

TECHNICAL SPECIFICATION

Lighting systems – General requirements

IECNORM.COM : Click to view the full PDF of IEC TS 63116:2021



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2021 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC online collection - oc.iec.ch

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 18 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IECNORM.COM : Click to view the full PDF IEC 60316:2021

TECHNICAL SPECIFICATION

Lighting systems – General requirements

IECNORM.COM : Click to view the full PDF of IEC TS 63116:2021

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.140.01; 29.140.50

ISBN 978-2-8322-1034-9

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

| | |
|--|----|
| FOREWORD..... | 3 |
| 1 Scope..... | 5 |
| 2 Normative references | 5 |
| 3 Terms and definitions | 5 |
| 4 General | 6 |
| 5 Electrical safety | 7 |
| 6 Functional safety | 7 |
| 7 Information security | 7 |
| 8 Installation, commissioning and maintenance | 8 |
| 9 Performance and functionality | 9 |
| 9.1 General..... | 9 |
| 9.2 Adaptive characteristics | 9 |
| 9.3 Functionality | 9 |
| 9.4 Communication protocol..... | 9 |
| 10 Instructions for use | 9 |
| Bibliography..... | 10 |
| Figure 1 – Flow chart for decision of information security measures..... | 8 |

IECNORM.COM : Click to view the full PDF of IEC TS 63116:2021

INTERNATIONAL ELECTROTECHNICAL COMMISSION

LIGHTING SYSTEMS – GENERAL REQUIREMENTS

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

IEC TS 63116 has been prepared by IEC technical committee 34: Lighting. It is a Technical Specification.

The text of this Technical Specification is based on the following documents:

| | |
|------------|------------------|
| Draft | Report on voting |
| 34/808/DTS | 34/843/RVDTS |

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Specification is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IECNORM.COM : Click to view the full PDF of IEC TS 63116:2021

LIGHTING SYSTEMS – GENERAL REQUIREMENTS

1 Scope

This document specifies general requirements for design, installation and maintenance of a lighting system.

A lighting system comprises a set of products. Requirements of the products are specified in product standards. For the general requirements of lighting systems, this document prevails.

Construction of lighting systems can vary in applications. This document is not intended to provide detailed technical specifications for the construction of lighting systems but to specify requirements in general that are necessary for lighting systems.

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.

IEC 62504, *General lighting – Light emitting diode (LED) products and related equipment – Terms and definitions*

IEC TS 63105, *Lighting systems and related equipment – Vocabulary*

IEC TS 63117, *General requirements for lighting systems – Safety*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC TS 63105 and IEC 62504 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

lighting system

system designed to provide lighting

Note 1 to entry: The lighting system can be dedicated to

- a) the support of one or more specified visual tasks under specified conditions considering other requirements such as human comfort, safety, the appearance of the surrounding environment and energy consumption;
- b) the support of other than human tasks.

Note 2 to entry: The lighting system can include a set of light sources, other physical components, communication protocols, user interfaces, software and networks to provide control and monitoring functions.

Note 3 to entry: The light source(s) and the related equipment can be integrated in a single item, e. g. an LED module, a lamp or a luminaire.

Note 4 to entry: A lighting system can be networked to provide central or remote control and monitoring functions.

Note 5 to entry: A lighting system can be connected to or integrated with other systems or devices.

[SOURCE: IEC 60050-845:2020, 845-27-010]

3.2

functional safety

part of the overall safety that depends on functional and physical units operating correctly in response to their inputs

[SOURCE: IEC 60050-351:2013, 351-57-06, modified – The Note 1 to entry has been deleted.]

3.3

information security

protection of information against unauthorized disclosure, transfer, modification, or destruction, whether accidental or intentional

Note 1 to entry: The term covers cyber-security.

[SOURCE: IEC 60050-721:1991, 721-08-57, modified – The Note 1 to entry has been added.]

3.4

communication protocol

set of rules for data transmission in a system interlinking several system components

Note 1 to entry: A communication protocol can define the conditions for establishing a connection to a transmission medium, the rules governing access to the medium, the procedures for error protection, the functional and procedural means of data exchange, the transport mechanisms, the communication control, the representation of data and the exchange of application data.

Communication protocols define, for example:

- data units transferred between system components,
- the meaning of data units (semantics),
- the format of data units (syntax) and
- the logic time sequence of data exchange.

Note 2 to entry: The communication protocols used in a system can be organized in accordance with industry-wide accepted reference models, e.g. the ISO-OSI seven-layer reference model.

[SOURCE: IEC 60050-351:2013, 351-56-14, modified – "protocol" has been replaced by "communication protocol", "participants" has been replaced by "system components", and the Note 2 to entry has been modified.]

3.5

adaptive characteristic

characteristic that responds to circumstances or predefined conditions

Note 1 to entry: The adaptive characteristic of a lighting system and its components is to provide adaptive lighting.

Note 2 to entry: See IEC 845-29-027 for the definition of "adaptive lighting".

4 General

The lighting systems shall be designed using products that:

- comply with product standards, such as, but not limited to safety requirements, performance requirements and interface requirements;
- are suitable for the environmental conditions to which the system is likely to be subjected, such as, but not limited to temperature range, humidity range, altitude and vibration;

- provide appropriate electrical insulation towards system integration for electrical safety assurance;
- provide appropriate protection measures towards system integration for functional safety and information security;
- provide appropriate interfaces, such as communication interfaces, towards system integration for the expected system performance and functionality.

Compliance is checked by inspection of the documentation and by carrying out the tests of Clause 5 to Clause 10.

5 Electrical safety

Lighting systems require additional safety requirements at the system level. These requirements apply in addition to the product safety requirements that can be found in the product specific standards.

The electrical safety requirements of lighting systems at the system level shall follow IEC TS 63117.

6 Functional safety

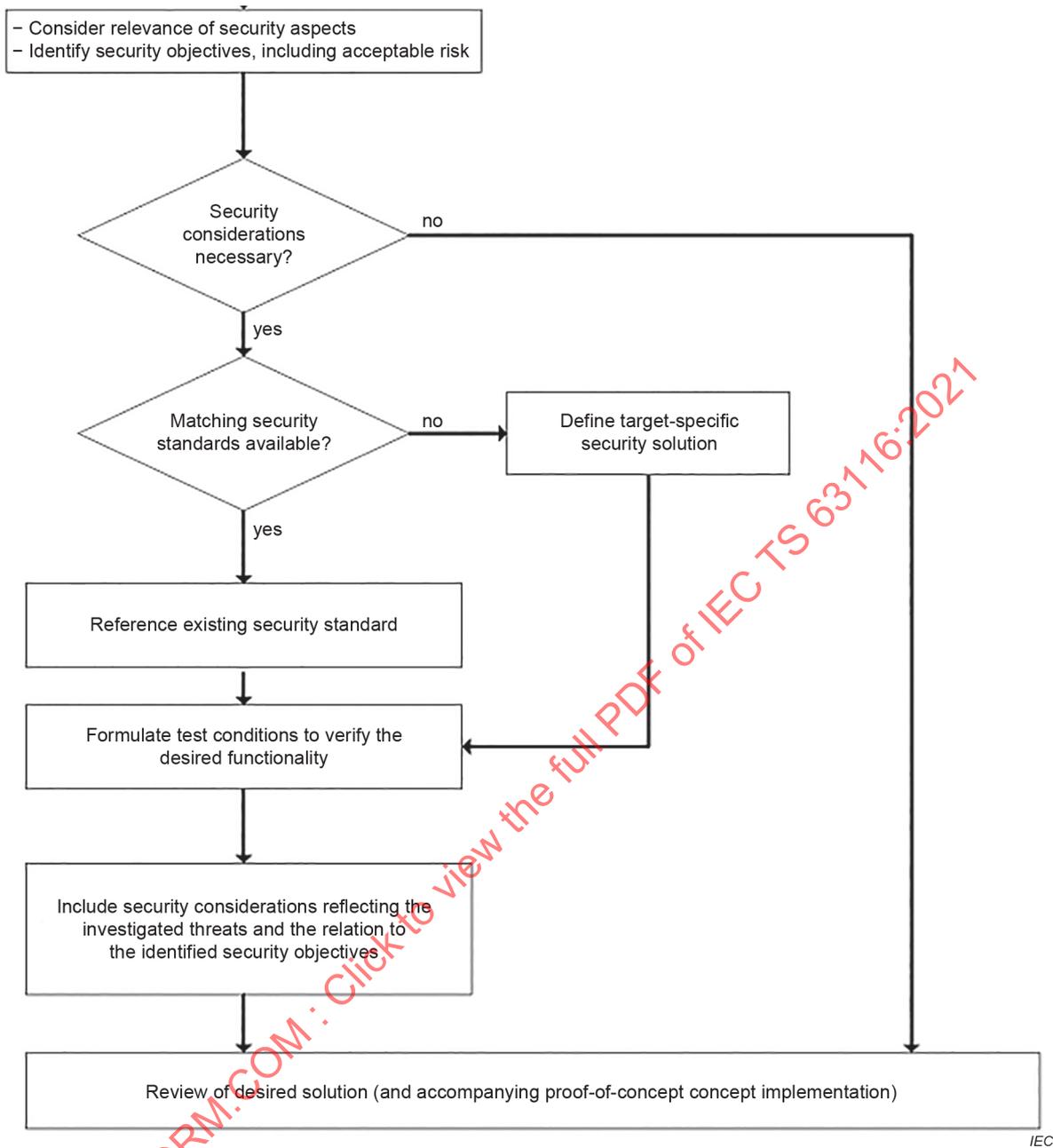
Lighting systems often comprise many different products (luminaire, sensor, controllers, touch panels and other human interfaces, etc.) which are connected through communication cabling or wirelessly, where the light output can be varied based on the input from sensors or users. Malfunction of the interaction of system components can create unsafe lighting conditions. When operating, they should incur no unacceptable risks.

Functional safety requirements of lighting systems shall follow IEC TS 63117.

7 Information security

Lighting systems often utilize communication, data transfer and data storage functions. The data and information can be sensitive and/or private. Lighting systems can also be applied within an environment demanding (a) higher security level(s). These lighting systems shall be applied with an appropriate level of information security.

Information security aspects shall be considered from the start of the design of a lighting system, throughout its service life, and at end-of-life-stage. Whether measures to provide information security are to be included should be checked against regulatory and application requirements, see Figure 1.



SOURCE: IEC Guide 120:2018

Figure 1 – Flow chart for decision of information security measures

A risk assessment process described in IEC 31010 can be used to perform this evaluation.

8 Installation, commissioning and maintenance

Lighting systems shall be installed in accordance with

- the instructions for use (see Clause 10), provided by the manufacturer or responsible vendor of the lighting system and the design details provided by the lighting system designer, and
- the installation instructions specified in the appropriate standards.

NOTE Local installation regulations provide relevant information that can also be consulted when preparing installation instructions.

Lighting systems should be commissioned to fulfil the designed system specifications. For a system with less complexity, the commissioning can be done according to the instructions for use. For lighting systems in highly complex buildings, the commissioning could follow ISO/TS 21274.

Lighting systems and its components shall be maintained in accordance with the instructions for use (see Clause 10), provided by the manufacturer or responsible vendor of the lighting system and the design details provided by the lighting system designer.

9 Performance and functionality

9.1 General

The lighting system performance parameters and functionalities shall comply with all claimed characteristics in the system documentation.

9.2 Adaptive characteristics

The lighting system shall fulfill all claimed adaptive characteristics in the system documentation, which include but are not limited to the following:

- sensitivity to a specific stimulus (e.g. occupancy, natural light level, weather and traffic conditions);
- relevant response (e.g. dimming (flux variation), changing colour and timing).

9.3 Functionality

The lighting system shall fulfill all claimed functionalities with specified accuracy in the system documentation, such as:

- fault detection,
- degradation compensation,
- remote monitoring,
- energy consumption monitoring.

NOTE 1 The type of functions of a lighting system depends on the application.

NOTE 2 A lighting system can also integrate functions other than lighting for enhanced performance, for example, monitoring of environmental and traffic conditions by a street lighting system. Other standards can apply for functions other than lighting.

9.4 Communication protocol

The communication protocol(s) employed within the lighting system shall be declared by the manufacturer or responsible vendor in the system documentation.

If the manufacturer or responsible vendor of a lighting system claims the capability of interfacing with other systems, they shall publish relevant substantiating information in the system documentation.

10 Instructions for use

Instructions for use shall be available for installation, commissioning, maintenance, disposal and all claimed performance characteristics and functionalities.

In case the system has been provided with measures to provide information security, corresponding information shall be provided by the manufacturer or responsible vendor to enable correct installation, use, data backup, software and firmware updates, maintenance and end-of-life treatment.