Australian Standard®

# Interior lighting

# Part 1: General principles and recommendations

This Australian Standard was prepared by Committee LG/1, Interior Lighting. It was approved on behalf of the Council of Standards Australia on 23 April 1990 and published on 16 July 1990.

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The following interests are represented on Committee LG/1:

Australian Electrical and Electronic Manufacturers Association
Australian Optometrical Association
Building Owners and Managers Association of Australia
Confederation of Australian Industry
Department of Administrative Services—Australian Construction Services
Electricity Supply Association of Australia
Illuminating Engineering Societies of Australia
Ministry of Housing and Construction, Vic.
Public Works Department, N.S.W.
Royal Australian Institute of Architects
The Association of Consulting Engineers Australia
The Australian Chamber of Commerce
The WorkCover Authority, N.S.W.
University of Sydney

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# Part 1: General principles and recommendations

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# PREFACE

This Standard was prepared by the Standards Australia Committee on Interior Lighting. It comprises Part 1 of a series of Standards which together supersede AS 1680—1976, *Interior Lighting and the Visual Environment.*

When complete the series will comprise the following:

| AS | | |
|---|---|---|
| 1680 | *Interior Lighting* | |
| 1680.1 | Part 1: | *General principles and recommendations* (This Standard) |
| 1680.2 | Part 2: | (This will comprise a series of separate Standards covering specific interiors and activities) |
| 1680.3 | Part 3: | *Measurement, calculation and presentation of photometric data* |

In the preparation of this Standard particular reference was made to the following publications:

*CIBS Code for Interior Lighting,* Chartered Institution of Building Services Engineers, London, 1984.

CIE Publication No 29.2, *Guide on Interior Lighting,* International Commission on Illumination, Vienna, 1986.

Grateful acknowledgement is made of the assistance derived from these sources.

The following are some of the more significant changes which have been made in comparison with AS 1680—1976:

(a) The specification of lighting levels in terms of ‘maintenance illuminance’ rather than ‘service illuminance’. This will facilitate assessment of compliance with the Standard at any time during the life of a lighting system. (See Clause 3.3.4 and Appendix D.)

(b) Provision for a more comprehensive assessment of glare from electric lighting in terms of a calculated glare index for the interior. This is an alternative to the luminaire selection procedure (in terms of luminance limits and cut-off angles) similar to that specified in AS 1680—1976. (See Clause 8.4.)

(c) A significant expansion of advice provided on the daylighting of buildings, including the integration of daylight and electric light, and on the effective use of energy. (See Clauses 10.2, 10.6 and 10.7.)

(d) More detailed advice is given on light sources, luminaires and lighting control systems and factors which influence the choice of lighting system for a given application.

(e) Inclusion of other useful advice and information for reference in the design, installation, operation and maintenance of interior lighting.

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# FOREWORD

This Standard sets out basic recommendations for the creation of good seeing conditions in buildings by means of appropriate lighting and interior colour treatment. The aim of the recommendations is to create a visual environment in which essential task detail is made easy to see and adverse factors which may cause visual fatigue are either excluded or appropriately controlled. Satisfaction of these objectives is of importance in promoting efficiency and well-being in workplaces, and cannot be achieved merely by supplying some specified quantity of light on the work.

While the provision of sufficient illuminance on the task is a necessary element, in many instances task visibility depends more on the way in which the light is applied. Furthermore, creation of the comfortable visual conditions which people require in order to maintain efficiency throughout the whole work period depends less on the quantity of light than on factors such as the distribution of light throughout the workplace; the use of suitable finishes on the walls, ceiling and equipment; the choice of luminaires with adequate glare control; the elimination of unwanted reflections; and so on.

Attention to all of these factors produces ‘good quality lighting’. Experience has shown that when inefficiency, eye fatigue, spoilt work or accidents are blamed on the lighting system, failure to meet one or more of the ‘quality’ recommendations is usually the true cause of the trouble. Even in cases where the illuminance is apparently too low, this is seldom the sole reason for the complaint.

The committee is of the view that the greatest scope for increased productivity lies with improvement in lighting quality rather than in the provision of higher illuminances.

The Standard is primarily intended for reference by those professionally concerned with interior lighting practice. It does not purport to specify the precise types and arrangements of lighting equipment necessary to meet the recommendations: the technical knowledge and experience of a qualified illuminating engineer will normally be required for designing the lighting system best suited to any particular interior.

STANDARDS AUSTRALIA

# Australian Standard
# Interior lighting

## Part 1: General principles and recommendations

## SECTION 1 SCOPE AND GENERAL

**1.1 SCOPE** This Standard sets out general principles and recommendations for the lighting of interiors of buildings. It applies primarily to interiors in which work is undertaken and takes into account both electric lighting and daylight. The recommendations have the object of producing a visual environment in which essential task details are made easy to see and adverse factors which may cause visual discomfort are either excluded or appropriately controlled.

Recommendations for the lighting of particular interiors or activities are provided in the Standards which comprise AS 1680.2.

The Standard does not deal with lighting for the purposes of decoration, display, entertainment or sport.

NOTE: Attention is drawn to AS 2293.1 and AS 2293.2 which set out requirements for the lighting necessary to alleviate panic and to permit safe evacuation of the building occupants should this be required in the event of loss of the normal lighting.

**1.2 APPLICATION**

**1.2.1 Date of application** This Standard is intended to apply to lighting systems, or alterations or additions thereto, which are installed after the date of publication. However, it is recommended that the Standard not be applied on a mandatory basis, e.g. in contracts, before 14 January 1991.

**1.2.2 Information needed for application** In order that this Standard may be properly applied the functional requirements of the building and the relevant structural and working conditions need to be clearly established.

Information required as a basis for lighting design includes the following:

(a) Function of building (e.g. factory, office, school).

(b) Nature of visual tasks.

(c) Room dimensions and structural features, including the size and location of windows and rooflights.

(d) Reflecting properties and colour of interior surfaces.

(e) Nature and layout of equipment (e.g. furniture, machinery).

(f) Atmospheric conditions (affecting light absorption and luminaire maintenance).

(g) Maintenance facilities and practices.

NOTE: Where any of the above information is not known at the time of design, appropriate assumptions should be made in consultation with the client. These assumptions should be stated in the design documentation.

Early consultation between architect and lighting engineer is desirable, especially for new buildings, so that the lighting equipment (and associated wiring) can be designed to meet the visual requirements of occupants and can be integrated with the structural and functional design. A completely satisfactory lighting system is often difficult to achieve when limited by unalterable structural features and services.

**1.3 REFERENCED DOCUMENTS** The documents referred to in this Standard are listed in Appendix A.

See also Appendix E for bibliographical details of the sources of information referenced in the text, i.e. Ref. 1 to Ref. 9.

**1.4 DEFINITIONS** For the purpose of this Standard, the definitions given in AS 2633, AS 3665 and those below apply.

NOTE: AS 3665 gives simplified definitions for some of the basic lighting terms and quantities used in this Standard. For the more precise primary definitions, see AS 1852(845).

**1.4.1 Average illuminance (within a room)** — the mean of the illuminances within the room, either calculated or measured as follows:

(a) *From illuminance calculations* Where there is a uniform array of luminaires, the average illuminance is calculated over the plan area of the room excluding section within 0.6 m of the walls, except where the lumen method of calculation is used in which case the average illuminance is determined in accordance with Appendix C.

(b) *From illuminance measurements* Th average illuminance is determined in accordance with Appendix B.

**1.4.2 Average illuminance (over a task area)** — the mean of the illuminances, calculated or measured, within the task area.

NOTE: See Appendix B for the method of measurement.

# AS 1680.1-1990 Interior lighting - General principles and recommendations