AS/NZS 1680.4:2017

Australian/New Zealand Standard™

# Interior and workplace lighting

# Part 4: Maintenance of electric lighting systems



STANDARDS Australia

STANDARDS NEW ZEALAND PAEREWA AOTEAROA

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee LG-001, Interior and Workplace Lighting. It was approved on behalf of the Council of Standards Australia on 10 May 2017 and by the New Zealand Standards Approval Board on 7 June 2017.
This Standard was published on 30 June 2017.

---

The following are represented on Committee LG-001:

Australian Building Codes Board
CIE Australia
Energy Efficiency and Conservation Authority of New Zealand
Engineers Australia
IES: The Lighting Society
Lighting Council Australia
Lighting Council New Zealand
Property Council of Australia
University of Sydney

---

## 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 Standards may also be withdrawn.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 Web Shop at www.saiglobal.com or Standards New Zealand web site at www.standards.govt.nz and looking up the relevant Standard in the on-line catalogue.

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 Standards Australia or the New Zealand Standards Executive at the address shown on the back cover.

---

*This Standard was issued in draft form for comment as DR AS/NZS 1680.4:2016.*

Australian/New Zealand Standard™

# Interior and workplace lighting

# Part 4: Maintenance of electric lighting systems

Originally as AS/NZS 1680.4:2001.
Second edition 2017.



Jointly published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001 and by Standards New Zealand, PO Box 1473, Wellington 6140.

ISBN 978 1 76035 843 3

# PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee LG-001, Interior and Workplace Lighting, to supersede AS/NZS 1680.4:2001.

This Standard forms Part 4 of the AS/NZS 1680 series.

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

| AS(/NZS) | | |
|---|---|---|
| 1680 | Interior lighting | |
| 1680.0 | Part 0: | Safe movement |
| 1680.1 | Part 1: | General principles and recommendations |
| 1680.2.1 | Part 2.1: | Specific applications—Circulation spaces and other general areas |
| 1680.2.2 | Part 2.2: | Specific applications—Office and screen-based tasks |
| 1680.2.3 | Part 2.3: | Specific applications—Educational and training facilities |
| 1680.2.4 | Part 2.4: | Industrial tasks and processes |
| 1680.2.5 | Part 2.5: | Hospital and medical tasks |
| 1680.3 | Part 3: | Measurement, calculation and presentation of photometric data |
| 1680.4 | Part 4: | Maintenance of electric lighting systems (this Standard) |
| 1680.5 | Part 5: | Outdoor workplace lighting |

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/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/NZS 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.

CONTENTS

*Page*

# 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 edition of 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 the AS/NZS 1680 series. 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 light source depreciation.'

However, these is 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: The term 'maintained illuminance' is identical to the term 'maintenance illuminance' used in some parts of the AS/NZS 1680 series.

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.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

# Australian/New Zealand Standard
# Interior and workplace 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/NZS 1680.1.

### 1.2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

NOTE: See Appendix A for related documents containing further information.

AS
60529 Degrees of protection provided by enclosures (IP Code)

AS/NZS
1680 Interior and workplace lighting
1680.1 Part 1: General principles and recommendations

### 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. (Not usually applicable to LEDs.)

#### 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.