

Australian Standard[®]

**Control of the obtrusive effects
of outdoor lighting**

This Australian Standard was prepared by Committee LG/10, Obtrusive Effects of Outdoor Lighting. It was approved on behalf of the Council of Standards Australia on 29 October 1997 and published on 5 December 1997.

The following interests are represented on Committee LG/10:

The Association of Consulting Engineers Australia
Astronomical Society of Australia
Australian Electrical and Electronic Manufacturers Association
Brisbane City Council
Illuminating Engineering Society of Australia and New Zealand
Local Government and Shires Association of N.S.W.
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**Control of the obtrusive effects
of outdoor lighting**

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PREFACE

This Standard was prepared by the Standards Australia Committee LG/10, Obtrusive Effects of Outdoor Lighting, to supersede AS 4282(Int)—1995.

With any outdoor lighting it will rarely be possible to contain all light within the boundaries of the property on which the lighting system is installed. Some light will inevitably be spilled outside the property boundaries, either directly or by reflection. The determination of when the spill light becomes obtrusive to others is difficult since both physiological and psychological effects are involved.

Local government plays an important role in controlling the obtrusive effects of outdoor lighting through the development approvals process, and in resolving neighbourhood disputes involving residents who experience discomfort or annoyance from nearby outdoor lighting installations. Some local government authorities have applied restrictions on the frequency of use and hours of operation of outdoor lighting, and on the levels of light spilled beyond the boundaries of the subject site.

The objective of this Standard is to provide a common basis for assessment of the likely effects of developments that involve the provision of outdoor lighting. However, it should be noted that the potentially obtrusive effects of the lighting will normally be only one of a number of environmental considerations that will need to be addressed. Compliance with this Standard, i.e. with the recommended limits for the various light technical parameters, will therefore not usually be the sole basis for the approval of particular development proposals.

Where any doubt exists on the potential effects of a specific proposal, appropriate persons with competence in the fields of illuminating engineering and environmental design should be consulted. This applies particularly to installations that are large in extent or that are otherwise of a nature which may require a formal development impact statement.

This Standard does not address the requirements which may be necessary for the lighting system to facilitate the activities for which it is designed. In this respect, for sports lighting installations, reference should be made to the appropriate Standard in the AS 2560 series.*

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.

* The Standards published in the AS 2560 series as at the date of publication of this Standard are as follows:

AS

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

CONTENTS

	<i>Page</i>
FOREWORD	4
SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE	6
1.2 APPLICATION	6
1.3 REFERENCED DOCUMENTS	7
1.4 DEFINITIONS	7
1.5 DEMONSTRATION OF COMPLIANCE	9
SECTION 2 POTENTIAL OBTRUSIVE EFFECTS AND ASSOCIATED LIGHT TECHNICAL PARAMETERS	
2.1 SCOPE OF SECTION	10
2.2 THE PURPOSES OF OUTDOOR LIGHTING	10
2.3 TOTAL ENVIRONMENTAL EFFECTS OF A DEVELOPMENT	10
2.4 POTENTIAL EFFECTS OF OUTDOOR LIGHTING	10
2.5 INFLUENCE OF SURROUNDING DEVELOPMENTS	11
2.6 SPECIFIC EFFECTS AND RELEVANT LIGHT TECHNICAL PARAMETERS	12
2.7 RECOMMENDED LIMITS FOR LIGHT TECHNICAL PARAMETERS ...	13
SECTION 3 DESIGN, INSTALLATION, OPERATION AND MAINTENANCE	
3.1 SCOPE OF SECTION	20
3.2 DESIGN OBJECTIVES	20
3.3 DESIGN GUIDELINES	21
3.4 INSTALLATION AND COMMISSIONING	25
3.5 MAINTENANCE	26
3.6 REMEDIAL MEASURES FOR EXISTING INSTALLATIONS	26
SECTION 4 COMPLIANCE WITH DESIGN OBJECTIVES	
4.1 SCOPE OF SECTION	28
4.2 STATEMENT OF OBJECTIVES	28
4.3 SUPPORTING DOCUMENTATION	28
SECTION 5 CALCULATION OF LIGHT TECHNICAL PARAMETERS	
5.1 SCOPE OF SECTION	30
5.2 DETERMINATION OF ILLUMINANCE	30
5.3 DETERMINATION OF LUMINOUS INTENSITIES	32
5.4 DETERMINATION OF THRESHOLD INCREMENT	41
SECTION 6 MEASUREMENTS OF LIGHT TECHNICAL PARAMETERS	
6.1 SCOPE OF SECTION	43
6.2 CHECK MEASUREMENTS	43
APPENDICES	
A GENERAL PRINCIPLES FOR CONTROL OF THE OBTRUSIVE EFFECTS OF OUTDOOR LIGHTING	44
B BIBLIOGRAPHY	46
C INVESTIGATIONS INTO THE OBTRUSIVE EFFECTS OF OUTDOOR LIGHTING	48
D ILLUSTRATION OF FLOODLIGHT CLASSIFICATIONS	55

FOREWORD

The content and recommendations of this Standard are based on surveys of interested parties, i.e. local government, electricity utilities and the lighting industry; on studies of people's reaction to obtrusive light; on the extent of spill light from lighting installations; and on precedents for the regulatory control of obtrusive light. Further information is provided in Appendix C.

Several aspects of potential obtrusiveness are considered, viz. the light falling on surrounding properties, the brightness of luminaires in the field of view of nearby residents, the glare to users of adjacent transport systems and the effects on astronomical observations (see Clause 2.6). For the control of these effects, the limiting values of the light technical parameters recommended in Tables 2.1 and 2.2 have been developed taking account of the following:

- (a) The level of lighting existing in the area.
- (b) The times that the proposed lighting is to operate.
- (c) The type of lighting technology available to light the activity.
- (d) The use of readily available and easily understood technical data on the lighting installations which can easily be verified at the design and assessment stages.
- (e) The data contained in the experimental survey and analytical studies into obtrusive light which are summarized in Appendix C.

These criteria have been employed to ensure that the Standard is both *credible* to the interested parties and *pragmatic* in application.

However, the data indicate that the limiting values of illuminance at windows and of the intensity of bright light sources, necessary to satisfy the large majority of people as being at all times unobtrusive, are rather low. Furthermore, these values can easily be exceeded with conventional lighting practice, especially if the area of activity being lit is large and the required light level is relatively high. Thus, the potentially conflicting requirements for dark hours activity and the maintenance of amenity and environmental integrity have to be resolved.

Therefore, two sets of limiting values are given dependent on the levels of lighting already in the area. One, with higher values, is for application before a nominated or curfew hour set by local government and one, with lower values, is for application after that hour. The majority of outdoor lighting systems likely to be subject to this Standard are expected to operate only before the curfew hour.

The less restrictive values are predicated on dark hour activity taking place whilst giving passive recipients of spill light relief from it being *excessively* obtrusive. The limiting values are based on the use of conventional lighting technology but with *good practice* being employed through the selection of appropriate lighting levels, floodlighting equipment and aiming practices.

The more restrictive values, applying after the curfew hour, are predicated on the maintenance of amenity and environmental integrity being the dominant considerations. The spill light at these times should be such that it will not be obtrusive to the large majority of recipients. To achieve this goal the need for the proposed lighting and its use during curfewed hours should be considered in the first instance. If the lighting is to operate during curfewed hours then careful attention needs to be given to the limitation of spill light, including consideration of the type of lighting system to be used, the type of floodlights (i.e. light distribution) and their specific location and aiming, and the need for the fitting of louvres, baffles or shields.

Public lighting has been excluded from this Standard because such lighting is provided to facilitate all-night safety and security for the public at large. Such lighting is normally supplied from the switched public lighting network. Requirements aimed at minimizing the obtrusive effects of public lighting are addressed in the AS/NZS 1158 series of Standards. For traffic routes, AS/NZS 1158.1.1* has introduced the upward waste light ratio (*UWLR*) as a parameter to control the amount of light emitted in directions above the luminaires.

Internally illuminated signs often require the evaluation of additional factors such as colour, movement and cyclic operation. Hence, it was decided to defer consideration of appropriate guidelines until a later time.

The obtrusive effects of brightly lit surfaces, e.g. floodlit buildings and externally lit advertising signs, are not addressed in this Standard but may be the subject of future consideration. However, the Standards covers the obtrusive effects produced indirectly by these forms of lighting, in terms of the parameters specified in Section 2.

Lighting installations that are designed for colour television broadcasting have been excluded from the Standard for the following reasons:

- (i) They normally require preparation of a formal environmental impact statement which will include consideration of the effects of any lighting.
- (ii) Specialist lighting consultants are usually employed in the design of such installations.
- (iii) High values of vertical illuminance are required for camera operation which will necessitate special consideration for their control.

Visual intrusion caused by the daytime appearance of outdoor lighting systems, including associated support structures, is not addressed in this Standard. Whilst the subject is important, the issues involved are of more general application involving aesthetics and environmental design.

* As at the date of issue of this Standard, the following Standards have been issued in the AS/NZS 1158 series:

AS/NZS

- 1158 Road lighting
- 1158.0 Part 0: Introduction
- 1158.1.1 Part 1.1: Vehicular traffic (Category V) lighting—Performance and installation design requirements
- 1158.1.3 Part 1.3: Vehicular traffic (Category V) lighting—Guide to design, installation, operation and maintenance

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STANDARDS AUSTRALIA

Australian Standard**Control of the obtrusive effects of outdoor lighting**

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard sets out guidelines for the control of the obtrusive effects of outdoor lighting except for those applications specifically excluded below. It includes recommended limits for the relevant lighting parameters to control these effects. As the obtrusive effects of outdoor lighting are best controlled by appropriate design, the guidance given is primarily applicable to new installations; however, some advice is also provided on remedial measures that may be taken for existing installations.

This Standard specifically refers to the potentially adverse effects of outdoor lighting on nearby residents (e.g. of dwellings such as houses, hotels, hospitals), users of adjacent roads (e.g. vehicle drivers, pedestrians, cyclists) and transport signalling systems (e.g. air, marine, rail), and on astronomical observations.

This Standard does not apply to—

- (a) public lighting, as defined in Clause 1.4.10;
- (b) internally illuminated advertising signs;
- (c) the obtrusive effects of brightly lit surfaces, e.g. floodlit buildings, and externally lit advertising signs;
- (d) lighting systems which are installed for the purposes of colour television broadcasting;
- (e) lighting systems which are of a cyclic or flashing nature; and
- (f) environmental impacts associated with the daytime appearance of outdoor lighting systems, including their support structures.

Notwithstanding Item (c) above, whilst this Standard does not cover the obtrusive effects of the bright objects themselves, it does apply to any indirect effects produced in terms of the light technical parameters of Table 2.1.

NOTES:

- 1 Some lighting installations may require, in terms of planning ordinances, the preparation of an environmental impact statement as a prerequisite for obtaining development approval.
- 2 See the Foreword for further information on the specific exclusions outlined above.
- 3 Appendix A sets out general principles that should be applied in the design of outdoor lighting for the control of obtrusive effects.

1.2 APPLICATION This Standard is intended for reference by the following:

- (a) Planning bodies, particularly local government authorities, to assist in assessing the potential obtrusiveness of outdoor lighting installations.
- (b) Designers of outdoor lighting as an aid to producing lighting systems that control obtrusive effects to an acceptable degree.



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