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General requirements for lighting systems – Safety

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GENERAL REQUIREMENTS FOR LIGHTING SYSTEMS – SAFETY

FOREWORD

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IEC TS 63117 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
34/809/DTS	34/840/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- withdrawn,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.

INTRODUCTION

Lighting systems are becoming more common, not only to save energy but also to improve human well-being.

These systems are often comprised of many different products (luminaires, sensors, 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.

This safety document is intended to cover those safety aspects that are specific to a lighting system and are not covered by existing standards. This document does not address safety aspects that are already covered in:

- product safety standards,
- installation safety standards.

IEC Guide 110 gives guidance on determining which electrical safety aspects of systems should be covered. Products that are considered safe, according to the relevant product safety standard, need to remain safe when connected to a network. The products need to remain safe under normal, abnormal and single fault conditions of any product connected to the lighting network.

For this purpose, the following electrical safety aspects are mentioned in IEC Guide 110:

1) protection from overvoltages on the network;
2) protection from hazards caused by connection of different types of circuits;
3) limitation of network interface leakage current;
4) protection from overheating of the communication network.

By correctly classifying a network, and by applying the required electrical insulation between different types of circuits, a manufacturer of products can design products to be safely connected to such a network.

Since it is not clear how many products will be connected to a network, due to the fact that lighting systems are often tailor-made, the designer of the lighting system is responsible for ensuring that the accumulated network interface leakage current from all products connected to the network does not exceed an acceptable limit. For the system designer it is therefore important that the product individual network touch current is specified in product documentation, and that system limits are given in a system publication. This document provides system network interface leakage current limits for different types of networks.

Communication networks can also be used for limited powering. The currents in these cables are not known to the installer, since they depend on the products used in the system as specified by the person designing the system. So, the person responsible for system design needs to take measures specified in system safety publications in order to avoid overheating of this cabling.

Functional safety is part of the overall safety that depends on functional and physical units operating correctly in response to their inputs. This document also covers functional safety aspects at the system level. For lighting systems, functional safety is normally related to communication errors, incorrect software (response), or foreseeable misuse. This document assists system designers in assessing the product characteristics for their inclusion in a system.

Lighting systems are not always considered to be associated with functional safety unless the light properties are relevant for the safety of the installation and surroundings. For example, in a tunnel, an inappropriate light level after power restoration can cause a safety issue.

GENERAL REQUIREMENTS FOR LIGHTING SYSTEMS – SAFETY

1 Scope

This document specifies the safety requirements of lighting systems at the system level, applicable when designing a lighting system.

A lighting system comprises a set of products. Safety requirements of the products are not covered in this document, but specified in product safety standards.

NOTE For emergency lighting systems, national or regional regulations provide relevant information that can be firstly consulted.

This document specifies safety requirements for lighting systems based on specific networks.

This document does not cover cyber-security and information security of lighting systems.

This document does not apply to lighting systems to be installed in potential explosive atmospheres which are under the scope of IEC TC 31.

For lighting systems based on an information and communication technology (ICT) network, refer to IEC 62949. For lighting systems based on a home and building electronic system and building automation and control system (HBES/BACS) network, refer to IEC 63044-3.

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 60364-4-44:2007, *Low-voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*
IEC 60364-4-44:2007/AMD1:2015
IEC 60364-4-44:2007/AMD2:2018

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage supply systems – Part 1: Principles, requirements and tests*

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

IEC 62949, *Particular safety requirements for equipment to be connected to information and communication technology networks*

IEC 63044-3, *Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) – Part 3: Electrical safety requirements*