

Australian Standard[®]

Sports lighting

**Part 2.8: Specific applications—
Outdoor bowling greens**



This Australian Standard® was prepared by Committee LG-009, Sports Lighting. It was approved on behalf of the Council of Standards Australia on 26 October 2007. This Standard was published on 7 December 2007.

The following are represented on Committee LG-009:

- Association of Consulting Engineers Australia
 - Australian Electrical and Electronic Manufacturers Association
 - Confederation of Australian Sport
 - Department of Local Government, Planning, Sport and Recreation, Qld
 - Energy Networks Association
 - IES: The Lighting Society
 - Parks and Leisure Australia
 - Sport and Recreation Victoria
 - Sport Industry Australia
 - Tennis Australia
 - Tennis Coaches Australia
 - Tennis Court and Sports Field Builders Association of Australia
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Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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Sports lighting

Part 2.8: Specific applications— Outdoor bowling greens

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PREFACE

This Standard was prepared by the Standards Australia Committee LG-009, Sports Lighting, to supersede AS 2560.2.8—1994, Sports lighting, Part 2.8: Specific applications—Bowling greens.

This Standard incorporates Amendment No. 1 (March 2008). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

When revision of the AS 2560 series of Standards is completed, it will consist of the following:

AS

- 2560 Sports lighting
- 2560.1 Part 1: General principles
- 2560.2.1 Part 2.1 Specific applications—Lighting for outdoor tennis
- 2560.2.2 Part 2.2 Specific applications—Lighting of multipurpose indoor sports centres
- 2560.2.3 Part 2.3 Specific applications—Lighting for football (all codes)
- 2560.2.4 Part 2.4 Specific applications—Lighting for outdoor netball and basketball
- 2560.2.5 Part 2.5 Specific applications—Swimming pools
- 2560.2.6 Part 2.6 Specific applications—Baseball and softball
- 2560.2.7 Part 2.7 Specific applications—Outdoor hockey
- 2560.2.8 Part 2.8 Specific applications—Outdoor bowling greens (this Standard)

NOTE: Until the revision of this series is complete some of the above Standards might have, as a main title, 'Guide to sports lighting'.

The proper application of this Standard will require reference to AS 2560.1 for the definitions of various technical parameters and the explanation of basic concepts and principles.

The term 'informative' has been used in this Standard to define the application of the appendix to which it applies. An 'informative' appendix is only for information and guidance.

CONTENTS

	Page
1 SCOPE.....	4
2 REFERENCED DOCUMENTS.....	4
3 DEFINITIONS.....	4
4 CHARACTERISTICS OF PLAY AND IMPLICATIONS FOR LIGHTING.....	5
5 GENERAL DESIGN OBJECTIVES.....	5
6 ILLUMINANCE LEVELS	5
7 UNIFORMITY OF ILLUMINANCE.....	8
8 CONTROL OF GLARE.....	8
9 COLOUR RENDERING REQUIREMENTS.....	12
10 ENVIRONMENTAL CONSIDERATIONS.....	12
11 VERIFICATION OF COMPLIANCE.....	12
APPENDIX A ILLUSTRATION OF FLOODLIGHT CLASSIFICATIONS.....	14

STANDARDS AUSTRALIA

Australian Standard
Sports lighting

Part 2.8: Specific applications—Outdoor bowling greens

1 SCOPE

This Standard contains recommendations and requirements (the requirements refer to methods of assessment and measurement and levels of performance) specific to the lighting of lawn bowls where played outdoors.

Recommendations which are appropriate for indoor bowls and covered outdoor bowling greens are provided in AS 2560.2.2.

This Standard deals with training and competition levels of play, and takes into account spectator viewing requirements associated with these levels of play.

The Standard does not address the amenity and emergency lighting which may be required in public areas associated with stadiums.

Additional recommendations and requirements applicable to all sports venues, including those for football, are contained in AS 2560.1.

The Standard does not detail the special requirements of lighting for television broadcasting.

This Standard makes recommendations, but does not set requirements, regarding obtrusive light released into the environment from sports lighting installations (see Clause 10).

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

2560 Sports lighting

2560.1 Part 1 General principles

2560.2.2 Part 2.2 Lighting of multipurpose indoor sports centres

4282 Control of the obtrusive effects of outdoor lighting

AS/NZS

3827 (all parts) Lighting system performance—Accuracies and tolerances

CIE*

112 Glare evaluation system for use within outdoor sports and area lighting

3 DEFINITIONS

For the purpose of this Standard, the definitions given in AS 2560.1 as qualified below for the specific instances of bowling greens areas apply. Some critical definitions are also repeated in this Standard.

* International Commission of Illumination, Vienna

3.1 Maintained illuminance (E_m)

The defined level below which the average illuminance on the reference plane of a lighting system is not allowed to fall.

NOTE: It is the minimum illuminance at which maintenance is to be carried out.

3.2 Principal playing area (PPA)

For each green, all sections of the playing surface within the boundary. This typically includes the gutter.

3.3 Shall

Indicates a mandatory requirement. It is necessary that such requirements be followed strictly in order to comply with this Standard.

3.4 Should

Indicates a recommendation. It is not necessary that such recommendations be followed in order to comply with this Standard.

4 CHARACTERISTICS OF PLAY AND IMPLICATIONS FOR LIGHTING

The game may be played in any of the four major directions normal to the sides of the green and players are required to look in all directions, below the horizontal.

Players are required to judge distances accurately and the relative position of the bowls anywhere on the green.

It is important that shadows on the green, cast by the bowls, are neither too dense nor of excessive length. This implies the need for the green to be lit from a number of directions, using floodlights that are mounted at an adequate height.

5 GENERAL DESIGN OBJECTIVES

The main objectives of a lighting installation which will provide an adequate visual environment for bowls, when played outdoors, are as follows:

- (a) Provision of an appropriate level of illuminance to cater for the visual requirements of the players and, officials and spectators, where applicable (see Clause 6).
- (b) Uniformity of illuminance over the whole of the green (see Clause 7).
- (c) Control of glare from floodlights within the range of normal viewing directions of players and, spectators, where applicable (see Clause 8).
- (d) Control of stray light and glare beyond the boundaries of the bowls complex (see Clause 10).
- (e) Use of light sources with colour-rendering properties that will ensure the satisfactory appearance of players and surroundings (see Clause 9).
- (f) Selection of lighting equipment of appropriate type and the location and arrangement of such equipment in a manner that will facilitate necessary maintenance during the life of the installation.

6 ILLUMINANCE LEVELS

6.1 General

This Standard specifies requirements for the horizontal illuminance of the PPA only.

6.2 Allowance for depreciation

Allowance shall be made for the progressive reduction in the illuminance provided by the installation which will occur as the result of lamp lumen depreciation (LLD) and luminaire dirt depreciation (LDD).

The extent of the allowance required will depend on the type of lamp selected, location of the installation and the cleaning and lamp replacement cycles adopted. (Refer to the relevant Clauses in AS 2560.1 for information on determining these quantities.)

The combined effect of these allowances will determine the illuminance which should initially be provided by the installation in order to ensure that the maintained illuminance required by Table 1 can be provided at all times (refer to Clause 3.1).

6.3 Measurement and calculation details

6.3.1 *Height above PPA*

All measurements or calculations of horizontal illuminance levels, including those for horizontal illuminance uniformity, shall be made at the level of the PPA.

6.3.2 *Calculation points*

To check the conformance of the lighting design with the lighting criteria in Table 1 by means of calculation, the illuminance levels shall be calculated at points located on a 2 m × 2 m grid, located within the PPA specified in Clause 6.3.4.

6.3.3 *Measurement points*

To check the conformance of the lighting design with the relevant illuminance parameters by means of measurement, it is not practicable to measure all of the calculation points required. The illuminance levels shall be measured at points located on a 4 m × 4 m grid, contained within the PPA as specified in Clause 6.3.4.

6.3.4 *Location of calculation and measurement grids*

A 2 m × 2 m calculation grid shall be fitted within the perimeter of the PPA such that all points immediately inside that perimeter are within 1.0 m (i.e. half a grid space) of the relevant boundary line or lines.

With regard to measurement points, one point shall be located at each corner of the above grid and thence on a 4 m × 4 m grid, expanding from each corner to cover the relevant quarter of the PPA. In some cases, this will result in rows of measurement points only 2 m apart on either side of either the longitudinal or transverse axis of the green, or both. Refer to Figure 1 for examples.