Australian/New Zealand Standard™

Interior lighting

Part 4: Maintenance of electric lighting systems

Standards Australia

STANDARDS NEW ZEALAND

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee LG-001, Interior Lighting. It was approved on behalf of the Council of Standards Australia on 3 November 2000 and on behalf of the Council of Standards New Zealand on 9 March 2001. It was published on 5 April 2001.

The following interests are represented on Committee LG-001:

Association of Consulting Engineers Australia
Australian Building Codes Board
Australian Chamber of Commerce and Industry
Australian Electrical and Electronic Manufacturers Association
Energy Efficiency & Conservation Authority of New Zealand
Illuminating Engineering Society of Australia and New Zealand
Institution of Engineers Australia
Ministry of Economic Development, New Zealand
N.S.W. Department of Public Works and Services
Property Council of Australia
University of Sydney
WorkCover New South Wales

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Australia web site at www.standards.com.au or Standards New Zealand web site at www.standards.co.nz and looking up the relevant Standard in the on-line catalogue.

Alternatively, both organizations publish an annual printed Catalogue with full details of all current Standards. For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia International or Standards New Zealand at the address shown on the back cover.

Australian/New Zealand Standard™

Interior lighting

Part 4: Maintenance of electric lighting systems

First published as AS/NZS 1680.4:2001.

Jointly published by Standards Australia International Ltd, GPO Box 5420, Sydney, NSW 2001 and Standards New Zealand, Private Bag 2439, Wellington 6020

ISBN 0 7337 3717 X

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee LG-001, Interior Lighting. It is closely based on CIE Publication No. 97 (1992), *Maintenance of indoor electric lighting systems*, issued by the International Commission on Illumination.

This Standard forms Part 4 of the AS/NZS 1680 series, which will progressively replace the AS 1680 series.

At the date of publication of this Standard, the following Standards were available in the AS 1680 and AS/NZS 1680 series:

AS/NZS 1680	Interior lighting	
AS 1680.1	Part 1:	General principles and recommendations
AS 1680.2.0	Part 2.0:	Recommendations for specific tasks and interiors
AS 1680.2.1	Part 2.1:	Circulation spaces and other general areas
AS 1680.2.2	Part 2.2:	Office and screen-based tasks
AS 1680.2.3	Part 2.3:	Educational and training facilities
AS 1680.3	Part 3:	Measurement, calculation and presentation of photometric data.
AS/NZS 1680.0	Part 0:	Safe movement
AS/NZS 1680.2.4	Part 2.4:	Industrial tasks and processes
AS/NZS 1680.2.5	Part 2.5:	Hospital and medical tasks
AS/NZS 1680.4	Part 4:	Maintenance of electric lighting systems (this Standard)

This Standard contains the detailed information required to establish the intended maintenance regime of an installation during the design phase plus recommendations regarding maintenance techniques. It is an important support document to the other Standards in the AS and AS/NZS 1680 series and is relevant to all forms of exterior lighting, such as streetlighting, and sports floodlighting.

This Standard is supplementary to and should be read in conjunction with the general recommendations of AS 1680.1.

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.

Statements expressed in mandatory terms in notes to tables and figures are deemed to be requirements of this Standard.

CONTENTS

FOREWORD

The illuminance initially provided by a lighting system will decrease gradually throughout the life of the system. Several terms to describe the factor that accounts for this reduction have been used. In the current AS 1852 (identical with IEC 60050) *International electrotechnical vocabulary* Part 845: *Lighting* the term 'light loss factor' is given with 'maintenance factor' shown as obsolete and the term 'light loss factor' is currently used in parts of AS 1680. However for the purposes of this Standard it has been decided to retain the term 'maintenance factor' as this is the more commonly used and understood term. The meaning of this term is the same as that given for 'light loss factor' in the International Lighting Vocabulary, i.e.:

> 'Ratio of the average illuminance on the working plane after a certain period of use of a lighting installation to the average illuminance obtained under the same conditions for the installation considered conventionally as new.
>
> NOTES:
>
> 1 The term 'depreciation factor' has formerly been used to designate the reciprocal of the above ratio.
>
> 2 The light losses take into account dirt accumulation on luminaire and room surfaces and lamp depreciation.'

with the additional condition that the 'certain period' is chosen to be the maintenance interval.

The recommended illuminance for lighting design is now termed 'maintained illuminance', which is the average illuminance at the end of the 'certain period' of the above definition, (i.e. at the end of the cleaning interval) when maintenance has to be carried out.

NOTE: Maintained illuminance is identical to the term 'maintenance illuminance' used in some Parts of AS 1680.

Lighting systems have different maintenance characteristics and this should be one of the important assessments made in the early stages of project design.

This Standard discusses the various influencing factors and gives data based on practical solutions that enable the maintenance factor for types of systems, buildings and locations to be derived. The derived maintenance factor should be applied to all formulae used for lighting scheme calculations, such as illuminance and luminance on areas or at points. Methods for estimating economic maintenance periods and advice on cleaning techniques are also given.

The Standard also provides a limited selection of typical data to allow the calculation methods to be explained. However, to take advantage of the continuing development of lighting products, up-to-date data should be obtained from manufacturers.

A bibliography contains a short list of publications used as the basis for this Standard. Further information may be obtained from these documents.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard
Interior lighting

Part 4: Maintenance of electric lighting systems

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard describes the causes of light loss in indoor electric lighting systems, from environmental, operating and age related conditions, and recommends procedures for estimating maintenance factors for use in design calculations. The Standard also provides information to assist in the maintenance and servicing of the lighting systems and equipment.

This Standard is supplementary to and should be read in conjunction with the general recommendations of AS 1680.1.

NOTE: See Appendix A for details of the publications used as a basis for this Standard.

1.2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS	
1680	Interior lighting
1680.1	Part 1: General principles and recommendations
1939	Degrees of protection provided by enclosures for electrical equipment (IP Code)

1.3 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

1.3.1 Cleaning agent

Material used to aid the removal of dirt.

1.3.2 Discharge lamp

A lamp in which the light is produced, directly or indirectly, by an electric discharge through a gas, a metal vapour or a mixture of several gases and vapours.

NOTE: The various forms of fluorescent lamp are types of discharge lamp.

1.3.3 Group replacement (lamps)

Replacement of a large number of lamps at one chosen time in a lighting system.

1.3.4 Incandescent lamp

A lamp in which light is produced by means of an element heated to incandescence by the passage of an electric current.

NOTE: Tungsten filament lamps and tungsten halogen lamps are forms of incandescent lamps.