

ICS 91.160.01

English Version

## Light and lighting - Lighting system design process

Lumière et éclairage - Méthode de conception d'un système d'éclairage

Licht und Beleuchtung - Planungsprozess für Beleuchtungssysteme

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## European foreword

This document (CEN/TS 17165:2018) has been prepared by Technical Committee CEN/TC 169 “Light and lighting”, the secretariat of which is held by DIN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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## Introduction

Light allows us to see visual tasks and their surrounding area effectively and efficiently in comfort, safety and security, in all conditions. Furthermore light affects our circadian rhythms, mood, improves our performance and well-being. A good lighting design will deliver light where and when it is required at the right level, direction and quality over the required time.

Illumination can be provided by daylight, electric light or by a combination of these two sources through a well-designed, installed and operated lighting system.

The lighting system design process is an iterative process and this technical specification describes the key design considerations in the process for a good quality, energy efficient and effective lighting system for major projects in the tertiary lighting sectors listed in the scope. The final designed lighting system should provide efficient and effective good quality lighting for the user needs. Good lighting quality improves quality of life, human health, productivity, comfort and function. The design should include safety/emergency lighting based on risk assessment or legislation identified during consultation. Elements of this design process can also be used for smaller lighting schemes.

The full lighting system design process will support implementation of regulatory measures and the development of verification requirements. In this way it will ensure that the anticipated energy savings will be met without jeopardising the required lighting conditions.

The lighting system design process is a tool that can be regulated by legislation.

Lighting systems are often subject to input from other design disciplines and shall respect and take into account the intrinsic requirements and tolerances of other components.

The complete design of a lighting system typically consists of:

- the lighting system design;
- design of the electrical system and structures of the system, as regulated by the legislation in force and by the applicable International, European and National standards.

This document sets out the general frame of a lighting system design process that can be applied to lighting of any projects including smart buildings.

## 1 Scope

This document specifies steps to be taken in the lighting system design process and lists responsibilities for the implementation and operation of the lighting solution. The aim of the process is:

- 1) to design lighting system solutions for sustainable lighting quality based on recommendations in the relevant lighting application standards, for the wellbeing of users and for a pleasant built environment, and
- 2) to ensure that the light requirements are fulfilled with energy efficient solutions (luminaire and control system) with data that can be used in the energy calculations, and
- 3) to list the equipment information to be used in the installation, commissioning, operation, maintenance of the lighting system over the years and the decommissioning process, and
- 4) to compile the documents defining the designed lighting system solution.

The described lighting system design process applies to all projects of buildings and facilities whether, new or a refurbishment in the lighting sector. This includes amongst others the following applications:

- office buildings – business, communication, design;
- industry buildings – manufacture, warehouse;
- outdoor work place areas – shipyards, marshalling yards, timber works;
- healthcare buildings – hospitals, hospice, residential and elderly care facilities;
- retail buildings – shops, supermarkets, wholesale establishments;
- hospitality buildings – bedded areas, meeting rooms, restaurant, café;
- sports – indoor sports facilities and outdoor sports fields;
- education buildings – schools, colleges, universities;
- roads – traffic routes and conflict areas;
- amenity areas – cycle paths, residential roads, pedestrian areas;
- parking areas – indoor and outdoor.

The process does not apply to:

- specialized lighting systems, (historic buildings, stage, studio, dentist, operating table, etc.);
- lighting built into machinery or medical equipment;
- temporary lighting installations.

This document is not applicable to the design of the relevant electrical system and structures.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12665, *Light and lighting — Basic terms and criteria for specifying lighting requirements*

EN 13201-5, *Road lighting — Part 5: Energy performance indicators*

EN 15193-1, *Energy performance of buildings — Energy requirements for lighting — Part 1: Specifications, Module M9*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12665 and the following apply. ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 3.1

#### **AECI**

$D_E$

annual energy consumption indicator (of a lighting installation in a specific year)

Note 1 to entry: AECI is expressed in kWh/(m<sup>2</sup>·y).

### 3.2

#### **client**

person who requires and procures the project

### 3.3

#### **client brief**

set of instructions/order by or on behalf of the client for the project

### 3.4

#### **commissioning engineer**

competent person with suitable educational and professional qualifications and relevant experience in the commissioning of lighting systems

### 3.5

#### **competent person**

person having suitable knowledge, qualification and experience to undertake the required role

### 3.6

#### **concept philosophy**

statement of the design approach

### 3.7

#### **constraint**

fixed item that has to be met during the design process