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TECHNICAL REPORT

Explanation and background information on electrical safety requirements in TC 34 standards

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Explanation and background information on electrical safety requirements in TC 34 standards

FOREWORD

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IEC TR 63139 has been prepared by IEC technical committee 34: Lighting. It is a Technical Report.

This second edition cancels and replaces the first edition published in 2018. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) new title and scope to enable the adding of further new subjects to the content of this document in the future;
b) new Clause 9 providing background information regarding the possible addition of currents in a lighting installation where luminaires are interconnected via their control ports;
c) new Clause 10 transferring Annex S of IEC 61347-1:2015 [1] (Examples of controlgear insulation coordination) from the controlgear safety standard into this document.

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

Draft	Report on voting
34/1416/DTR	34/1435/RVDTR

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 Report 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/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– withdrawn, or
– revised.

INTRODUCTION

This document provides background information to the following subjects being introduced into IEC TC 34 standards to cover new technologies associated with the use of LED light sources and controllable products.

This document consists of the following subdivisions:

Clause 4 - Calculation of increased working voltage in case of insulation failure;

Clause 5 - Insulation between circuits following the circuits analysis in Clause 6;

Clause 7 - Use of protective extra low voltage (PELV);

Clause 8 - Insulation between LV supply and control line conductors;

Clause 9 - Summation of touch currents in a connected lighting system;

Clause 10 - Examples of insulation coordination situations between controlgear and luminaire.

1 Scope

This document provides explanations and background information on electrical safety requirements in TC 34 standards.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

– IEC Electropedia: available at https://www.electropedia.org/
– ISO Online browsing platform: available at https://www.iso.org/obp

4 Calculation of increased working voltage in case of insulation failure

Insulation requirements between live parts and accessible conductive parts as a function of the controlgear input/output insulation classification and the insulation class of the luminaire are given in IEC 60598-1:2024 [2], Table T.1 and IEC 61347-1:2024 [3], Table M.1.

Insulation requirements in TC 34 standards are based on a hazard assessment with the assumption that a certain failure will occur.

The required insulation is normally based on the working voltage U_{OUT}, but in some specific failure cases when the basic insulation between supply and output of a controlgear fails, the supply voltage is added to U_{OUT}. For controlgear with double or reinforced insulation between primary (U_{SUPPLY}) and secondary (U_{OUT}) this type of failure is not expected.

In case of failure of the basic insulation within the controlgear the following assumptions are made:

– there is an increased output voltage,
– the luminaire remains working, and the increased voltage is present for a time long enough to create a conduction track across the insulation (known as tracking).

For 50/60 Hz transformers inside the controlgear, this failure condition results in the addition of the voltages that can be calculated by the simple summation of the two values. In electronic controlgear this situation can result in a more complex summation due to the complexity of the oscillating circuit that can influence the result.

The best method to check the output voltage in case of insulation failure is to measure the output voltage directly on a sample of controlgear with the fault simulated. The failure of the insulation and the output voltage is measured against earth (or zero potential). This method has been found not to be practical due to the following reasons:

– differing supply conditions (voltage/frequency);
– difficulty in simulating exactly the failure condition;
– difficulty in making accurate and reproducible measurements.