WORLD SQUASH FEDERATION

WORLD SQUASH FEDERATION

(WSF)

SQUASH

SQUASH (WSF WORLD SQUASH FEDERATION)

11 FIELD OF PLAY

11.1 COURT DIMENSIONS AND TOLERANCES

11.1.1 The plan dimensions of the singles court, measured 1 metre above finished floor level, shall be:

- Length: 9750 mm plus or minus 10 mm
- Width: 6400 mm plus or minus 10 mm
- Diagonals: 11665 mm plus or minus 25 mm

11.1.2 The plan dimensions of the standard doubles court, measured 1 metre above finished floor level, shall be:

- Length: 9750 mm plus or minus 10 mm
- Width: 7620 mm plus or minus 10 mm
- Diagonals: 12375 mm plus or minus 25 mm

Note: For WSF recognised World and Regional events and Commonwealth Games, the width of the court between playing surfaces has been expanded from 7620mm to 8420mm and the height above the floor to the top of the tin shall be 330mm.

11.2 Clear Height

The clear height above finished floor level (i.e. the height to the underside of the lowest obstruction) over the whole of the court shall be not less than 5.64 m. The clear height shall be measured to the underside of the lowest obstruction including lights.

11.3 COURT MARKINGS

- Generally all court markings shall be 50 mm wide and contrast in colour to adjoining surfaces,
- all wall markings shall be the same colour and all floor markings shall be the same colour.
- All court markings shall be straight to within plus or minus 2 mm in 3 metres.
- The maximum variation from the correct position of any court marking at any point shall not exceed 5 mm, except that the Tin shall not be more than 2 mm from the correct height at any point.

- There shall be three horizontal court markings on the front wall:
    - the front wall line
    - the service line
    - the upper 50mm of the Tin.
- The lower edge of the front wall line shall be 4570 mm above finished floor level. The line shall not project into the space above the court and shall ideally be so shaped as to deflect any ball striking it.
- The lower edge of the service line shall be 1780 mm above finished floor level. The line shallbe marked on the surface of the wall and shall not deflect in any way any ball striking it.
- The top of the Tin shall be 480 mm above the finished floor level and the upper 50mm shall project into the court by not more than 15 mm at the top and 45 mm at the bottom and shall be shaped so as to deflect any ball striking it. All edges of the Tin shall be rounded. Below the upper 50mm, for the full width of the court, the Tin shall be constructed in such a manner as to make a distinctive noise when struck by the ball.
- If the court has a transparent front wall it is recommended that the wall extends to a minimum height of 5250 mm above the floor.
- As an alternative to the Tin electronic devices may be used providing they:Emit an audible sound when the ball passes within the 50 mm line zone that they replace and be unaffected by external condition such as vibrations, atmospherics or illuminance variations.

11.3.1 Back Wall

- There shall be one horizontal court marking on the back wall, the back wall line.
- The lower edge of the line shall be 2130 mm above finished floor level except that if the court has a transparent wall 2130 mm (plus or minus 5 mm) high above finished floor level the back wall line shall be omitted.
- If the court has a transparent back wall which is 2180 mm or more high above finished wall level, the back wall line shall be marked on the inside (court) face of the wall.
- No transparent wall with a height of between 2130 mm and 2180 mm (both dimensions plus or minus 5 mm) high above finished floor level shall be allowed.
- If the court has a solid back wall, the back wall line shall ideally be so shaped as to deflect any ball striking it or shall be marked on the bottom edge of a sounding board not less than 200 mm deep across the full width of the court. Any such sounding board may project up to 5mm into the court.

11.3.2 Side Walls

- There shall be one court marking on each side wall, the side wall line. The line shall join the ends of the front wall line and the back wall line. If the back wall line is omitted as allowed above, the side wall line shall join the ends of the front wall and an imaginary back wall line.
- The side wall lines shall not project into the court but should ideally be so shaped as to deflect any balls striking them.
- If the court has a transparent side wall it is recommended that the wall extends to a minimum height of 5250 mm above the floor for at least the first 2000 mm back from the front wall.

11.3.3 Floor Marking

- There shall be four court markings on the floor:
    - the Short Line
    - the Half Court Line
    - the Service Boxes (2).
- Court markings on the floor shall be flush with the finish and be non-slip.
- The Short Line shall be parallel to the front and back walls of the court. The distance to the nearest edge of the Short Line from the Back Wall shall be 4260 mm. The Short Line shall be marked for the full width of the court.
- The Half Court Line shall be parallel to and equidistant from the side walls. It shall run from the back wall to the Short Line.
- There shall be two Service Boxes, one on each side of the court behind the Short Line. Each service box shall be square with internal sides of 1600 mm and shall be bounded on three sides by lines (one of each shall be a part of the short line) and on the fourth side by one of the side walls).

11.4 . COURT WALLS

11.4.1 Construction

- Each wall of the court shall be of the same construction over the whole of the playing area . Adjacent walls need not be of the same construction.

11.4.2 Strength

- The walls of the court and all components of them shall be capable of withstanding all the stresses which may be placed upon them in normal play and

shall not suffer any permanent or temporary damage as a result of The impact of balls or rackets:

11.4.3 Finishes of court walls

- All playing walls of the court shall have a hard smooth finish.
- Any front or side walls, or any transparent panel in the playing surface of the front or side walls, shall be treated and/or lit in such a manner as to make it non-reflecting when viewed from inside the court.

11.4.4 Ball Rebound

- The ball shall rebound truly on striking all parts of the playing walls. The ball rebound shall be consistent over the whole area of each wall.

11.4.5 Joints in Playing Surfaces

- Any open joint in the finish of a wall of panel construction shall:
    - not deflect the rebound of the ball in any way
    - not be wider than 2 mm in the plane of the wall surface

11.4.6 Wall to Wall Junctions

- There shall be no protrusions of any kind into the court at the junction of one wall with another.Wall to Floor Junctions

11.5 Moveable walls

- While courts are provided with moveable walls these walls shall comply in all aspects with the above as if they are of a permanent construction.

18.6 THE DOOR

- Position of the Door
    - It is recommended that the door to the court is located in the middle of the back wall, but in any event should be in the middle third and shall open into the court.
- Inside Surface of the Door
    - The inside surface of the door shall be plane and shall be flush with the adjacent wall surfaces when the door is closed. It shall be fitted with a flush handle and a restraining device which shall stop the door opening through 180 degrees and hitting the court wall.
- The door shall match the colour, texture and ball rebound characteristics of the adjacent wall surfaces as closely as possible and shall be fitted with a latch or other

mechanism which will prevent the door opening following an impact of a player with it on the court side.

- Size of the Door
    - The door shall not normally be more than 900 mm wide and 2130 mm high.

11.7 **. THE FLOOR**

Finish

- The floor shall be hard, smooth, have limited spring and provide a firm footing in normal play.
- The floor shall either be:able to absorb small amounts of moisture without becoming slippery
- The floor shall be kept clean of all rubber, dust particles and other depositions which may reduce its slip resistance.

Resilience

- The bounce of the ball shall be of even height and pace over the whole area of the floor.

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11.8 THE CEILING AND OUT OF COURT AREAS

- The ceiling shall have a plain matt finish and shall be white or a light colour against which the players shall be able to sight the ball without difficulty. The minimum reflectance value shall be 80% or below.
- Roof Lights
    - There shall be no windows or other areas of glazing over any part of the court. If windows are provided in any walls above or adjoining the court they shall be provided with blinds.

11.9 . **THE USE OF COLOUR AND DESIGNS**

- There shall be no more than three different colours on the wall playing surfaces within the court.
    - Each of the side walls shall be of one colour and each side wall shall be the same colour.
    - The front wall may be two colours, one below and one above the service line. The front wall colours need not be the same colour as the side wall colours.

- The floor shall have no more than two colours and each colour shall be bounded on at least two sides by the floor markings.

11.10 . LIGHTING

- The court shall be lit by artificial light. The level of illumination measured 1000 mm above the finished floor shall be:-
  - Recommended standard 500 lux
  - Minimum standard 300 lux
  - TV standard 1200 lux
  - The walls of the court shall be lit in such a way as to appear evenly and uniformly illuminated and the lux levels shall not vary at any point by more than 15% from the average level of illumination.

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11.11 HEATING AND VENTILATION

- Temperature
  - It is recommended that a Squash court shall be provided with a heating and/or air conditioning system capable of maintaining a temperature of between 10 and 25 degrees Celsius with an ideal range of 15 to 20 degrees Celsius.
- Ventilation System
  - The court shall be provided with a ventilation system which shall provide not less than four complete air changes per hour when the court is in use.
- Location of Grilles and Other Equipment
  - The only part of the court which may be used as a location for any heating or ventilation equipment shall be below the top 50mm of the Tin on the front wall, provided that the sounding characteristics are maintained and that there are no projections into the court.
  - No part of any heating or ventilating or other equipment may project into the clear space above the court excepting that equipment may be mounted on the front wall above the playing surface provided that: no part of any such equipment is less than 5400 mm above floor level in the court
  - no part of any such equipment projects more than 150 mm into the clear space above the court and no shadows are thrown onto the front wall.

11.12 SUMMARY OF DESCRIPTION AND DIMENSIONS OF A SINGLES COURT

A Squash Court is a rectangular box with four vertical walls of varying height; being the Front Wall, Side Walls and Back Wall. It has a level floor and a clear height above the court area.

DIMENSIONS

Length of court between playing surfaces ..... 9750 mm
Width of court between playing surfaces ..... 6400 mm
Diagonal ..... 11665 mm
Height above floor to lower edge of Front Wall Line .... 4570 mm
Height above floor to lower edge of Back Wall Line ..... 2130 mm
Height above floor to lower edge of Service Line on Front Wall ..... 1780 mm
Height above floor to the top of the Tin ..... 480 mm
Distance to nearest edge of Short Line from Back Wall ..... 4260 mm
Internal dimensions of Service Boxes ..... 1600 mm
Width of all lines and the upper section of the Tin ..... 50 mm
Minimum clear height above the floor of the court ..... 5640 mm

NOTES

1. The Side Wall line is angled between the Front Wall Line and the Back Wall Line.
2. The Service Box is a square formed by the Short Line, the Side Wall and two other lines marked on the floor.
3. The length, width and diagonal of the court are measured at a height of 1000 mm above the floor.
4. It is recommended that the Front Wall Line, Side Wall Line, Back Wall Line and upper 50mm of the Tin are shaped so as to deflect any ball that strikes them.
5. No part of the upper section of the Tin shall project from the Front Wall by more than 45 mm.
6. It is recommended that the door to the court is in the centre of the Back Wall.
7. The general configuration of a Squash Court, its dimensions and its markings are illustrated on the diagram.

11.3 SUMMARY OF DESCRIPTION AND DIMENSIONS OF A INTERNATIONAL DOUBLES COURT

A Squash Court is a rectangular box with four vertical walls of varying height; being the Front Wall, Side Walls and Back Wall. It has a level floor and a clear height above the court area.

DIMENSIONS

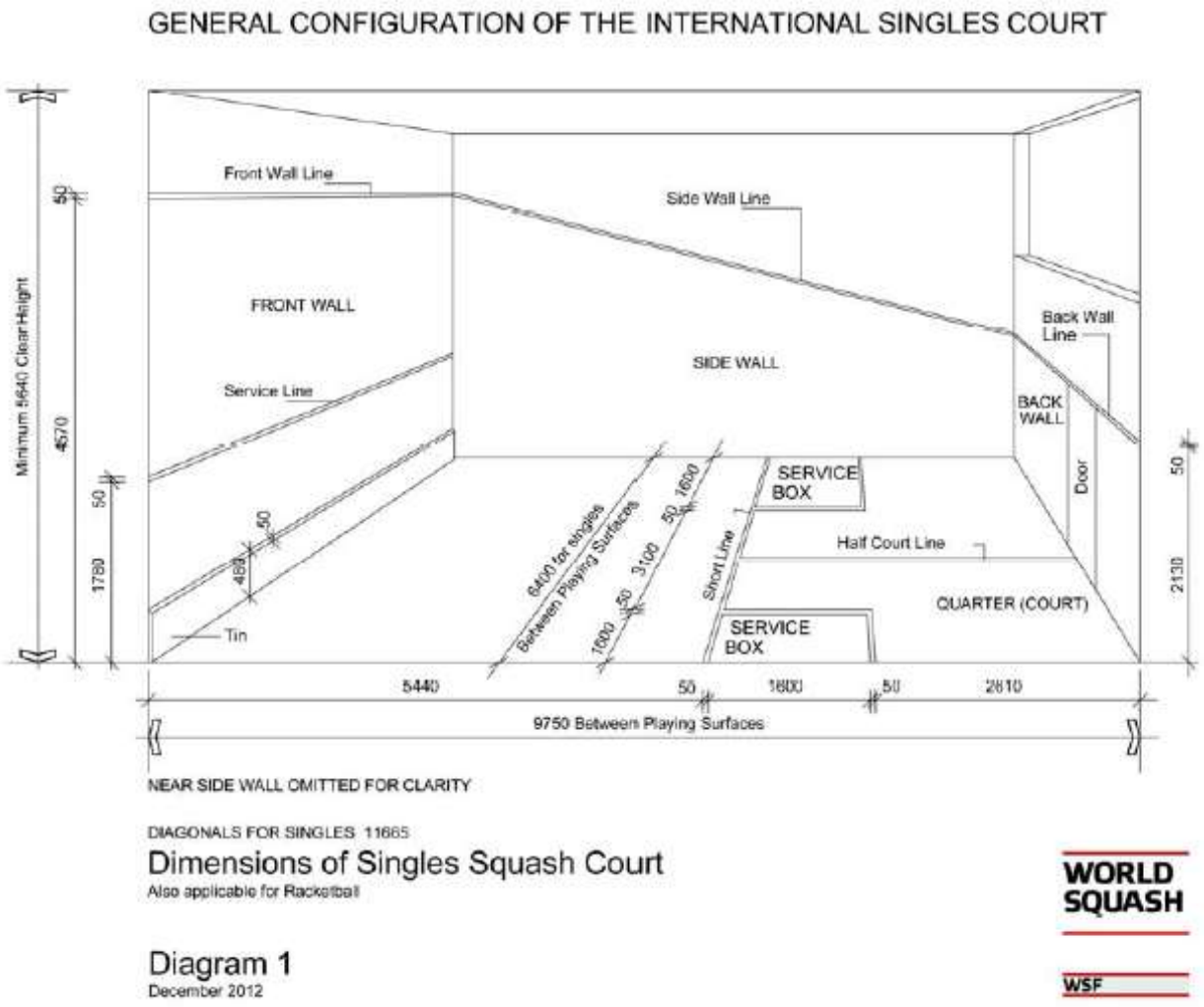
Length of court between playing surfaces ..... 9750 mm
Width of court between playing surfaces ..... 7620 mm or 8420 mm (Note 8)
Diagonal ..... 12375 mm
Height above floor to lower edge of Front Wall Line ..... 4570 mm
Height above floor to lower edge of Back Wall Line ..... 2130 mm
Height above floor to lower edge of Service Line on Front Wall ..... 1780 mm
Height above floor to the top of the Tin ..... 480 mm or 330 mm (Note 8)
Distance to nearest edge of Short Line from Back Wall ..... 4260 mm
Internal dimensions of Service Boxes ..... 1600 mm
Width of all lines and the upper section of the Tin ..... 50 mm
Minimum clear height above the floor of the court ..... 5640 mm

NOTES

1. The Side Wall is angled between the Front Wall Line and the Back Wall Line.
2. The Service Box is a square formed by the Short Line, the Side Wall and two other lines marked on the floor.
3. The length, width and diagonal of the court are measured at a height of 1000 mm above the floor.
4. It is recommended that the Front Wall Line, Side Wall Line, Back Wall Line and upper 50mm of the Tin are shaped so as to deflect any ball that strikes them.
5. No part of the upper section of the Tin shall not project from the Front Wall by more than 45 mm.
6. It is recommended that the door to the court is in the centre of the Back Wall.
7. The general configuration of a Squash Court, its dimensions and its markings are illustrated on the diagram.
8. International Competition Width: For WSF recognised World and Regional events and Commonwealth Games, the width of the court between playing surfaces has been expanded from 7620mm to 8420mm and the height above

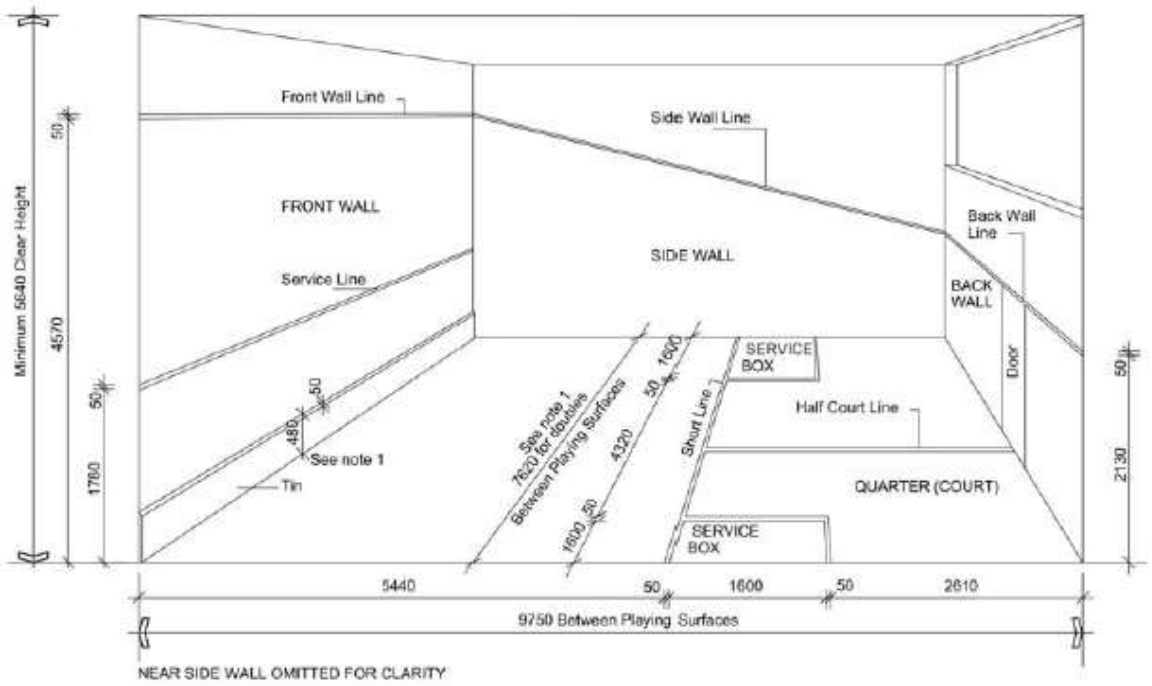
the floor to the top of the tin shall be 330mm.National Governing Body of Squash.

GENERAL CONFIGURATION OF THE INTERNATIONAL SINGLES COURT



GENERAL CONFIGURATION OF THE INTERNATIONAL DOUBLES COURT

GENERAL CONFIGURATION OF THE INTERNATIONAL DOUBLES COURT



Dimensions of Doubles Squash Court

NOTE 1

International Competition Width. For WSF recognised World and Regional events and Commonwealth Games, the width of the court between playing surfaces may be expanded from 7620mm to 8420mm and from July 2012 the height above the floor to the top of the tin shall be 330mm.

Diagram 2
September 2014

WORLD SQUASH

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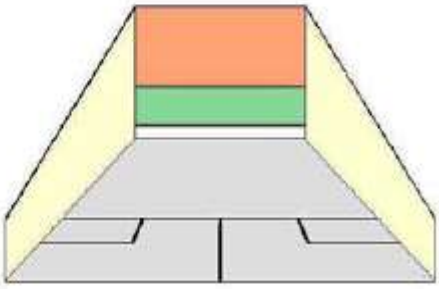
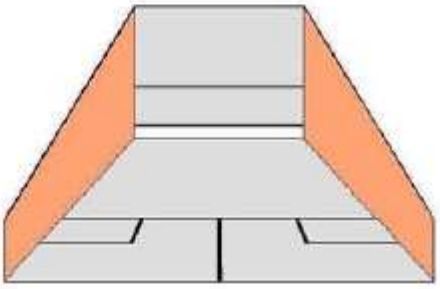
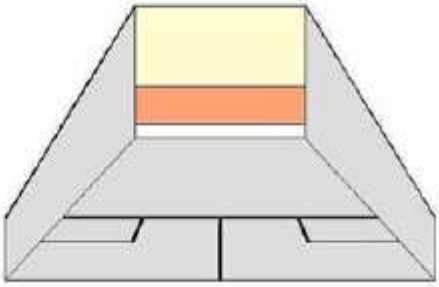
THE USE OF COLOUR AND DESIGN



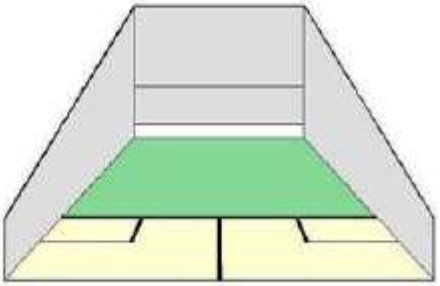
1. There shall be no more than three different colours on the wall playing surfaces within the court.



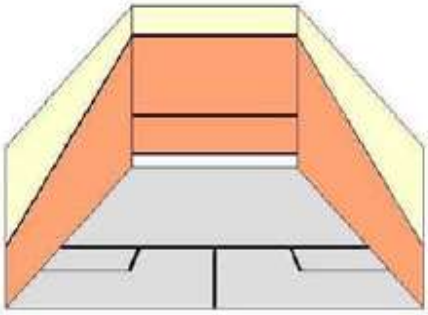
2. Each of the side walls shall be one colour and each side wall shall be the same colour.



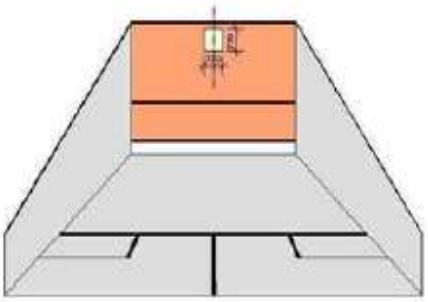
3. The front wall may be two colours, one below and one above the service line. The front wall colours need not be the same colour as the side wall colours.



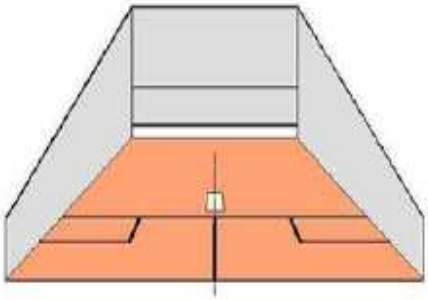
4. The floor shall have no more than two colours and each colour shall be bounded on at least two sides by the floor markings. The use of colours shall be symmetrical about the half court line. Natural wood materials shall be considered to be one colour providing the whole complies with clause 10.5.



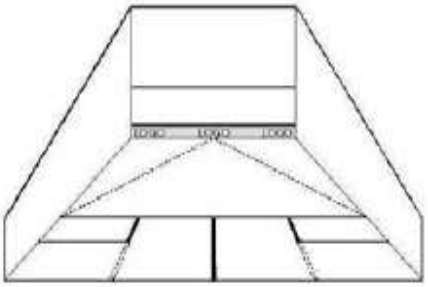
5. All colours shall have a minimum reflectance value of 50% and all colours shall be of the same reflectance value + or - 10%.
6. Colours will be permitted on all new and existing courts providing that the average illumination does not fall below the recommended standard of 500 lux or the minimum standard of 300 lux.
7. Out of court wall surfaces shall have a reflectance value the same or higher than any of the colours used on the play wall surfaces.
8. The ceiling shall have a minimum reflectance value of 80%.



8. Stripes or patterns of any type will not be permitted on the wall playing surfaces except on the front wall at a minimum height of 3600mm above the floor where a logo, club or sponsors name may be used providing it is not more than 750mm square and located central on the front wall.
11. The minimum reflectance value of any of the colours used in any logo or name shall be 30%.



10. A logo, club or sponsors name on the floor will not normally be permitted however individual designs may be specifically approved by the WSF upon request.
11. The minimum reflectance value of any of the colours used in any logo or name shall be 30%.



12. The tin may be of any colour and contain advertising, logos, club or sponsors names providing no part has a reflectance value of less than 30%.
13. The court play lines may be any colour providing they contrast with all colours on adjoining play surfaces. Wall play lines need not be the same colour as floor play lines.
14. Patterns and coaching aids on either the floor or the walls will not normally be permitted however individual designs may be specifically approved by the WSF upon request and following play testing to determine ball visibility.
15. All lines, colours or other markings on the floor shall be non slip in accordance with the Squash Court Specification.

WSF ACCREDITED COMPANIES & PRODUCTS

Aacer Cush, Aacer Cush 1 Plus, Aacer Flex Tri Power, Aacer Anchored Power Sleeper System, Aacer Channel System Koko Thaw, International Sales Manager Aacer Flooring 970 Ogden Road, Peshtigo, WI 54157, USA Tel: (1) 715 582 1181 Fax: (1) 715 582 1182 Email: kokot@aacerflooring.com Website: www.aacerflooring.com	**ACCRED DATE** **2014**
A Best "Doubleplay" Standard Glass Back Wall and Door Brian S Richy, Sales Manager A. Best Enterprises, Inc., 879 Brickyard Circle, Unit B-9, Golden, CO 80403-8027, USA Tel: (1) 303 659 4477 Fax: (1) 720 294 8480 Email: brian@glasswalls.com Website: www.glasswalls.com	**ACCRED DATE** **2014**
Action Cush I, Action Cush II, Action Cush II Plus **Action Thrust and Pro-Action Thrust Squash Court Flooring System** Tom Abendroth Action Floor Systems LLC, 4781 Highway 51, Mercer, Wisconsin 54547, USA Tel: (1) 715 476 3512 Fax: (1) 715 476 3585 Email: tom@actionfloors.com Website: www.actionfloors.com	**ACCRED DATE** **2014**
Altempco Tempered Glass Back Walls Ajith Koshy, Operations Manager Hollman Inc., 1825 Walnut Hill Lane, Suite 110, Irving, Texas 75038, USA Tel: (1) 972 815 4025 Fax: (1) 972 815 2901 Email: ajithk@hollman.com Website: www.hollman.com	**ACCRED DATE** **2014**
Armourcoat Squash Court Plaster **Armourcoat Sounding Board System** Duncan MacKellar Armourcoat Limited, Morewood Close, London Road, Sevenoaks, Kent TN13 2HU, England Tel: (44) 1732 460668 Fax: (44) 1732 450930 Email: marketing@armourcoat.co.uk Website: www.armourcoat.com	**ACCRED DATE** **2014**
ASB All-Glass Court **ASB Squash Court Wall Panel System and Rainbow Court** **ASB Moveable Walls** **ASB Adjustable Tin**	**ACCRED DATE** **2014**

Combatwall Plaster Coat System Ashu J. Aggarwal Harrison Industries, Harrison House, AB/8 Safdarjung Enclave, New Delhi 110 029, India. Tel: (91) 11 2610 5426 / (91) 11 4165 4051 Fax: (91) 11 2616 9064 E: info@harrisonsport.com / contact@harrisonsport.com Website: www.harrisonsport.com	**ACCRED DATE** **2014**
Connor Squash Flooring System "Squashplay" "Neoshock" & "Duracushion II" Bill Roever, Director International Sales Connor Sports Flooring, 1830 Howard Street, Suite F, Elk Grove Village, Illinois, 60007, USA Tel: (1) 801 924 3710 Fax: (1) 801 924 3711 Email: broever@connorfloor.com Website: www.connorsportcourt.com	**ACCRED DATE** **2014**
CourtTech Walls **CourtTech Glass Back Walls** **CourtTech 4 Sided Glass Court** **CourtTech (CT) Moveable Side Wall** **CourtTech (CT) Sport Floor** **CourtTech Height Adjustable Tin** **CourtTech LED Lighting** See Complete Court Accredited Companies Listing	**ACCRED DATE** **2014**
Courtwall 28mm Front Wall and 22mm Side Wall Squash Court Panels **Courtwall All-Glass Court** **Courtwall Glass-Back Walls** **Courtwall Plaster System** **Courtwall Moveable Side Wall** **Courtwall-Boen Squash Flooring** **Courtwall Sound Board** See Complete Court Accredited Companies listing below	**ACCRED DATE** **2014**
Ellis Pearson Glass Back Walls Jayne Roberts Prospec Limited, Canklow Meadows Estate, West Bawtry Road, Rotherham, South Yorkshire, S60 2XL, England Tel: (44) 1709 377 147 Fax: (44) 1709 375 239 Email: jsr@prospec.co.uk Website: www.prospec.co.uk	**ACCRED DATE** **2014**
Fiberesin 38mm Front Wall and 28mm Side Wall Racquetball/Squash Court Wall Panels Sandy Higgins, VP Sales & Marketing Fiberesin Industries Inc., P.O. Box 88, 37031 , E. Wisconsin Avenue, Oconomowoc, Wisconsin, 53066-0088, USA Tel: (1) 262 560 4429 Fax: (1) 262 567 4814 Email: shiggins@fiberesin.com Website: www.fiberesin.com	**ACCRED DATE** **2014**

GSG HM Type 95.2 & Type 95.2 Handicap Access, Type 95.2 COCO-B & Type 95.2 COCO-B Handicap Access, Type 95.4 & Type 95.4 Handicap Access, Type 95.4 COCO-B & Type 95.4 COCO-B Handicap Access, Type 95.6 & Type 95.6 Handicap Access Antoine Vermeulen GSG B.V. (Glas Specialisme Gooiland), PB 6112, 4000 HC Tiel, The Netherlands Tel: (31) 3446 19746 Fax: (31) 3446 15379 Email: a.vermeulen@gsg-bv.nl / info@gsg-bv.nl Website: www.glasssquashcourt.com	**ACCRED DATE** **2014**
HARO Sports Model Melbourne 65 Flooring Eva Weber, Area Sales Manager Hamberger Flooring GmbH & Co. KG, Postfach 10 03 53, 83003 Rosenheim, Deutschland Tel: (49) 8031 700 494 Fax: (49) 8031 700 463 Email: e.weber@hamberger.de Website: www.haro-sports.de / www.hamberger.com	**ACCRED DATE** **2014**
Hollman's Panelised Squash Courts Ajith Koshy, Operations Manager Hollman Inc., 1825 Walnut Hill Lane, Suite 110, Irving, Texas 75038, USA Tel: (1) 972 815 4025 Fax: (1) 972 815 2901 Email: ajithk@hollman.com Website: www.hollman.com	**ACCRED DATE** **2014**
McWIL 28mm Front and 22mm Side Walls **McWIL - Fiberesin 38mm Front and 28 mm Side Walls** **McWIL All-Glass Court** **McWIL - HARO Sports Model Melbourne 65 Flooring** **McWIL - GSG Glass Back Walls and Hardware** **McWIL Adjustable Tin** See Complete Court Accredited Companies listing below	**ACCRED DATE** **2014**
Panelized Squash Courts Erika Milligan The Court Company, 3059 Forest Hill – Irene Road Suite 100 Germantown, TN 38138 USA Tel: (1) 901 682-2600 Fax: (1) 901 682-2836 Email: erika@squashcourts.com Website: www.squashcourts.com	**ACCRED DATE** **2014**
Prestige Resi-Sleeper, Resi-Panel, Bi-Power Sleeper, Bi-Power "D-B" (Double Batten) Sleeper Modified, Bi-Power Sleeper Modified, Bi-Power Channel and Bi-Power Panel Flooring Systems Mireille Gabbour Prestige Sports Systems, 11343 Grooms Road, Cincinnati, Ohio 45242, USA Tel: (1) 513 469 6044 Fax: (1) 513 469 6444 Email: info@prestigefloor.com / prestige@prestigefloor.com Website: www.prestigefloor.com / www.resilientpad.com	**ACCRED DATE** **2014**

Rebound Plaster **Rebound 'Sport 2000' Squash Court Paint** Directors: Simon David Barker & Sonia Barker, Rebound, 'The Depot', 21 Station Approach, Oldham, OL3 5EF England Tel: (44) 161 929 7758 Mob: (44) 781 8046 464 Fax: (44) 161 929 7786 Email: rebound@Copley.co.uk Website: www.reboundsquash.com	**ACCRED DATE** **2014**
SylvaSquash Flooring System Kim Maretti, Group Marketing Manager Junckers Industrier A/S, Værftsvej 4, 4600 Køge, Denmark Tel: (45) 5667 3504 Fax: (45) 5667 3710 Email: kim@junckers.dk / ctt@junckers.dk Website: www.junckers.dk / www.junckers.com	**ACCRED DATE** **2014**
Syncotts Synplast Squash Court Hard Plaster **Syncotts Glass Back Wall** Sanjay Minotra, Syncotts International, J-219, Lane 2-W15, Western Avenue, Sainik Farms, New Delhi-110062, India Tel : 91-11-29551733 / 29555390 Fax: 91-11-29554316 Email: sanjay@syncotts.com Website: www.syncottsinternational.com	**ACCRED DATE** **2014**
Tarkett Multiflex M and Proflex M Floors Daphné Astaix, TWE Product Development Director 2, rue de L'Egalité, 92000 Nanterre, France Tel: (33) 141 20 4172 Fax: (33) 147 21 49 09 Email: Daphne.Astaix@tarkett.com Web: www.tarkett.com	**ACCRED DATE** **2014**

COMPLETE COURT ACCREDITED COMPANIES

WORLD SQUASH

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ASB All-Glass Court **ASB Squash Court Wall Panel System and Rainbow Court** **ASB Moveable Walls & ASB Adjustable Tin** Horst Babinsky ASB Systembau Horst Babinsky GmbH, Fabrikstraße 14, D-83371 Stein, Germany Tel: (49) 8621 987410 Fax: (49) 8621 987420 Email: hbabinsky@asbsquash.com Website: www.asbsquash.com	**ACCRED DATE** **2014**
CourtTech Walls **CourtTech Glass Back Walls** **CourtTech 4 Sided Glass Court** **CourtTech (CT) Moveable Side Wall** **CourtTech (CT) Sport Floor** **CourtTech Height Adjustable Tin** **CourtTech LED Lighting** Markus Gaebel, Managing Partner CourtTech GmbH & Co. KG, Pullacher Straße 11 83358 Seebruck, Germany Tel: (49) 8667 72491 Mob: (49) 1522 880 2090 Email: markus@courttech.biz Website: www.courttech.biz	**ACCRED DATE** **2014**
Courtwall 28mm Front Wall and 22mm Side Wall Squash Court Panels **Courtwall All-Glass Court** **Courtwall Glass-Back Walls** **Courtwall Plaster System** **Courtwall Moveable Side Wall** **Courtall-Boen Squash Flooring** **Courtwall Sound Board** Wolfgang Denk Courtwall Gmbh, c/o C19 Sportanlagen, Heiligenstädterstr. 86 Innenhof, A-1190 Vienna/Austria Tel: (43) 699 1002 9506 Fax: (43) 1 533 3332 Email: info@courtwall.com Website: www.courtwall.com	**ACCRED DATE** **2014**
McWIL 28mm Front and 22mm Side Walls **McWIL - Fiberesin 38mm Front and 28 mm Side Walls** **McWIL All-Glass Court** **McWIL - HARO Sports Model Melbourne 65 Flooring** **McWIL - GSG Glass Back Walls and Hardware** **McWIL Adjustable Tin** David Carr McWIL Squash Inc, 5185 MacArthur Blvd., NW # 103-612, Washington, DC 20016, USA Tel: (1) 202 966 4776 Fax: (1) 202 315 3365 Email: dcarr@mcwilsquash.com Website: www.mcwilsquash.com	**ACCRED DATE** **2014**

ARTIFICIAL SPORTS LIGHTING

12. ARTIFICIAL SPORTS LIGHTING

12.1 Introduction

The creation of an appropriate visual environment is a fundamental requirement in sports design and the effective integration of the artificial lighting system should be considered as a standard part of a modern sports facility.

The general benefits of good artificial lighting can be readily understood:

- Indoors, artificial lighting helps designers to provide consistent, uniform, adequate lighting levels, sometimes using artificial lighting alone and sometimes with supplementation by daylight
- In facilities such as swimming pools, artificial lighting is essential for the maintenance of safe conditions
- Outdoors, providing artificial lighting on a sports facility greatly extends the hours of play, particularly in winter
- The high, uniform levels of light necessary for many televised sports events can only be ensured through artificial lighting.

12.2 Technical complexities

Lighting is a subject area with a high degree of technical complexity that can be difficult to understand. The complicating factors which need to be taken into account in developing a lighting design may include:

- The varying and conflicting requirements of individual sports in a multi-sports context
- A lack of appreciation of the needs of some individual sports that are particularly sensitive to poorly designed lighting
- Complex inter-relationships with other elements of the building such as:
    - OO Reflectance and colour of surfaces
    - OO Variation in background surfaces
    - OO Configuration of walls and roof
    - OO Location of structural supports
- Health and safety issues, for example in swimming pools or in fast moving ball games such as cricket or hockey, where the maintenance of a good lighting system is a fundamental requirement.

This sports lighting guidance is not intended to be a substitute for appointing the appropriate professionally qualified organisations, who will be required to develop the Sports lighting performance requirements into acceptable design solutions and specifications

12.3 General requirements

It is important that the lighting requirements of each sport are fully understood at the outset of a project. This requires an understanding of the nature of the sporting activity and key characteristics. Many sports involve swift player actions and reactionsand involve relatively small objects such as shuttlecocks and balls travelling within three dimensions at very high speed.

12.4 Volume of the field of play

The whole of the three-dimensional volume above and including the field of play should be considered, rather than just the two-dimensional surface of the playing area. This can include:

- Safety zones around the playing area
- Space reserved for officials and team benches
- The underwater volume in the case of a swimming pool
- Spectator facilities.

Where events are televised, or for sports which involve great use of the height above the playing area - for instance badminton, athletics throwing events, cricket, rugby - consideration of the full volume is especially important. In lighting engineering terms, this means considering both horizontal and vertical planes for the full volume of the field of play. For example, a lighting scheme for badminton should not be based solely on illuminance on the floor, when the path of the shuttlecock can be anywhere in a playing volume 7 - 9 m high.

12.5 Lamp types

There is a variety of different lamp types used for sports lighting, as shown in the table below. Their characteristics differ and manufacturers are continually developing improved products. Selection is often made on the basis of colour of light emitted, energy consumption and life expectancy.

Types of lamps	
Indoors	Tubular fluorescent
	Compact fluorescent
	Metal halide
	High pressure sodium
	Light emitting diode (LED)
Outdoor	Metal halide
	High pressure sodium
	Tungsten halogen

For both indoor and outdoor sports, sodium lighting will only be acceptable where its relatively poor color rendering can be tolerated. Tungsten halogen lights are inexpensive, but inefficient. Metal halide lamps are efficient and give good colour rendering. They are specifically recommended by some National Governing Bodies for Sport (NGBs). For indoor use, fluorescent lamps offer a good balance between cost and efficiency. Light emitting diode (LED) lights are starting to be offered for sports lighting purposes.

12.6 Glare

The complete elimination of glare in sport is difficult to achieve due to the ever-changing directions of view of participants. Nevertheless, measures should be taken to minimise glare that may affect the visual performance of participants. When attempting to minimise the likelihood of glare, the factors over which a designer has control are;

• Selection of luminaires designed with attention to the avoidance of glare. In designing a luminaire, there are two main methods of avoiding causing glare, which are;

- to make any direct view of the light source impossible by placing it deep within the luminaire, behind baffles
- to use low-intensity light sources, such as fluorescent tubes

- The locations of the luminaires.
  - Where possible, luminaires should be located in positions which mean that players will not need to look towards them or in their general direction in the course of a game, for example behind the badminton baseline.

12.7 Colours of surfaces

The colours of the surfaces in a sports hall - walls, ceiling, dividing nets - are often important because the play object will be seen against them. Choosing the right colours can help make the play object more visible. For example, a mid-range reflective surface helps badminton players see a white shuttlecock and a surface of higher reflectance helps players see the flight of a red cricket ball.

12.8 The use of daylight

The use of natural light in indoor sports spaces to augment the artificial lighting system that would normally be required is an issue that often generates conflicting interests. For some, natural lighting of indoor spaces is completely unacceptable. The sun or areas of bright sky seen either directly through windows or by reflection from bright surfaces within the sports hall can lead to a level of disability or discomfort glare that will be unacceptable or even dangerous. Any proposal to use natural light requires very careful consideration of how glare can be controlled and how reasonably stable and uniform levels of lighting can be ensured

12.9 Multi-sports halls

The principal aims and objectives in lighting a sports hall include:

• The provision of a safe, enjoyable environment for players

• The illumination of court markings and key features such as nets and goals for the player and match officials

• The provision of suitable and sufficient lighting for spectators

• The provision of lighting for television broadcasting, where applicable.

The geometry and layout of a sports hall area together with the material, colour and surface finish of internal fabrics used all have an influence on the quality of the final lighting produced.

12.10 Multi-sports facilities

Design of the lighting installation for multi-sports halls is a complex matter in which the conflicts between the requirements of different sports need to be resolved. Many sports halls stage several differing sports and in an attempt to maximise the time and space allocation within a sports hall, some of these differing sports may take place at the same time.This has the potential to produce a conflict of interests in respect of simultaneous lighting requirements. There must, however, be flexibility within a lighting installation that will allow selective switching and / or other methods of control to satisfy the demands of differing sports that may be played at varying levels of competition.

As a consequence of the often significant diversity of lighting requirements within sports halls, it is usually recommended that the activity with the most stringent lighting requirements be

used as the basis for lighting design. The demands of other sports should, however, be met wherever practical. **Where there is limited information on the likely usage of a sports hall, it is generally recommended that a scheme is designed to suit the most common use, usually badminton courts.**

12.11 Horizontal and vertical illuminance

Lighting references, best practice case studies and design guides generally specify 'horizontal illuminance' i.e. illuminance on the horizontal plane. There is, however, a requirement for suitable and sufficient vertical illuminance e.g. on the bodies of participants and on the equipment required for the playing of sports.

Calculations are therefore based upon the reasoning that when the values of horizontal illuminance specified are attained, the corresponding values of vertical illuminance required for the safe and efficient playing of a sport are usually simultaneously achieved. Values of vertical illuminance should not be less than 30% of the corresponding simultaneous horizontal values, measured at the same locations. Vertical illuminance values are measured 1 m above court level; horizontal illuminance is measured on the court surface. When vertical illuminance is critical, for instance for televised activities, it is separately specified, calculated and measured.

12.12 Swimming pools

The recommended levels of illuminance for swimming pools are 300 lux for most activities and 500 lux for competition. For international events, FINA require 600 lux at the start and turn ends of the pool, while for Olympic swimming events the requirement is for 1500 lux over the entire pool.

12.13 SUMMARY OF RECOMMENDATION FOR LUX REQUIRED

(Compiled from Sports England organization compilation)

Where not otherwise stated in the Table, the 'Classes' used correspond to Sport England 'Level of play' categories as follows:

- Class 1 - International / Premier
- Class II – Club **Considered equivalent to Regional centres/Academic institution**
- Class III - Community. **Considered equivalent to STCs/SAG Centres**

Sport / Class	Horizontal illuminance		Vertical illuminance		Ra	Reference / Sport England updates
	Eave (lux)	Emin/Eave	Eave (lux)	Emin/Eave		
Aerobics						Table A.3 *BS EN 12193:2007*
I	500	0.7			60	
II	300	0.7			60	
III	200	0.7			20	
Archery						Table A.5 *BS EN 12193:2007* See requirements for vertical illuminances at distances from the target *CIBSE Lighting Guide 4*
I	200	0.5	1000 - 2000	0.8	60	
II	200	0.5	1000 - 2000	0.8	60	
III	200	0.5	1000 - 2000	0.8	20	
Athletics						Table A.3 *BS EN 12193:2007* Glare from luminaires above pole vault shall be avoided Vertical illuminance of 1000 lux at finish line for photo recording equipment
I	500	0.7			60	
II	300	0.7			60	
III	200	0.7			20	
Badminton						Table A.1 *BS EN 12193:2007* No luminaires should be above the court See NGB recommendations 30% vertical illumination. *CIBSE Lighting Guide 4* Badminton World Federation (BWF) recommend 1000 lux for international competition Badminton England recommend 500 lux for all other levels of play
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	

Sport / Class	Horizontal illuminance		Vertical illuminance		Ra	Reference / Sport England updates
	Eave (lux)	Emin /Eave	Eave (lux)	Emin/Eave		
Basketball						Table A.2 *BS EN 12193:2007* No luminaires should be above the 4.0 m diameter circle around the basket
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Billiards						Table A11 *BS EN 12193:2007* The ratio of Eave (TA) to Eave (PA) can be relaxed to 0.5
I	750	0.8			80	
II	500	0.8			80	
III	500	0.8			80	
Boccia						Table A.8 *BS EN 12193:2007*
Boules						Table A.8 *BS EN 12193:2007*
Bowling (10 pin)						Table A.5 *BS EN 12193:2007* See requirements for illuminances at distances from the pins
I	200	0.5	500	0.8	60	
II	200	0.5	500	0.8	60	
III	200	0.5	500	0.8	20	
Bowls (Flat and short mat)						Table A.9 *BS EN 12193:2007* Illuminance gradient should not be more than 5% per metre to avoid a banding effect that can occur with low mounting heights of fittings and reflectance from the mat See page 18 for conflicting advice between *CIBSE Lighting Guide 4* and the Indoor Bowls Sports Governing Bodies
I	500	0.8			60	
II	500	0.8			60	
III	300	0.5			60	
Boxing						Table A10 *BS EN 12193:2007* Ev.ave should be at least 50% of Eh.ave
I	2000	0.8	1000		80	
II	1000	0.8	500		80	
III	500	0.5	250		60	

Sport / Class	Horizontal illuminance		Vertical illuminance		Ra	Reference / Sport England updates
	Eave (lux)	Emin /Eave	Eave (lux)	Emin/Eave		
Cricket						Table A.1 *BS EN 12193:2007* See ECB recommendations
I	750	0.7	500	0.8	60	
II	500	0.7	300	0.8	60	These levels are regarded as unacceptable by ECB
III	300	0.7	200	0.8	20	These levels are regarded as unacceptable by ECB
Cricket nets						Table A.1 *BS EN 12193:2007* See ECB recommendations
I	1500	0.8	500	0.8	60	
II	1000	0.8	300	0.8	60	
III	750	0.8	200	0.8	20	
Cycle racing						Table A.2 *BS EN 12193:2007* Illuminance is taken on the surface of the track The vertical illuminance at the finish should be 1000 lux for photo-finish equipment and officials
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Curling						Table A12 *BS EN 12193:2007*
Dancing						Table A.3 *BS EN 12193:2007*
I	500	0.7			60	
II	300	0.7			60	
III	200	0.7			20	
Darts						Table A.7 *BS EN 12193:2007*
I	200		750		60	
II	100		500		60	
III	50		300		20	
Equestrian						Table A.3 *BS EN 12193:2007*
I	500	0.7			60	
II	300	0.7			60	
III	200	0.7			20	
Fencing						Table A.1 *BS EN 12193:2007*
I	750	0.7	500	0.7	60	
II	500	0.7	300	0.7	60	
III	300	0.7	200	0.7	20	

Sport / Class	Horizontal illuminance		Vertical illuminance		Ra	Reference / Sport England updates
	Eave (lux)	Emin /Eave	Eave (lux)	Emin/Eave		
Fistball						Table A.2 *BS EN 12193:2007*
Floorball						Table A.2 *BS EN 12193:2007*
Football 5 / 6-a-side						Table A.2 *BS EN 12193:2007*
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Go Karting						
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Gymnastics						Table A.3 *BS EN 12193:2007*
I	500	0.7			60	
II	300	0.7			60	
III	200	0.7			20	
Handball						Table A.2 *BS EN 12193:2007*
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Hockey						Table A.1 *BS EN 12193:2007* Note that England Hockey recommends a minimum of 350 lux for competition www.englandhockey.co.uk/
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Ice Hockey						Table A.1 *BS EN 12193:2007* For mounting heights below 8.0 m, Emin/ Emax should be greater than 0.5, for Class 3 the uniformity can be relaxed to 0.5
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Ice sports (artistic)						For mounting heights below 8.0 m, Emin /Emax should be greater than 0.5, for Class 3 the uniformity can be relaxed to 0.5
Judo						Table A.2 *BS EN 12193:2007*
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	

Sport / Class	Horizontal illuminance		Vertical illuminance		Ra	Reference / Sport England updates
	Eave (lux)	Emin/Eave	Eave (lux)	Emin/Eave		
Korfball						Table A.2 *BS EN 12193:2007* No luminaires should be above the 4.0 m diameter circle around the basket
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Martial arts (Kendo, Karate)						Table A.2 *BS EN 12193:2007*
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Netball						Table A.2 *BS EN 12193:2007* No luminaires should be above the 4.0 m diameter circle around the basket
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Petanque						
Racketball						Table A.1 *BS EN 12193:2007* No luminaires within 1.0 m of wall
	50	0.5			20	
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Rollerskating						Table A.3 *BS EN 12193:2007*
I	500	0.7			60	
II	300	0.7			60	
III	200	0.7			20	
Rhythmic gymnastics						Table A.3 *BS EN 12193:2007*
I	500	0.7			60	
II	300	0.7			60	
III	200	0.7			20	
Shooting						Table A.5 *BS EN 12193:2007* See requirements for illuminances at distances from the target
I	200	0.5	500	0.8	60	
II	200	0.5	500	0.8	60	
III	200	0.5	500	0.8	20	

Sport / Class	Horizontal illuminance		Vertical illuminance		Ra	Reference / Sport England updates
	Eave (lux)	Emin/Eave	Eave (lux)	Emin/Eave		
Korfball						Table A.2 *BS EN 12193:2007* No luminaires should be above the 4.0 m diameter circle around the basket
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Martial arts (Kendo, Karate)						Table A.2 *BS EN 12193:2007*
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Netball						Table A.2 *BS EN 12193:2007* No luminaires should be above the 4.0 m diameter circle around the basket
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Petanque						
Racketball						Table A.1 *BS EN 12193:2007* No luminaires within 1.0 m of wall
	50	0.5			20	
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Rollerskating						Table A.3 *BS EN 12193:2007*
I	500	0.7			60	
II	300	0.7			60	
III	200	0.7			20	
Rhythmic gymnastics						Table A.3 *BS EN 12193:2007*
I	500	0.7			60	
II	300	0.7			60	
III	200	0.7			20	
Shooting						Table A.5 *BS EN 12193:2007* See requirements for illuminances at distances from the target
I	200	0.5	500	0.8	60	
II	200	0.5	500	0.8	60	
III	200	0.5	500	0.8	20	

Sport / Class	Horizontal illuminance		Vertical illuminance		Ra	Reference / Sport England updates
	Eave (lux)	Emin / Eave	Eave (lux)	Emin/Eave		
Snooker						Table A11 *BS EN 12193:2007* The ratio of Eave (TA) to Eave (PA) can be relaxed to 0.5
I	750	0.8			80	
II	500	0.8			80	
III	500	0.8			80	
Speed skating						Table A.3 *BS EN 12193:2007*
I	500	0.7			60	
II	300	0.7			60	
III	200	0.7			20	
Squash						Table A.1 *BS EN 12193:2007* No luminaires within 1.0 m of wall
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Swimming						Table A.6 *BS EN 12193:2007* Additional requirements for diving, racing and polo in individual pools *BS EN 12193:2007* advises against underwater lighting for racing and polo
I	500	0.7			60	
II	300	0.7			60	
III	200	0.5			20	
Table tennis						Table A.1 *BS EN 12193:2007*
I	750	0.7	500	0.7	60	
II	500	0.7	300	0.7	60	
III	300	0.7	200	0.7	20	
Tennis (indoor)						Table A.4 *BS EN 12193:2007* No luminaires above the court and within 3.0 m from the base line, or in the players' line of sight
I	750	0.7			60	LTA specify minimum maintained average illuminance of 750 lux (0.7 uniformity value) within the PPA and 600 lux (0.6 uniformity value) within the TPA
II	500	0.7			60	LTA specify minimum maintained average illuminance of 600 lux within the PPA and 500 lux within the TPA (see page 21)
III	300	0.5			20	Below LTA specified standard (see page 21)

Sport / Class	Horizontal illuminance		Vertical illuminance		Ra	Reference / Sport England updates
	Eave (lux)	Emin /Eave	Eave (lux)	Emin/Eave		
Tug of War						Table A.2 *BS EN 12193:2007*
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Volleyball						Table A.2 *BS EN 12193:2007* No luminaires above the net area
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Wall climbing						Table A.3 *BS EN 12193:2007*
I	500	0.7			60	
II	300	0.7			60	
III	200	0.7			20	
Weight lifting						Table A.2 *BS EN 12193:2007*
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	
Wrestling						Table A.2 *BS EN 12193:2007*
I	750	0.7			60	
II	500	0.7			60	
III	300	0.7			20	

OUTDOOR LIGHTING

Sport / Class	Horizontal illuminance		Vertical illuminance		Ra	Reference / Sport England updates
	Eave (lux)	Emin / Eave	Eave (lux)	Emin/Eave		
American football						Table A.21 *BS EN 12193:2007*
I	500	0.7			60	
II	200	0.6			60	
III	75	0.5			20	
Archery						Table A.15 *BS EN 12193:2007*
I	250	0.5	750	0.8	60	
II	200	0.5	750	0.8	60	
III	200	0.5	750	0.8	60	
Athletics						Table A.13 *BS EN 12193:2007*
I	500	0.7			60	For discus, javelin and hammer, special precautions should be taken since the object may travel above the line of light and hence be invisible during part of the flight The vertical illumination at the finish line should be 1000 lux for photo-finish equipment and officials
II	200	0.5			60	For Class 2 the colour rendering index limit can be reduced to 20
III	100	0.5			20	Horizontal illuminance can be reduced to 50 lux for running events
Bandy						Table A.19 *BS EN 12193:2007*
Basketball						Table A.21 *BS EN 12193:2007*
I	500	0.7			60	
II	200	0.6			60	
III	75	0.5			20	
Baseball						Table A.14 *BS EN 12193:2007*
I	750	0.7	500	0.5	60	
II	500	0.7	300	0.5	60	
III	300	0.5	300	0.5	20	
Beach Volleyball						Table A.21 *BS EN 12193:2007*
I	500	0.7			60	
II	200	0.6			60	
III	75	0.5			20	

Sport / Class	Horizontal illuminance		Vertical illuminance		Ra	Reference / Sport England updates
	Eave (lux)	Emin/Eave	Eave (lux)	Emin/Eave		
Bobsleigh, Luge and Tobogganing						Table A.28 *BS EN 12193:2007*
Boccia						Table A.20 *BS EN 12193:2007*
Boules						Table A.20 *BS EN 12193:2007*
I	200	0.7			50	
II	100	0.7			50	
III	50	0.5			20	
Cricket						Table A.14 *BS EN 12193:2007*
I	750	0.7	500	0.5	60	
II	500	0.7	300	0.5	60	
III	300	0.5	300	0.5	20	
Curling						Table A.12 *BS EN 12193:2007*
Cycle racing						Table A.18 *BS EN 12193:2007*
I	500	0.7			60	The vertical illumination at the finish line should be 1000 lux for photo-finish equipment and officials
II	300	0.7			60	
III	100	0.5			20	
Equestrian						Table A.13 *BS EN 12193:2007*
Fistball						Table A.21 *BS EN 12193:2007*
I	500	0.7			60	
II	200	0.6			60	
III	75	0.5			20	
Football						Table A.21 *BS EN 12193:2007*
I	500	0.7			60	
II	200	0.6			60	
III	75	0.5			20	FA recommend minimum 120 Lux for Class III Football Refer to www.TheFA.com
Go Karting						Table A.18 *BS EN 12193:2007*
I	500	0.7			60	The vertical illumination at the finish line should be 1000 lux for photo-finish equipment and officials
II	300	0.7			60	
III	100	0.5			20	
Golf driving range						Table A.26 *BS EN 12193:2007*
I						
II						
III	100	0.8			50	

Sport / Class	Horizontal illuminance		Vertical illuminance		Ra	Reference / Sport England updates
	Eave (lux)	Emin /Eave	Eave (lux)	Emin/Eave		
Handball						Table A.21 *BS EN 12193:2007*
I	500	0.7			60	
II	200	0.6			60	
III	75	0.5			20	
Hockey						Table A.22 *BS EN 12193:2007* Engand Hockey recommends a minimum of 350 lux for competition and the following levels for particular pitches Class 1 = 750 lux Class 2 = 500 lux Class 3 = 300 lux See 'Guide to the Artificial Lighting of Hockey Pitches' download at: www.englandhockey.co.uk
I	500	0.7			60	
II	200	0.7			60	
III	200	0.7			20	
Horse racing						Table A.24 *BS EN 12193:2007*
Ice Hockey						Table A.19 *BS EN 12193:2007*
I	750	0.7				
II	500	0.7				
III	200	0.5				
Netball						Table A.21 *BS EN 12193:2007* AENA recommend 400 lux minimum maintained average for competitive play and 200 lux minimum maintained average for training Go to: http://www.englandnetball.co.uk Under *'The Game'*, select *'Facility and Court Information'* Lamps / columns in line with the player's sight of the net should be avoided
I	500	0.7			60	
II	200	0.6			60	
III	75	0.5			20	
Petanque						Table A.20 *BS EN 12193:2007*
I	200	0.7			50	
II	100	0.7			50	
III	50	0.5			20	

Sport / Class	Horizontal illuminance		Vertical illuminance		Ra	Reference / Sport England updates
	Eave (lux)	Emin /Eave	Eave (lux)	Emin/Eave		
Rugby						Table A.21 *BS EN 12193:2007* RFU lighting requirements are: Premiership: Eh 800 Lux, U2 = 0.7 Ev 500 Lux RFU Levels 2 to 5 / National Leagues: 200 Lux RFU Levels 6 and below, and training / Regional Leagues and lower levels of competition: 100 Lux The illuminance on a 5.0 m margin around the playing area is to be at least 25% of the illuminance on the playing area
I	500	0.7			60	
II	200	0.6			60	
III	75	0.5			20	
Cross country / street						Table A.17 *BS EN 12193:2007*
I	20	0.3			20	
II	10	0.3			20	
III	3	0.1				
Shooting						Table A.15 *BS EN 12193:2007*
I	250	0.5	750	0.8	60	
II	200	0.5	750	0.8	60	
III	200	0.5	750	0.8	60	
Skiing						Table A.17 *BS EN 12193:2007*
Skiing alpine / freestyle / jumps						Table A.23 *BS EN 12193:2007*
Softball						Table A.25 *BS EN 12193:2007*
Speed skating (400m)						Table A.13 *BS EN 12193:2007*
I	500	0.7			60	
II	200	0.5			60	
III	100	0.5			20	
Swimming						Table A.27 *BS EN 12193:2007*
I	500	0.7			60	
II	300	0.7			60	
III	200	0.5			20	

Sport / Class	Horizontal illuminance		Vertical illuminance		Ra	Reference / Sport England updates
	Eave (lux)	Emin/Eave	Eave (lux)	Emin/Eave		
Rugby						Table A.21 *BS EN 12193:2007* RFU lighting requirements are: Premiership: Eh 800 Lux, U2 = 0.7 Ev 500 Lux RFU Levels 2 to 5 / National Leagues: 200 Lux RFU Levels 6 and below, and training / Regional Leagues and lower levels of competition: 100 Lux The illuminance on a 5.0 m margin around the playing area is to be at least 25% of the illuminance on the playing area
I	500	0.7			60	
II	200	0.6			60	
III	75	0.5			20	
Cross country / street						Table A.17 *BS EN 12193:2007*
I	20	0.3			20	
II	10	0.3			20	
III	3	0.1				
Shooting						Table A.15 *BS EN 12193:2007*
I	250	0.5	750	0.8	60	
II	200	0.5	750	0.8	60	
III	200	0.5	750	0.8	60	
Skiing						Table A.17 *BS EN 12193:2007*
Skiing alpine / freestyle / jumps						Table A.23 *BS EN 12193:2007*
Softball						Table A.25 *BS EN 12193:2007*
Speed skating (400m)						Table A.13 *BS EN 12193:2007*
I	500	0.7			60	
II	200	0.5			60	
III	100	0.5			20	
Swimming						Table A.27 *BS EN 12193:2007*
I	500	0.7			60	
II	300	0.7			60	
III	200	0.5			20	

Sport	Class	Horizontal illuminance		Vertical illuminance		Ra	Reference / Sport England updates
		Eave (lux)	Emin /Eave	Eave (lux)	Emin/Eave		
Tennis							Table A.16 *BS EN 12193:2007* LTA recommend maintained average illuminance of 500 lux on the PPA and 400 lux on the TPA LTA specify minimum maintained average illuminance of 400 lux on the PPA and 300 lux on the TPA To maintain safety margins and to ensure that there are no luminaires in an unacceptable location, there must be no lighting columns within the TPA
	I	500	0.7			60	
	II	300	0.7			60	
	III	200	0.6			20	LTA does not fund recreational level lighting
Tug of War							Table A.21 *BS EN 12193:2007*
	I	500	0.7			60	
	II	200	0.6			60	
	III	75	0.5			20	
Volleyball							Table A.21 *BS EN 12193:2007*
	I	500	0.7			60	
	II	200	0.6			60	
	III	75	0.5			20	

20. REFERENCES

- Manuals, Handbooks and Guidelines if International Sports Federations of respective Sports Disciplines in this handbook
- Publication on Design and Guidance note on Sports Halls : Sizes and Layouts by Sport England
- Publication on Design and Guidance note on Artificial Sports Lighting by Sport England
- Various publications on sports infrastructure available on Internet