SLOVENSKI STANDARD
SIST-TS CEN/TS 17165:2019

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Svetloba in razsvetljava - Postopek načrtovanja sistemov za razsvetljavo

Light and Lighting - Lighting system design process

Licht und Beleuchtung - Planungsprozess für Beleuchtungssysteme

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

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ICS:

91.160.01 Razsvetljava na splošno Lighting in general

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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 COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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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.

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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^2·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

3.8
design concept
set of fundamental thoughts (including visual and non-visual aspects) at the start of the project and noting the constraints

Note 1 to entry: Concept design generally takes place after feasibility studies and options appraisals have been carried out and a project brief has been prepared. The concept design represents the design team's initial response to the project brief.

3.9
definitive design
based on the indications of the approved design concept and according to the approval of any competent statutory authority

Note 1 to entry: It contains all the elements required for obtaining the necessary construction permits, and for verifying the compliance with the city planning laws or other equivalent deeds; it also develops the graphic and descriptive design documents and the calculations achieving a level of definition which ensures that there are no significant technical differences or differences in terms of costs in the subsequent working drawing design phase.

3.10
detailed design
detailed implementation of processes scheduled by the design so that every architecture, structure and plant detail can be clearly defined and make it possible to do

Note 1 to entry: It does not include site operational plans, procurement plans and the calculations and graphics for any temporary installations and/or structures. The detailed design is fully in compliance with the definitive design, and with any applicable prescriptions of building regulation or competent statutory authority, if any.

3.11
design criteria

set of requirements to be achieved by the lighting system

3.12
document
drawing or written description of the essential factors created during the design process to be retained as records

3.13
emergency lighting
lighting provided for use when the supply to the normal lighting fails

3.14
energy efficiency
measure to ensure that the lighting design criteria are met by the efficient use of energy

3.15
feasibility study
set of all elements which are necessary for the design process to be completed

Note 1 to entry: The purpose of design concept is to present an overview of necessary information for making decisions about the technical and organizational feasibility of the design, the benefits, costs, risks and deadlines, so implementing the design concept and outlining the process from the initial phase to the final one.

3.16
identifier
code or description that uniquely identifies a place, product (or a component of a) service

3.17
illumination
process of lighting

3.18
installation
process of installing the lighting system

3.19
installation engineer
competent person with suitable educational and professional qualifications and relevant experience in the mechanical and electrical installation of lighting systems

3.20
Lighting Energy Numeric Indicator
LENI
numeric indicator of the annual energy requirement for the lighting system in the project normalised to the useable area of the project

Note 1 to entry: LENI is expressed in kWh/(m^2·y).

3.21
lighting control system
system consisting of devices that control the lighting installation, luminaire or light source to adjust the light output

Note 1 to entry: The devices can be operated manually or automatically and can include relevant detection devices.

Note 2 to entry: The lighting control system can dim to an appropriate level, be daylight linked to harvest free daylight, utilise occupancy detection to respond to presence, adjust for specific activities using scene setting, algorithmic control, etc.

3.22
lighting installation
lighting solution installed in the project

3.23
lighting scheme drawing
annotated plan, section, detail or layout diagram describing the lighting solution

3.24
lighting system solution
lighting equipment or lighting solution (lamps, ballast, luminaire and controls) required for the lighting scheme, its installation and operation during the life of the scheme

3.25
lighting system
lighting solution including products, scheme and operation instructions

3.26
lighting system design
taken to be a product consisting of a set of documentation approved by the lighting system designer detailing the information used and the solution proposed for the project

3.27
lighting system designer
competent person with suitable educational and professional qualifications and relevant experience in lighting system design able to manage both the technical and aesthetic issues of a project

Note 1 to entry: Where a team of designers is used the lighting system designer is the person with overall lighting design responsibility.

3.28
maintenance
routine process to keep the lighting system operating through life according to design intent

3.29
operation
functioning of the lighting system

3.30
operating regime
way the lighting system should be operated

3.31
project
building or place or activity area requiring the lighting system

3.32
project information
sum of all information required to produce the lighting system design

Note 1 to entry: The information can come from discussion and input from project manager, architect, etc. and agreed with the client.

3.33
project brief
project detail as agreed and specified in the client brief for fulfilment by the lighting system designer

3.34
product equivalent
<lighting design>
product with identical characteristics in terms of type (aesthetics), style (colour of the light and embodied lighting technology) and performance (quantities and energy)

3.35
power demand
sum of the power required for all the installed lighting products normalised to the useable area of the project

Note 1 to entry: The power demand is expressed in W/m^2.