

Australian Standard[®]

Interior lighting

Part 2.3: Educational and training facilities

This Australian Standard was prepared by Committee LG/1, Interior Lighting. It was approved on behalf of the Council of Standards Australia on 28 October 1993 and published on 17 January 1994.

The following interests are represented on Committee LG/1:

Australian Chamber of Commerce and Industry
Australian Electrical and Electronic Manufacturers Association
Building Owners and Managers Association of Australia
Department of Arts and Administrative services—Australian Construction Services
Electricity Supply Association of Australia
Illuminating Engineering Society of Australia and New Zealand
The Association of Consulting Engineers Australia
University of Sydney
WorkCover Authority of New South Wales

Review of Australian Standards. To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standard users ensure that they are in possession of the latest edition, and any amendments thereto.

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications, this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

This Standard was issued in draft form for comment as DR 93057.

Australian Standard[®]

Interior lighting

Part 2.3: Educational and training facilities

First published as part of AS (E) CA501—1942.
Revised and redesignated AS CA30—1957.
Second edition 1965.
Revised and redesignated AS 1680—1976.
AS 1680—revised and redesignated in part as
AS 168022.0—1990.
AS 1680.2.0—revised in part and redesignated
AS 1680.2.3—1994.

PREFACE

This Standard was prepared by the Standards Australia Committee on Interior Lighting to supersede the recommendations given in Table 3 of AS 1680.2.0—1990*. It forms part of the AS 1680.2 series and has been developed to provide specific advice on the lighting of educational and training facilities.

The Standard is intended to be read in conjunction with the general recommendations of AS 1680.1* and with other specific recommendations in the AS 1680.2 series which may apply depending on the nature of the building or the visual tasks involved. It is anticipated that the AS 1680.2 series will, when complete, comprise separate Standards covering specific recommendations for the following:

- (a) Circulation spaces and other general areas (see AS 1680.2.1*)
- (b) Offices and screen-based tasks (see AS 1680.2.2*)
- (c) Educational and training facilities (this Standard—AS 1680.2.3*)
- (d) Industrial buildings and processes.
- (e) Hospitals and medical premises.

This Standard maintains a parallelism with the structure of AS 1680.1 and contains recommendations that either add to or amend the recommendations of that Standard. While the Sections of this Standard correspond with those of AS 1680.1, the Clauses within each Section are numbered consecutively and do not directly relate to the Clauses in AS 1680.1.

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

ANSI/IES RP3 *Guide for educational facilities lighting*, Illuminating Engineering Society of North America, New York, 1988.

CIBSE 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 acknowledgment is made of the assistance derived from these sources.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

* AS

1680	Interior lighting
1680.1	Part 1: General principles and recommendations
1680.2.0	Part 2.0: Recommendations for specific tasks and interiors
1680.2.1	Part 2.1: Circulation spaces and other general areas
1680.2.2	Part 2.2: Office and screen-based tasks
1680.2.3	Part 2.3: Educational and training facilities

CONTENTS

	<i>Page</i>
FOREWORD	5
SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE	6
1.2 APPLICATION	6
1.3 REFERENCED DOCUMENTS	6
1.4 DEFINITIONS	7
SECTION 2 GENERAL REQUIREMENTS FOR GOOD LIGHTING	
2.1 SPECIAL CONSIDERATIONS	
SECTION 3 TASK VISIBILITY	
3.1 SPECIAL CONSIDERATIONS FOR VERY YOUNG OBSERVERS	9
3.2 DIVERSITY OF TASKS	9
3.3 NEED FOR FLEXIBILITY	9
3.4 SPECIAL CONSIDERATION FOR THE VISUALLY IMPAIRED	9
3.5 SPECIAL CONSIDERATION FOR SCREEN-BASED TASKS	9
3.6 SPECIAL CONSIDERATIONS FOR OVERHEAD PROJECTION TASKS	10
3.7 SPECIAL CONSIDERATIONS FOR VIDEO PROJECTION TASKS	10
3.8 SPECIAL CONSIDERATIONS FOR VIDEO MONITOR TASKS	10
3.9 SPECIAL CONSIDERATIONS FOR SLIDE AND OVERHEAD PROJECTION	10
3.10 SPECIAL CONSIDERATIONS FOR VERY SMALL TASKS	10
3.11 RECOMMENDED ILLUMINANCE	11
SECTION 4 DIRECTIONAL EFFECTS OF LIGHTING	12
SECTION 5 UNWANTED REFLECTIONS	
5.1 SPECIAL ADVICE ON SCREEN-BASED TASKS	12
SECTION 6 SURFACES	
6.1 SPECIAL CONSIDERATIONS FOR SCREEN-BASED TASKS	12
6.2 SPECIAL CONSIDERATIONS FOR SINGLE-SIDE LIT CLASSROOMS	12
6.3 SPECIAL CONSIDERATIONS FOR LECTURE ROOMS	12
SECTION 7 LIGHT SOURCE COLOUR	
7.1 LAMP COLOUR APPEARANCE AND COLOUR RENDERING PROPERTIES	13
SECTION 8 GLARE AND RELATED EFFECTS	
8.1 MAXIMUM GLARE INDEX VALUES	13
SECTION 9 LIGHT SOURCES, LUMINARIES AND CONTROL SYSTEMS	
9.1 SELECTION OF LIGHTING EQUIPMENT	13

SECTION 10 LIGHTING SYSTEMS	
10.1	SPECIAL CONSIDERATIONS FOR SCREEN-BASED TASKS 14
10.2	DIVERSITY OF TASKS 14
10.3	INTEGRATION OF DAYLIGHT AND ELECTRIC LIGHT 14
10.4	GENERAL PURPOSE CLASSROOMS 14
10.5	ART ROOMS 14
10.6	CLASSROOMS FOR THE VISUALLY IMPAIRED 15
10.7	CLASSROOMS FOR THE HEARING IMPAIRED 15
10.8	DRAFTING ROOMS 15
10.9	LABORATORIES 15
10.10	SEWING ROOMS 15
10.11	INDUSTRIAL ARTS AND CRAFTS WORKSHOPS 15
10.12	COMPUTER TRAINING ROOMS 15
10.13	LECTURE THEATRES 16
10.14	AUDITORIUMS AND GENERAL PURPOSE HALLS 17
10.15	VIDEO CONFERENCING ROOMS 18
10.16	CORRIDORS AND STAIRS 18
10.17	FOOD SERVICE FACILITIES 18
10.18	LIBRARIES AND LEARNING RESOURCE CENTRES 19
10.19	FIRST AID FACILITIES 19
10.20	OFFICES 19
10.21	PHYSICAL EDUCATION SPACES 19
10.22	SAFETY LIGHTING 19
SECTION 11 LIGHTING DESIGN PROCEDURE 20	
SECTION 12 MAINTENANCE OF LIGHTING SYSTEMS AND EQUIPMENT 20	
APPENDICES	
A	LIST OF REFERENCED DOCUMENTS 21
B	MEASUREMENT OF ILLUMINANCE 21
C	NOTES ON THE USE OF UTILIZATION FACTOR TABLES BY THE LIGHTING DESIGNER 21
D	NOTES ON CHANGES TO ILLUMINANCE RECOMMENDATIONS 21
E	SPECIFIC RECOMMENDATIONS FOR EDUCATIONAL FACILITIES 22
F	BIBLIOGRAPHICAL REFERENCES 28

FOREWORD

This Standard sets out recommendations for the creation of good seeing conditions in educational and training facilities by means of appropriate lighting and interior colour treatment. The aim of the recommendations is to create a visual environment in which essential task details are made easy to see and adverse features which may cause visual fatigue are either excluded or appropriately controlled.

While the provision of sufficient illuminance on the task is necessary in many instances task visibility depends more on the way in which the light is applied. Furthermore, the creation of the comfortable visual conditions required 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 luminaries with adequate glare control; and the elimination of unwanted reflections.

The Committee is of the view that the greatest scope for better lighting in educational and training facilities lies with improvements 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 in educational and training facilities. It does not purport to specify the precise types and arrangements of light equipment necessary to meet the recommendations; the technical knowledge and experience of a qualified lighting engineer will normally be required for designing the lighting systems best suited to any particular interior.

An effort has been made to write a Standard that can be readily understood and used by those interested in the problems of lighting educational and training facilities, even though they may not be engineers or architects. Detailed technical knowledge is available in the bibliographic literature and some can be found in the references.

This is not a code to be followed rigidly, allowing no room for individual choice. It is a Standard that indicates paths to be followed and gives reasons for the advisability of following them. In some cases, it mentions limits within which lighting systems should be kept. Within these limits designers and engineers have great latitude in creating energy efficient and pleasing lighting designs.

© Copyright — STANDARDS AUSTRALIA

Users of Standards are reminded that copyright subsists in all Standards Australia publications and software. Except where the Copyright Act allows and except where provided for below no publications or software produced by Standards Australia may be reproduced or stored in a retrieval system in any form or transmitted by any means without prior permission in writing from Standards Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the head office of Standards Australia.

Standards Australia will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to Standards Australia.

Standards Australia will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by Standards Australia at any time.

STANDARDS AUSTRALIA

Australian Standard
Interior lighting

Part 2.3: Educational and training facilities

SECTION 1 SCOPE AND GENERAL

This Section of AS 1680.1 applies except as follows:

1.1 SCOPE This Standard sets out recommendations for the lighting of educational and training facilities. It is intended to be read in conjunction with the general recommendations of AS 1680.1 and with any applicable specific recommendations in the AS 1680.2 series.

NOTE: Separate Standards covering the lighting of specific tasks and interiors will progressively be issued to form the AS 1680.2 series (see Preface).

This Standard, in general, contains material that adds to or amends the recommendations in AS 1680.1. The use of this Standard without reference to AS 1680.1 is a misapplication of the Standard.

1.2 APPLICATION The lighting system should comply with the general recommendations of AS 1680.1 and with the applicable recommendations of this Standard and other appropriate Standards in the AS 1680.2 series.

If any recommendation in this Standard differs from the general recommendations of AS 1680.1, the recommendation in this Standard should prevail.

Attention should be paid to Section 1 of AS 1680.1 with regard to the information that may be needed to correctly apply this Standard.

1.3 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS	
1318	SAA Industrial Safety Colour Code
1485	Safety and health in workrooms of educational establishments
1680	Interior lighting
1680.1	Part 1: General principles and recommendations
1680.2.1	Part 2.1: Circulation spaces and other general areas
1680.2.2	Part 2.2: Office and screen-based tasks
2295	Emergency evacuation lighting in buildings
2295.1	Part 1: Design and installation
2560	Guide to sports lighting
2560.2.2	Part 2.2: Lighting of multipurpose indoor sports centres
AUBRCC	
BCA	Building Code of Australia