts

Table 2 shows the minimum run off requirements around a court at different levels of play. The same minimum space should still be maintained between all courts whatever the size of the hall.

The distances from court lines to division curtains must be allowed on both sides of the curtain if there are Badminton courts on both sides.

Where appropriate, additional space should be allowed for spectators and players to sit, for circulation, and for match officials' seats and judges' tables, especially where the facility is to be used for tournaments.

If the hall dimensions are larger than necessary, then the spaces around courts can be greater. Spaces larger than the minimum recommended safety run-off dimensions are generally acceptable.

However, if the hall dimensions are less than standard, then the spaces between courts and between courts and walls will be less than the minimum recommended to provide a safe run-off. In these circumstances the operator should undertake a risk assessment and must provide alternative control measures to ensure safety. Where this is not practicable, it may be necessary to reduce the proposed number of courts, or it indicates that the hall may not be suitable for playing Badminton. Courts with less than the recommended minimum space around them are not approved by BADMINTON England.

| | Run off (R/O) requirements (mm) | | | |
|---|---|---|---|---|
| Level of play category | side line to side line and side line to wall | side line to division curtain | back line to wall | back line to division curtain (see Section 4.0) |
| **International** | 2000 | 1500 | 2000 | 2000 |
| **Premier** | 1500 | 1300 | 2000 | 2000 |
| **Club** | 1500 | 1300 | 2000 | 1500 |
| **Community** | 1500 | 1200 | 2000 | 1500 |

**Table 2 Minimum spaces around courts**

## 4.0 Layout of Courts

The court must be marked out in easily distinguishable 40 mm wide lines. They may be applied by paint or inlaid and should be matt white in colour. In exceptional circumstances, where it is not possible for these lines to be white, yellow may be an acceptable alternative. Where a multi-purpose hall is accredited / funded by BADMINTON England, the badminton lines should be dominant.

Where the courts are laid out "end to end" there must be a curtain between the ends of the courts and it is essential that the minimum run-off dimension is maintained on both sides of the curtain (see Table 2). In this configuration, to avoid any distractions caused by movement and lights from the other courts, the curtain between the courts should preferably be of solid material to full height, rather than standard sports hall dividing nets.

## 5.0 Height Requirements

| Level of play category | Minimum height requirement (m) |
|---|---|
| **International** | 9.0 |
| **Premier** | 9.0 |
| **Club** | 7.5 |
| **Community** | 6.7 |

**Table 3 Minimum height requirements for a Badminton court and 0.75 / 2.0 m perimeter zone**

The heights indicated above are the minimum clear heights over the critical volume of the court and below any obstructions such as beams, basketball backboards, cricket net rails and lights (see Fig. 2).

6.1 m is the absolute minimum height for recreational badminton such as in a village community hall.

A clear height of 7.5 m will be accepted for premier level activities using existing facilities, but 9.0 m is preferred.

A minimum of 12.0 m clear height is required for Badminton World Federation (BWF) level 1 tournaments; a minimum height of 9.0 m is required for other international events, but 12.0 m is preferred.

## 6.0 Flooring

The preferred flooring for playing badminton is a sprung floor covered with a vinyl impact absorbent covering. This creates an area-elastic floor covered with a point-elastic top layer; and is referred to as a floor with combined-elastic properties.

The other type of floor commonly used and accepted by BADMINTON England is a sprung floor covered with wooden strip flooring to give area-elastic properties. The top surface should be laid as parallel strips rather than herringbone or other patterns which can be distracting to players.

Some facilities for multi-sports use, particularly on school sites, are fitted with a seamless wet-poured polyurethane flooring system. This would normally create a point-elastic floor but, if a synthetic area-stiffening component is introduced to create a mixed-elastic floor, this may be acceptable for Badminton.

The standards and testing methods for sports floors are covered by British/European Standard *BS EN 14904:2006: Surfaces for Sports Areas - Indoor Surfaces for Multi-Sport Use.* See also Sport England Design Guidance Note *'Floors for Indoor Sports'*.

The finish to the flooring should be matt to avoid any glare. Preferred colours are green, blue or natural timber with a transparent seal.

Where a facility does not offer the right flooring specification and layout for Badminton, a portable court mat may be placed over a sprung surface to provide the right playing conditions. This is commonly done for major one-off competitions. However, the size and weight of these mats can

**Portable court mat laid on top of a sprung floor**

| Description | Category C4 Combined Elastic System, category A4 Area Elastic System, or category M4 mixed elastic system as defined by BS EN14904:2006 "Surfaces For Sports Areas - Indoor Surfaces For Multi-Sports Use" | |
|---|---|---|
| **Characteristic Description** | **Test/Reference** | **Badminton Standard** |
| Friction | EN13036 - 4 | 80 - 100 |
| Shock Absorption | EN14808 | 55 % - 75 % |
| Vertical Deformation | EN14809 | ≥ 2.3 mm < 5 mm |
| Resistance to Rolling Load | EN 1569 | 0.5 mm over 0.3 m |
| Resistance to Wear | EN ISO 5470 -1 | ≤ 1000 mg |
| Specular Gloss | EN ISO 2813 | ≤ 30 % |
| Specular Reflectance | EN ISO 7724 | 20 % - 40 % |
| Resistance to Indentation | EN 1516 | ≤ 0.5 mm |
| Resistance to Impact | EN1517 | ≤ 0.5 mm |
| Degree of Evenness | EN 13036 - 7 | ±0.6 mm over 0.3 m and ±5 mm over 3 m |

**Table 4 Performance specification for Badminton flooring**

make laying, lifting and storing them a problem. It is also important to consider the interaction between the existing and portable floors to ensure that the combination is stable and meets the same performance standards as a properly specified permanent floor would deliver.

In older existing halls solid floors are often used i.e. concrete, screed or composition flooring. This is NOT acceptable for the playing of Badminton and injuries can be caused with this type of floor. This type of floor can be improved by covering the existing hard floor with laminated timber planks on rubber strips, or with a foam-backed cushioned sheet material. Halls modified in this manner would be an improvement but would not be considered by BADMINTON England for accreditation or for funding unless they comply with BS EN 14904.

See section on rolling resistance and wheelchair use on page 13.

## 7.0 Walls

A background against which a fast moving shuttle can be seen easily is critically important for the successful playing of the game.

The ideal badminton hall has four plain walls with no windows or roof lights. There should be no distracting attachments, particularly brightly coloured items. There should be no ledges or other projections likely to trap shuttles. The surface texture, colour and reflectance value must be consistent and uninterrupted over the full height of the hall. In the case of a refurbishment where it is not practical to remove glazing, it must be covered by blinds or shutters to exclude natural light completely.

**Natural light excluded by covering windows with shutters painted to match walls**

| Colour description and code * | | Colours preferred by Badminton England, with a 30-50% light reflectance value | Examples of colours, with a reflectance value of around 50%, that still allow a reasonable contrast to see the shuttlecock and also help to achieve a general level of luminance in a multi-sport hall. See Sport England Design Guidance Note *'Sport Halls: Design and Layouts'* |
|---|---|---|---|
| Blue | 86 BG 43/321 | ● | |
| Green | 30 GG 40/290 | ● | |
| Blue green | 53 GG 50/360 | | ● |
| | 87 GG 51/291 | | ● |
| | 10 GG 48/366 | | ● |

Notes:

* ICI colour code (Dulux) where the central number represents the surface reflectance. i.e. 86 BG 43/321 is a colour with a 43 % light reflectance value (LRV)

**Table 5 Recommended background wall colours**

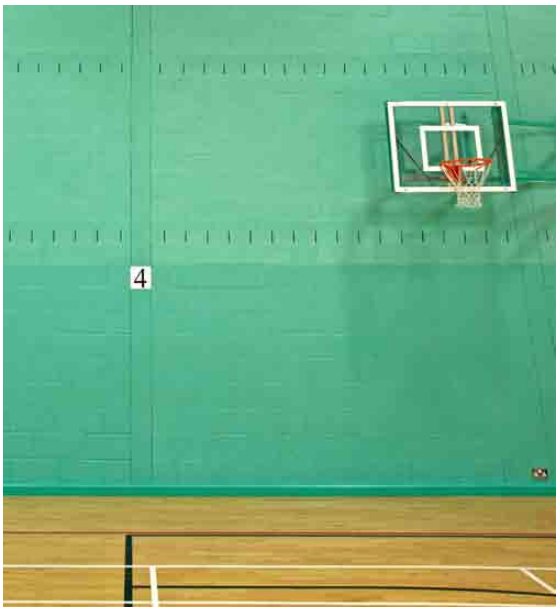
Walls should be finished in medium to dark shades and have a matt surface. This applies just as much to sidewalls as to the end walls, since many shots are played looking towards the side of the court. Colours with a reflectance value of 30-50 % [2] have been found to give the best playing conditions, but not all colours in this range work equally well. Green (Dulux Colour dimensions code 30 GG 40/290) and blue (86 BG 43/321) have been found to provide the best background but, for instance, shuttlecocks are harder to see against a grey background. Any doors, blinds or shutters should be finished in the same colour as the walls. Walls can be built of many different types of material, but it should be borne in mind that acoustics play an important part in the enjoyment of the hall. See Section 8.0 *Acoustics*.

Where curtains are used to divide a hall, they should be the same colour as the walls, with a sight screen of solid material at least 2.0 m high, topped with coloured netting of maximum mesh size 50 mm. Where curtains are positioned at the ends of the courts, such as in a hall that has the courts laid out 'end to end', the solid material should be at least 6.0 m high. Alternatively, electrically operated sports hall divider screens may be used to provide a visual and acoustic barrier, but these too must be coloured to match the walls.

[2] See BS 8493:2008 + A1: 2010 for test method for light reflectance value (LRV)

## 8.0 Acoustics

The internal acoustics of a hall can have a significant impact on its suitability for Badminton, and particularly for coaching the sport. Badminton does not require the walls to be as robust as some other sports necessitate. However, multi-sport halls need hard surfaces, to withstand impact damage, and these tend to have poor sound absorbency properties, which results in sound reverberating within the hall. This can lead to poor speech intelligibility and high background noise levels, making it difficult for coaches to manage and control their players.




**Acoustic blocks used in the wall construction**

For Badminton halls, the overall construction should be designed to provide sound absorption qualities with a reverberation time of 1.5 - 2.0 seconds at mid-frequency. This can be achieved by integrating suitably robust sound absorbent materials into the ceiling and/or upper wall levels e.g. acoustic blocks or acoustic wall panels. However, it is important for Badminton that there are no visual distractions, so any acoustic materials introduced must blend with the surrounding walls in terms of texture and colour.

The level of sound insulation in the building should be sufficient to prevent players being distracted by external noise. A standard noise rating of 40NR would normally be specified. Heating and ventilation equipment should be as quiet as possible in operation.

## 9.0 Ceilings

The ceilings in sports halls are often the underlining to the roof, which is usually of a sandwich construction. The underlining can be of an acoustic material and, as with the walls, this is very important to the environment of the hall. In many cases a self-finished acoustic lining with a light colour is ideal for the ceiling and complies with the required reflectance values of 70–90 %.

## 10.0 Lighting

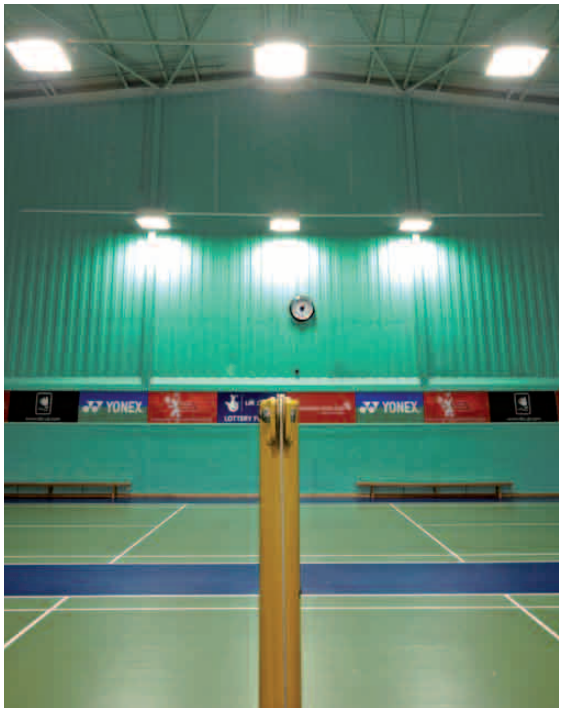
Lighting is one of the most important requirements in the design of a hall where badminton is to be played. It is essential to consider lighting early in the design stage so that the lighting layout, lamp type and background colours can be co-ordinated with other aspects of the design. (ref. Sport England's forthcoming Design Guidance Note '*Artificial Sports Lighting*').

The lighting design in a badminton hall must take into consideration the requirements for provision of:

- A safe environment for players
- Effective illumination of the shuttlecock and court markings to aid players and to assist match officials in the execution of their duties
- Suitable and sufficient lighting for spectators.

When designing the lighting for badminton halls it is important to appreciate how the game is played. The shuttle can move at very fast speeds over the net, requiring maximum light reflecting from the white feathers of the shuttle.

The shuttle can best be seen when illuminated in this way against a dark background, therefore the rear of the court does not need to be lit to such a high level as the centre.



**Luminaire positions**

***Speeds of over 200 mph are regularly recorded in top matches.***

The shuttle may also be hit very high and over some distance, which demands a degree of uplighting to pick up the shuttle in flight. Preferred lighting conditions are obtained when the luminaires are suspended from the ceiling, however, luminaires must not be directly positioned over the court. The game involves the players looking upwards to follow the flight of the shuttle and they must be able to do so without being troubled by glare or having their attention distracted by bright light sources. Doors and windows to other lit areas are also distracting, and arrangements should be made for such light sources to be screened or switched off.

The background and the lighting should be considered as an entity, as both can alter the playing conditions. With regard to the ceiling, the reflectance value may be higher if the luminaires are suspended further from the ceiling - alternatively if the luminaires are positioned nearer to the ceiling then the ceiling fabric must be darker, with a lower reflectance value.

***The walls need to have a reflectance value of 30 - 50% and the ceilings 70 - 90%.***

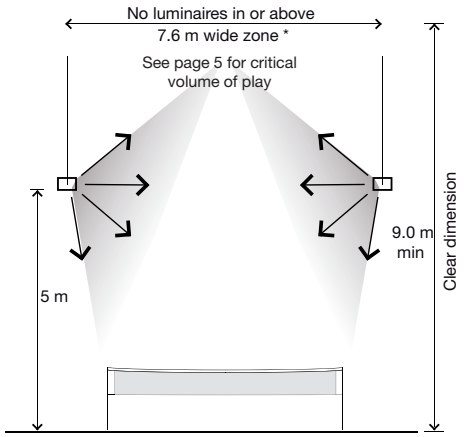
The luminaires should ideally be set at 5.0 m from the floor and centred over the shared run offs between the courts. Luminaires should be concentrated adjacent to the middle third of the court; one positioned level with the net and the others positioned three metres back in both directions, level with the midcourt area as the photo on page 9. This layout has proven to give the best playing conditions and avoids situations where a player may be dazzled.

The total elimination of glare in sport is seldom achieved due to the ever-changing directions of view of participants. Nevertheless, measures should be taken in an attempt to minimise glare that may affect the visual performance of participants. It is important that an appropriate type of luminaire is selected that allows a degree of shielding and / or diffusion so that players are not looking into direct light. Good lighting conditions have been obtained by using high frequency compact fluorescent luminaires.

**Lights set in multi-sport state (five luminaires at ceiling height)**

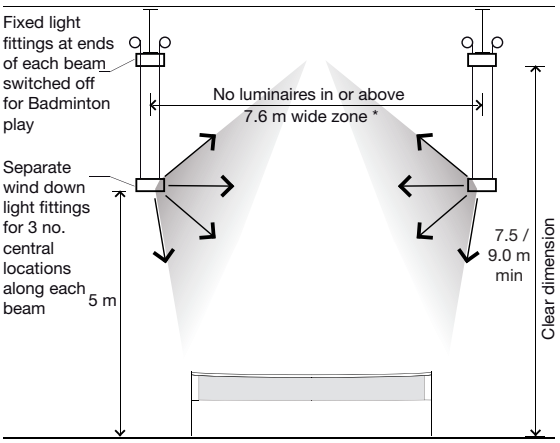
**and lights set in Badminton state (three luminaires only & lowered to 5 m)**

If a curtain is used between the courts then lighting may be required on both sides of the curtain to maintain the same level of light.




Elevation

**Fig 3 Badminton England preferred lighting setup for a premier / international standard facility**




Elevation

**Fig 4 Badminton England alternative lighting setup for multi-sport halls, with central drop-down lighting units and with the end fixed-lights switched off**

*Luminaires are permitted above runoffs with their centre lines no closer than 750 mm from the side line of the court (see Fig 5).

BADMINTON England recognises that their recommendations for lighting are not totally in accordance with BS EN 12193:2007. Nevertheless, experience gained over many years supports the recommendation that lighting for Badminton should ideally be in accordance with the illuminance levels shown in Fig 5. This diagram shows there is not a uniformity of lighting across the court, but rather a higher level of lighting across the full width of the centre area of the court.

In a multi-use hall where it is not practical for the lights to be installed permanently at a height of 5 m, the same results can be created if the lights adjacent to the middle third of the court are lowered on a temporary basis to 5 m on a rise and fall gantry system (allowing sufficient cable for maintenance) with the remaining lights switched off as shown in Fig 4.

If this is not possible, then the three central luminaires suspended on either side of the courts should be separately wired so that they can be left on for play, whilst the luminaires at the rear of the courts are switched off to create a darker background and an illumination pattern similar to that shown in Fig 5.

For some visually impaired or partially sighted badminton players increased illumination may improve their performance and enjoyment, but for others, this would be detrimental to their enjoyment. A lighting system that enables lux levels to be adjusted up and down may therefore benefit such players.

| **Maintained illuminance levels with luminaires at 5 metres above floor level** | |
|---|---|
| **Average illuminance** | 500 lux |
| **Minimum illuminance** | 300 lux |
| **Maximum illuminance** | 600 lux |
| **Note:** The Badminton World Federation (BWF) recommends 1000 lux for international events. Television companies will advise on their lighting requirements. | |

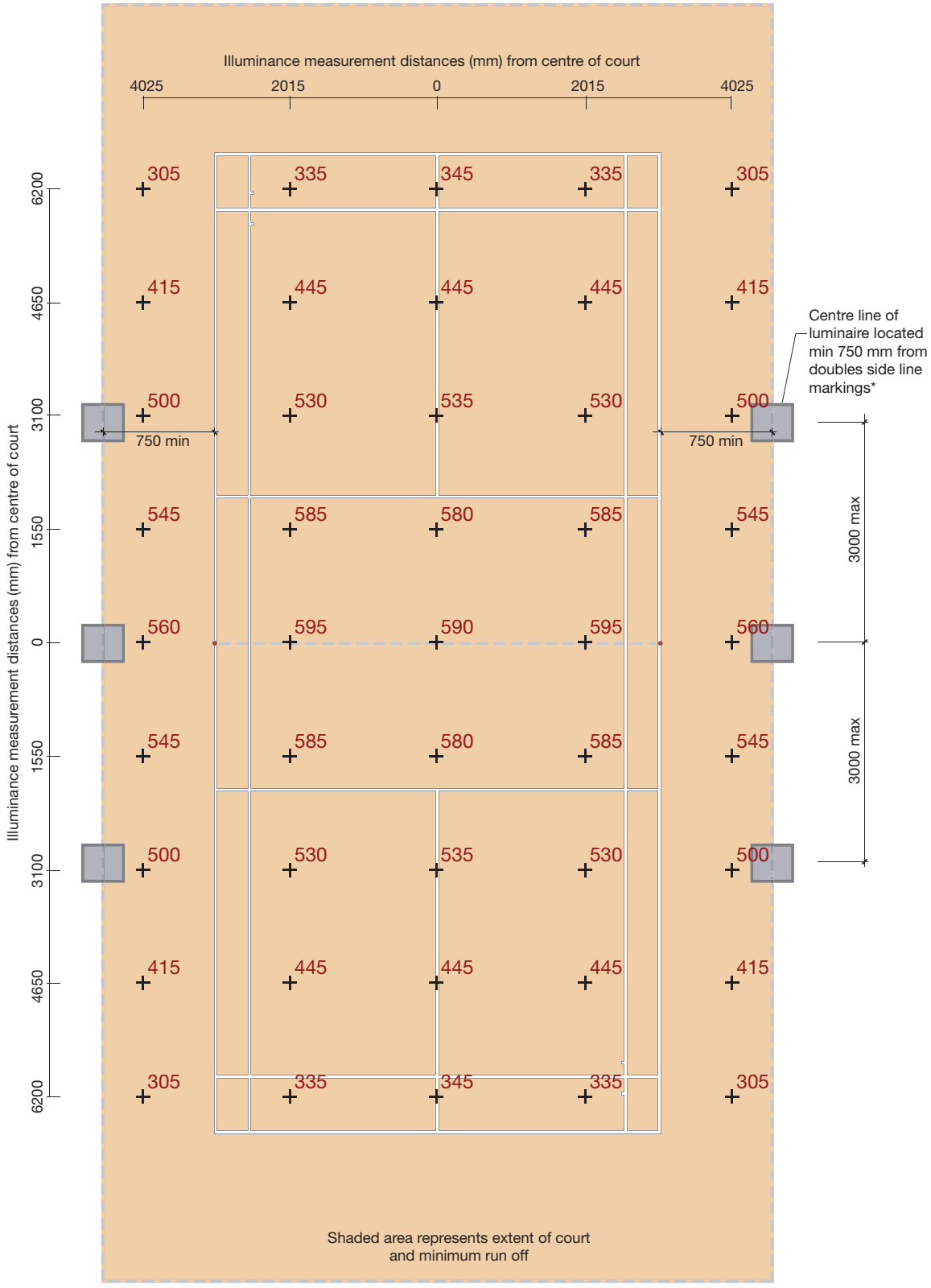
**Table 5 Illuminance levels**

**Lighting Maintenance**

A programme of cyclic maintenance should be operated whereby: -

- Luminaires are cleaned at a frequency in keeping with the activities performed within the hall
- Lamps are changed in accordance with manufacturers' recommendations
- Records are kept of maintenance performed
- Individually failed lamps are replaced as a matter of urgency, since an inoperative luminaire will present a 'dark patch' when players are looking upwards. This will make it difficult to follow the trajectory and velocity of the shuttle.




Note: All dimensions are in millimetres

**Fig. 5 Illuminance plot (Lux levels measured at ground level) based on 3 suspended light sources at a height of 5 metres above the playing surface. It should be noted that the fall off of the illumination at the back of the court is acceptable and this also helps to darken the back wall and give a good contrast for viewing the white shuttlecock.**

***** Luminaires are permitted above runoffs with their centre lines no closer than 750 mm from the side line of the court.

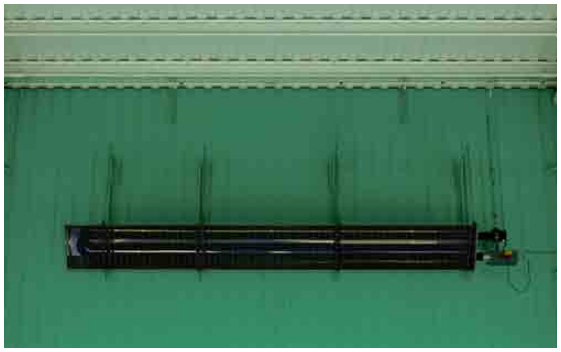
## 11.0 Heating and ventilation

Most sports hall heating and ventilation systems will be designed to deliver a temperature range of 12 - 20ºC. The most comfortable temperature for playing Badminton is around 16ºC. Temperatures as low as 12ºC may be acceptable, particularly for performance play and it is recognised that, without air cooling, temperatures may exceed 20ºC during periods of hot weather but, wherever possible, heat loss/solar gain should be minimised through insulation.

It is recommended that no less than 1.5 air changes per hour be made. Any heating or ventilating system that moves the air can deflect the shuttlecock; therefore it is important that heating and ventilation systems are designed taking this into account. The location and protection of all air input and extraction grilles or openings must be carefully considered, particularly in relation to the flight path of the shuttlecock. It is better if ventilation systems are designed to operate around the perimeter of the hall, to limit air movement over the court. The air velocities within the playing area should not exceed 0.1 m/s (metres per second).

Where air velocity cannot reasonably be limited to 0.1 m/s, the ventilation system should be fitted with an override switch or 'Badminton Button' in an accessible location, to disable the system when the hall is used for Badminton.

The heating system most commonly used in halls where badminton is played is high-level radiant panels or tubes fitted to the walls or ceiling, in conjunction with a controlled ventilation system. Traditional low pressure hot water radiator systems, or under floor heating, could be used if appropriate to the type of flooring. Heating by warm air is not recommended as it is difficult to control the air movement when the heating is operating. Radiant heaters should be fitted with fine mesh guards to prevent shuttlecock damage.



**High-level radiant heaters on walls and extract fans at ends of the building**

## 12.0 Disability badminton

The design of any new sports facility should take account of the needs of disabled people. This is referred to as 'inclusive design'. Part M of the Building Regulations and BS 8300 set out basic access standards for buildings, but they do not cover all of the issues which are important in the design of inclusive sports facilities. Aspects of design which have particular relevance to disabled people include layout and signage, the use of colour, light levels and control of glare, changes in level, gradients and surface finishes [3].

Disability badminton encompasses various forms of the sports where the rules of the parent game are modified to suit the particular disabilities of the people playing [4]. For example, the area in front of the short service line can be regarded as out of bounds for wheelchair players and some lower limb amputee singles players might play singles on half a standard badminton court, using the centre line and the doubles sideline as their sidelines. Wheelchair players also play with the net lowered by 150 mm. Most court surfaces are suitable, but

[3] See Sport England Design Guidance Note *'Accessible Sports Facilities'* for further details and free downloads of CAD layouts from the Sport England website.

[4] The *Parabadminton World Federation* have a classification system. http://www.parabadminton.org/

softer surfaces are generally unpopular with players using sports chairs because of the higher rolling resistance - a wooden floor is preferred. The sports floor must be able to withstand marks left by wheelchairs and other mobility aids so that users are not restricted by protective management regimes.

Sports chairs used for badminton vary in width depending on the seat width required for the individual and on the degree of wheel camber required for the level of play. They can be up to 1.2 m wide and are generally 0.8 m long. Therefore, a 1.5 m minimum clear width access is recommended around the court to allow players to change ends easily. The net posts on adjacent courts must not be too close together for sports chair users to pass between them.

The size of sports wheelchairs has implications for the whole sports facility and the establishment of a 'sports chair zone' is recommended, from the car parking area to the entrance and into the sports area where badminton will be played. It should have adequate space to allow individual players or groups to easily and safely bring their sports chairs into the building, move around and transfer from their day chairs, as required and should include a convenient wheelchair storage area. See Sport England Design Guidance Note *'Accessible Sports Facilities'* for the critical dimensions of corridors, lifts and doorways.

The extent of this zone needs to be defined and agreed with key stakeholders. It is likely that in most cases the 'sports chair zone' will not include the changing and toilet provision. However, the extent of access for the larger sports chairs to individual or team changing and toilet facilities needs to be decided at the briefing stage for the project.

***Some athletes find sitting in a sports chair for long periods uncomfortable and often only use the chairs during the sporting activity. It is therefore necessary to make provision for the secure storage of chairs while they are not in use.***

***See Sport England's 'Accessible Sports Facilities' Design Guidance Note.***

All doorways, including emergency exits must have a minimum of 0.875 m clear width, or 1.2 m where they will be used by sports chairs. Automatic doors should be used wherever possible, but avoid fully glazed frameless entrance doors as these are less distinguishable from their surroundings. Ideally, automatic doors should have a sliding arrangement as an automatic swinging door can be a hazard. Doors that need to swing out into main corridors should be 'protected' by being set into a recess. Doors in corridors must have viewing panels. Where double doors of unequal width are used, the wider doors should all be on the same side of the corridor and meet the minimum clear width requirement above.

Internal circulation routes should be designed to minimise the number of doors and the distances that users have to travel. Corridors should be free from obstructions, with radiators, hose reels etc. set into recesses to maintain corridor width. Splayed or radius corners to walls at changes in direction or junctions will benefit wheelchair users and visually impaired people.

A 1.5 m turning circle should be maintained throughout the facility and the unobstructed corridor width should also be a minimum of 1.5 m. However, where the width is less than 1.8 m, it should have passing places at least 1.8 m long and 1.8 m wide to allow wheelchair users to pass each other. These passing places should be no more than 5.0 m apart. If large numbers of wheelchair users are expected, the corridor width should be increased to at least 2.0 m to allow wheelchair users to pass each other freely along main routes.

In 'sports chair zones', the unobstructed width of a corridor should preferably be 2.5 m throughout, to allow users in large sports chairs to pass each other, or 2.0 m with the incorporation of passing places at least 2.5 m long and 2.5 m wide. Again, these passing places should be no more than 5.0 m apart.

Avoid changes in level whenever possible. However, where this is not practical, all ramps must have a minimum width of 1.5 m (2.5 m in the 'sports chair zone') with a gradient of less than 1 in 20 and level landings / rest points 1.5 m long every 0.5 m rise. The maximum rise of any series of ramps should be 2.0 m. Ramps should be surfaced with slip-resistant materials.

It is also necessary to ensure that lifts are large enough to accommodate wheelchairs and sports wheelchairs if they are within the 'sports chair zone'. Minimum depth 1.4 m, minimum width 1.1 m (2.0 m where sports chairs will be used) and minimum door opening 0.9 m (1.2 m where sports chairs will be used).

## 13.0 Spectator seating

For major tournaments, some form of seated viewing area for spectators, waiting players and team officials is essential. Seats may also be required in the stands for sponsors and other VIPs, referees and other tournament officials, and radio and television commentators. Where possible competition players should have a separately marked area for seating when watching matches. Teams and officials should have a different access point to spectators.

**Courtside seating for spectators and players**

Very careful thought should be given to the design of spectator galleries, since they can sometimes create difficulties and distractions when viewed from the court. These areas need to be of similar colour to the court walls and the lighting should be subdued and carefully hidden when viewed from the court. Windows and doors at the rear of the spectator galleries should be curtained or designed so that no light can be seen from the court. If the spectator areas are glazed then specialist advice should be obtained, so that no

**Hall / spectator gallery**

interference is caused by reflection of lights or activity on the courts. One source of such guidance is the Glass & Glazing Federation - see Appendix 1 for contact details.

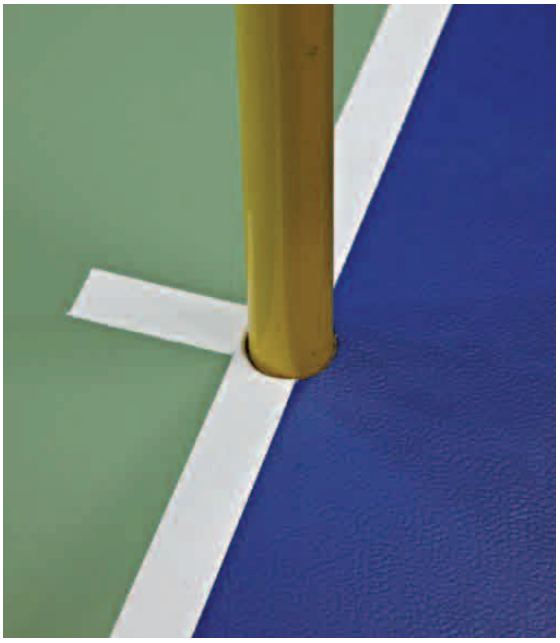
Spectator seating areas should be designed to be accessible to everyone. Entrances should provide a clear opening of 1.0 m, with a minimum clear width of 0.65 m between rows of seats. At least six designated wheelchair spaces should be provided, or 1 % of the spectator capacity, whichever is the greater. Wheelchair spaces should be a minimum 0.9 x 1.4 m each. Handrails should be provided to stepped access routes to assist ambulant disabled people. The design of informal viewing areas should also consider the needs of all users. For example viewing from a balcony or circulation space should have areas of suitable height to allow wheelchair users adequate sight lines.

**Informal spectator gallery screened using tinted glazing at an angle to minimise distraction and reflection**

## 14.0 Equipment

Badminton posts must be 1.55 m in height from the surface of the court and must remain vertical when the net is strained. The posts are placed on the doubles side lines irrespective of whether a singles or doubles match is being played, with the inner edge of the post in line with the inner edge of the side line.



**Post correctly positioned (court to the left of the post)**

New posts should comply with BS EN 1509:2008 which stipulates that no part of the posts or their supports should extend into the court. BADMINTON England recommends socketed posts as the most practical means of complying with this stipulation, since this avoids the need for the very heavy counterbalance weights necessary to comply with the new standards. Socketed badminton posts require sockets to be set into the sub-floor - see diagram below.

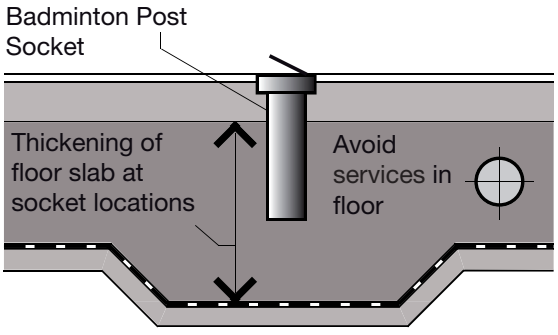



**Fig 6: Typical section through sports floor construction**

Typically the holes required are 63 - 64 mm diameter and 290 mm deep. Standard floor slabs are generally not of sufficient depth to accommodate a hole of this size so special provision for thickening of the structural slab is likely to be required. Pipe work and under-floor heating must be taken into account when positioning the sockets and the depth of the damp proof membrane needs to be considered too.

The net must be made of fine cord of dark colour and even thickness, with a mesh of not less than 15 mm and not more than 20 mm. The net must be 0.76 m in depth and at least 6.10 m wide. The top of the net must be edged with a 75 mm white tape doubled over a cord or cable running through the tape and stretched firmly, flush with the top of the posts.

The top of the net must be 1.524 m from the surface of the court at its centre and 1.55 m from the surface of the court over the side lines for doubles. There must be no gaps between the ends of the net and the posts. If necessary, the full depth of the net at the ends should be tied to the posts.

For top tournaments, umpire's chairs should be provided. These must be stable and safe for the umpire to ascend and descend. They should be equipped with a hinged writing platform on which the umpire can rest the score sheet. The seat should be at the same height as the net i.e. 1.55 m and should be comfortable in terms of size and material used for construction. When in use, the chair should be centred along the extension of the net approximately one metre from the net (see Figure 2).

## 15.0 Other accommodation and facilities

Badminton does not require large storage facilities for equipment in dedicated badminton centres as the posts and nets are permanently positioned in the floor of the hall. The only other items of equipment may be shuttles and umpires chairs. However, in multi-use halls, the general minimum storage provision for all sports activities must be equivalent to 12.5 % of the hall floor and Badminton will require sufficient room for wheel-away / slot-in posts, nets and shuttles. If court mats are used, then substantial storage space will be required, since these can be 7.0 m long and 0.5 m in diameter when rolled, and may weigh up to 350 kg. Specialist trolleys are recommended for manoeuvring these mats.

Other facilities required are as set out in Table 6 on page 17:

| Level of Play Category [5] | International | | Premier | Club | Community |
|---|---|---|---|---|---|
| **Equivalent Badminton England Category** | Major Competition | High Performance Centres | Premier Club in a Performance Centre | Premier Club in a Community Badminton Network | Local League or Recreational Club |
| **Requirements** | | | | | |
| Changing rooms with showers for both males and females [6] | | ● | ● | ● | ● |
| Basic catering e.g. vending | | ● | ● | ● | |
| Space for spectators, parents, players etc. to sit and wait /socialise | | ● | ● | ● | |
| On site first aid | | | | ● | ● |
| Provision for hire of playing equipment | | ● | ● | ● | |
| Car parking [7] | ● | ● | ● | ● | ● |
| First aid room | | | ● | | |
| Meeting / seminar room for 20 to 30 people | ● | ● | ● | | |
| Access to weights / Cardiovascular training equipment | | ● | ● | | |
| Area for waiting / resting players | ● | ● | ● | | |
| Physio / medical room | ● | ● | | | |
| Office to accommodate two people with telephone | ● | ● | | | |
| Restaurant | ● | ● | | | |
| Residential accommodation for a minimum of 20 people | ● | ● | | | |
| Space for a minimum of 150 spectators either in the hall or in a gallery | ● | | | | |
| A good quality PA system covering all areas | ● | | | | |
| Additional rooms for various purposes according to level of competition | ● | | | | |

**Table 6 Typical support accommodation**

[5] See Table 1 for definitions.
[6] Refer to Sport England Design Guidance Note *'Sports Halls – Design and Layouts'*.
[7] Refer to Sport England Design Guidance Note *'Car Parking & Landscape Design'*.

## Appendix 1: Further information and references

### Sport England Design Guidance Notes

- Accessible Sports Facilities
- Artificial Sports Lighting
- Car Parking & Landscape Design
- Sports Halls – Design and Layouts

These are all free-to-download from the Sport England website.

### The National Badminton Facilities Strategy

Further information may be obtained from:

BADMINTON England, Development Department, National Badminton Centre, Bradwell Road, Milton Keynes, MK8 9LA

Tel: 01908 268400

Fax: 01908 268412

Email: enquiries@badmintonengland.co.uk

Website: www.badmintonengland.co.uk

### The Laws of Badminton

The Laws of Badminton. As amended and adopted by the Badminton World Federation (BWF)

Website:http://www.bwfbadminton.org/file_download.aspx?id=37390

### BS EN 14904:2006

Surfaces for Sports Areas - Indoor Surfaces for Multi-Sport use - Specification

### BS EN 1509:2008

Playing Field Equipment - Badminton Equipment - Functional and Safety Requirements, Test Methods

### BS EN 12193:2007

Light and lighting. Sports lighting.

These documents available to purchase from British Standards Publications

Website: http://shop.bsigroup.com/en/ProductDetail/?pid=000000000030164245

### Glass & Glazing Federation

54 Ayres Street, London SE1 1EU

Tel: 020 7939 9100

E-mail: info@ggf.org.uk

Website: http://www.ggf.org.uk/

### CERAM

(Testing specialists for the Light Reflectance Values (LRV) of back ground surfaces)

Queens Road, Penkhull, Stoke-on-Trent, Staffordshire ST4 7LQ

E-mail: enquiries@ceram.com

Website: http://www.ceram.com/contact-us/

## Alternative Languages and Formats:

This document can be provided in alternative languages, or alternative formats such as large print, Braille, tape and on disk upon request. Call the Sport England switchboard on 08458 508 508 for more details.

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## User Guide:

Before using this design guidance note for any specific projects all users should refer to the *User Guide* to understand when and how to use the guidance as well as understanding the limitations of use.

Click here for **'User Guide'**

Click here for current **'Design and Cost Guidance'**

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