

This is a preview of "BS EN 12193:2018". [Click here to purchase the full version from the ANSI store.](#)



BSI Standards Publication

## Light and lighting - Sports lighting

---

This is a preview of "BS EN 12193:2018". [Click here to purchase the full version from the ANSI store.](#)

## National foreword

This British Standard is the UK implementation of EN 12193:2018. It supersedes BS EN 12193:2007, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee EL/1, Light and lighting applications.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2019  
Published by BSI Standards Limited 2019

ISBN 978 0 539 04041 8

ICS 97.220.10; 91.160.01

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 December 2018.

### Amendments/corrigenda issued since publication

Date	Text affected
28 February 2019	Implementation of CEN correction notice 30 January 2019: Source in 3.4 and 3.6, and definition in 3.5 corrected, footnotes in Table A.24 and Table A.27 added

This is a preview of "BS EN 12193:2018". [Click here to purchase the full version from the ANSI store.](#)

## EUROPÄISCHE NORM

December 2018

ICS 91.160.01; 97.220.10

Supersedes EN 12193:2007

English Version

## Light and lighting - Sports lighting

Lumière et éclairage - Éclairage des installations  
sportives

Licht und Beleuchtung - Sportstättenbeleuchtung

This European Standard was approved by CEN on 1 July 2018.

This European Standard was corrected and reissued by the CEN-CENELEC Management Centre on 30 January 2019.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

This is a preview of "BS EN 12193:2018". [Click here to purchase the full version from the ANSI store.](#)

## Contents

Page

European foreword.....	4
Introduction .....	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions .....	6
4 Symbols and abbreviations .....	8
5 Design data .....	10
5.1 General.....	10
5.2 Essential light source data.....	10
5.2.1 General.....	10
5.2.2 Replacable lamp data.....	10
5.2.3 LED light source data .....	11
5.3 Essential luminaire data.....	11
5.3.1 General.....	11
5.3.2 Luminaires with replaceable lamps .....	11
5.3.3 LED luminaires.....	12
5.4 Useful luminaire data .....	12
5.5 Essential installation data.....	13
6 General principles of the lighting installation.....	13
6.1 Reference grid for calculation and measurement.....	13
6.1.1 General.....	13
6.1.2 Grid size for calculation and measurements for particular sports.....	13
6.1.3 Grid size for calculation and measurements for multi-sports facilities.....	14
6.1.4 Application .....	14
6.2 Measuring equipment .....	16
6.3 Measurement record .....	17
6.4 Practical differences .....	17
6.5 Maintenance.....	18
6.6 Spectator area lighting.....	18
6.7 Safety for participants and the continuation of an event in case of lighting failure .....	18
6.7.1 Safety lighting for participants.....	18
6.7.2 Safety lighting for spectators .....	19
6.7.3 Continuation of a sport.....	19
6.8 Glare restriction .....	19
6.8.1 General.....	19
6.8.2 Indoor.....	19
6.8.3 Outdoor.....	19
6.9 Surface colours and reflection properties .....	20
6.10 Obtrusive light.....	20
7 Requirements for the lighting of sports most practised in Europe .....	22
7.1 General requirements .....	22
7.2 Non televised requirements per sport .....	23
7.3 Specific requirements for television and film recording.....	26
7.3.1 General.....	26

This is a preview of "BS EN 12193:2018". [Click here to purchase the full version from the ANSI store.](#)

7.3.2	Vertical illuminance .....	26
7.3.3	Unwanted reflections or Skip Light (informative) .....	28
7.3.4	Correlated colour temperature of the lighting .....	28
7.3.5	Additional requirements for colour rendering of the lighting.....	29
7.3.6	Light level on surrounding spectators' areas.....	29
7.3.7	Position of floodlights .....	29
7.3.8	Additional requirements for Super Slow Motion broadcasting (major events only) .....	30
7.3.9	Considerations for other users .....	31
7.3.10	Effects of surface reflection.....	31
Annex A (normative) Tables of requirements.....		33
Annex B (informative) A-deviation .....		48
Bibliography .....		49

## European foreword

This document (EN 12193:2018) has been prepared by Technical Committee CEN/TC 169 "Light and lighting", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12193:2007.

In this revision the main technical changes can be divided between the needs of the players and that of the camera. For the players the minimum colour rendering index has been increased from  $R_a > 20$  to  $R_a > 60$ . The tables of requirements have been updated to take into account sports that have become popular since the last edition. Recommendations on the use of Glare Rating for indoor sports areas are now included.

The requirements for television and film recording have been revised to reflect changes in broadcast technology since the last edition. Lighting levels have been reviewed in line with the requirements for HD and 4K transmission as well as production techniques. For cameras colour rendering index has been replaced by Television Lighting Consistency Index (TLCI) which has been developed specifically for broadcast cameras. Requirements for eliminating flicker from slow motion cameras are included as well as lighting of spectators.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

This is a preview of "BS EN 12193:2018". [Click here to purchase the full version from the ANSI store.](#)

## **Introduction**

This European Standard deals with sports lighting to ensure good visual conditions for players, athletes, referees, spectators and CTV transmission. The objective of this document is to provide recommendations and specify requirements for good quality sports lighting by:

- optimizing the perception of visual information used during sports events;
- maintaining the level of visual performance;
- providing acceptable visual comfort;
- restricting obtrusive light.

This is a preview of "BS EN 12193:2018". Click here to purchase the full version from the ANSI store.

## 1 Scope

This document specifies lighting for those indoor and outdoor sports events most practised in Europe. This document only considers artificial lighting. It provides lighting values for the design and control of sports lighting installations in terms of illuminances, uniformity, glare restriction and colour properties of the light sources. All requirements are intended to be as minimum requirements. It also gives methods by which these values are measured. For the limitation of glare, it also points out restrictions on the location of the luminaires for specific applications.

For emergency lighting this document refers to the requirements of EN 1838.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1838, *Lighting applications — Emergency lighting*

EN 12665:2018, *Light and lighting — Basic terms and criteria for specifying lighting requirements*

EN 13032-1, *Light and lighting — Measurement and presentation of photometric data of lamps and luminaires — Part 1: Measurement and file format*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12665:2018 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 3.1 principal area PA

actual playing area needed for the performance of a certain sport

Note 1 to entry: Usually this means the actual marked out "field" area for that sport (for instance football), but in some cases this area comprises an extra playing area around the marked area (e.g. tennis, volleyball, table tennis).

Note 2 to entry: In all tables in Annex A examples of area sizes are given which are most commonly used for that sport. The particular area dimensions should be checked at the time when designing a lighting installation.

### 3.2 total area TA

area generally comprising the principal area (PA) plus an additional safety area outside the principal area

Note 1 to entry: The dimensions of this area are generally based on PA, for the relevant sport and level of competition. For most sports this reference area is limited by a rectangle in the horizontal plane of the ground. An example of a reference area is given in Figure 1 where  $l$  and  $w$  stand respectively for the length and the width of