

6.5 Artificial and display lighting

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standard

6.5

mandatory

Every *building* must be designed and *constructed* in such a way that the artificial or display lighting installed is energy efficient and is capable of being controlled to achieve optimum energy efficiency.

Limitation:

This standard does not apply to:

- (a) process and emergency lighting components in a *building*; or
- (b) alterations in *dwellings*.

6.5.0 Introduction

Artificial and display lighting can account for a substantial proportion of the electricity used within a *building*. Appropriate lighting design (including use of natural daylight) can not only reduce CO₂ emissions and associated running costs, but also reduce internal heat gains and lessen any need for mechanical cooling.

There are issues which go beyond the guidance that designers may wish to consider:

- when designing a lighting system consideration should be given to the advances in lighting technology, particularly with light emitting diodes technology (LED); and
- the system design should accommodate future upgrading with minimal disruption to the *building* fabric and services.

In regard to this standard:

- **Lamp Lumens** means the sum of the average initial (100 hour) lumen output of all the lamps in a luminaire.
- **Circuit-watt** is the power consumed in lighting circuits by lamps and, where applicable, their associated control gear (including transformers and drivers) and power factor correction equipment.
- **Lamps lumen per circuit-watt** is the total lamp lumens summed for all luminaires in the relevant areas of the *building*, divided by the total circuit-watts for all the luminaires.
- **LOR** is the light output ratio of the luminaire, which means the ratio of the total light output of the luminaire under the stated practical conditions to that of the lamp or lamps contained in the luminaire under reference conditions.
- **Luminaire lumens per circuit-watt** is the (lamp lumens x LOR) summed for all the luminaries.

Improving energy performance of existing *buildings*

The 2010 standards introduce a requirement to assess and improve the energy performance of an existing *building*. This is achieved through improvement of existing fixed *building* services to meet current standards. Where *building work* involving such services is carried out, guidance on the application of this requirement is noted under clause 6.5.4, with further explanation within annex 6.G.

Conversions

In the case of conversions, as specified in regulation 4, the *building* as *converted* shall meet the requirements of this standard in so far as is *reasonably practicable*, and in no case be worse than before the *conversion* (regulation 12, schedule 6).

6.5.1 Artificial lighting efficiency

A *building* with a floor area of more than 50 m² and installed with artificial lighting should have general purpose artificial lighting systems which are designed to meet the minimum standards for efficiency (averaged over the whole area of the applicable type of space in the *building*), as identified in the table below.

It is not necessary for this to be applied to either emergency lighting (see section 2 Fire) or specialist process lighting which is intended to illuminate specialist tasks within a space, rather than the space itself. Examples of specialist process lighting are, theatre spotlights, lighting used for the recording process in TV studios and lighting in *hospital* operating theatres.

Minimum lighting efficacy in buildings

Lighting type	Average Initial Efficacy
General Lighting in <i>office</i> , industrial and storage areas	Not less than 55 luminaire lumens per circuit-watt
General Lighting in other types of space	Not less than 55 lamp lumens per circuit-watt

Efficiency of not less than 55 luminaire lumens per circuit-watt for installations in existing *buildings*. When calculating the average luminaire lumens per circuit-watt, the circuit-watts for each luminaire may first be multiplied by the control factors in the table below:

Light output control	Control Factor
a. Luminaire in a daylight space, light output controlled by photoelectric switching or dimming control, with or without override	0.9
b. Luminaire in a space likely to be unoccupied most of the time, where a sensor switches off the lighting in the absence of occupants but switching on is done manually except where this would be unsafe	0.9
c. Circumstances a and b combined	0.85
d. None of the above	1.0

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The lighting design should be completed in accordance with the guidance given in the Society of Light and Lighting (CIBSE) [Code for Lighting 2009](#), and BRE Non Domestic Lighting [GBG 61](#) Part 3. The Simplified Building Energy Model (SBEM) calculation tool will take account of carbon dioxide emissions attributed to the design and this will encourage energy efficient lighting systems.

6.5.2 Display lighting efficiency

A display lighting system installed in a *building* with a floor area of more than 50 m² should be designed to be energy efficient.

Display lighting is artificial lighting that:

- highlights a merchandising display (e.g. in retail premises);
- highlights an exhibit (e.g. in a museum or art gallery); or
- is used in spaces intended for public entertainment (e.g. dance halls, auditoria and cinemas), but excludes any specialist process lighting within the space.

Due to the nature and purpose of display lighting, it is often not possible to achieve the levels of energy efficiency that can be reached with general purpose artificial lighting. Display lighting installations will be considered energy efficient where:

- a. the installed lighting capacity comprises lighting fittings with lamps having an average initial (100 hour) efficacy of not less than 22 lamp lumens per circuit watt; or
- b. at least 95% of the display lighting capacity in circuit Watts (i.e. the power consumed by lamps, their associated control gear and power factor correction equipment) is provided by lighting fittings with an efficacy not less than 22 lamp lumens per circuit watt.

6.5.3 Controls for artificial and display lighting

Every artificial lighting system in a *building* that has a floor area of more than 50 m² should have controls which encourage the maximum use of daylight and minimise the use of artificial lighting during the times when *rooms* or spaces are unoccupied. It is not necessary for this to apply to either emergency lighting (see section 2 Fire) or specialist process lighting (see clause 6.5.1 above).

Controls for general and display lighting

Space Classification	Control Type
Owned (small <i>room</i> for one or two people who control the lighting)	Manual, by door
Shared (multi-occupied area, e.g. an open-plan <i>office</i> or factory production area)	Flexible manual switching, e.g. pull cords or wireless transmitter
Temporarily owned (where people are expected to operate the lighting controls while they are there, e.g. a hotel <i>room</i> or meeting <i>room</i>)	All types and ratings
Occasionally visited (used for short period of time, e.g. store <i>room</i> or toilet)	Presence or absence detection (avoid use where this may cause a hazard or inconvenience, e.g. in an accessible <i>toilet</i>), manual control
Unowned (where individual users require lighting but are not expected to operate controls, e.g. a corridor or atrium)	a. time switching; b. presence or absence detection; or c. photoelectric switching or dimming (if daylight space)
Managed (where lighting is under the control of a responsible person, e.g. a hotel lounge, restaurant or <i>shop</i>)	a. time switching; b. centralised manual switching; or c. photoelectric switching or dimming (if daylight space)

Notes:

1. These definitions are discussed in more detail in BRE information Paper [IP6/96](#) 'People and lighting controls' and BRE Digest [498](#) 'Selecting lighting controls'.

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Display lighting
controls

Another way that can be considered as achieving the objectives of the standard for general artificial lighting is to install switching in accordance with the advice and guidance given in the Society of Light and Lighting (CIBSE) Code for Lighting 2009 and BRE Non Domestic Lighting GBG 61 Part 3.

When considering energy efficient switching for display lighting, dedicated circuits should be provided, that can be switched off at times when people will not be inspecting exhibits or merchandise or occupying the spaces used for public entertainment. In a retail store, for example, this could be achieved by timers to switch off the display lighting outwith opening hours, or possibly at a later time of the day for displays which are intended to be viewed from outside the *building*.

6.5.4 Work on existing buildings

Where an entirely new or replacement lighting system is being installed as part of an alteration, extension or *conversion* refer to the guidance in previous clauses.

If a lighting system is being replaced in part, or being extended, the guidance in previous clauses should also be followed and the existing system improved to meet current standards. Guidance on the extent to which improvement should be made is given in annex 6.G – ‘Improvement to the energy performance of existing *building* services when carrying out *building work*’.