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Explanation of the mathematical addition of working voltages, insulation between circuits, and use of PELV, in TC 34 standards

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TECHNICAL REPORT

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Explanation of the mathematical addition of working voltages, insulation between circuits and use of PELV in TC 34 standards

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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EXPLANATION OF THE MATHEMATICAL ADDITION OF WORKING VOLTAGES, INSULATION BETWEEN CIRCUITS AND USE OF PELV IN TC 34 STANDARDS

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IEC TR 63139, which is a Technical Report, has been prepared by IEC technical committee 34: Lamps and related equipment.

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

DTR	Report on voting
34/415/DTR	34/493A/RVDTR

Full information on the voting for the approval of this Technical Report can be found in the report on voting indicated in the above table.

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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 – Mathematical addition of working voltages;

Clause 5 – Insulation between circuits;

Clause 6 – Use of protective extra low voltage (PELV);

Clause 7 – Insulation between LV supply and control line conductors.

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EXPLANATION OF THE MATHEMATICAL ADDITION OF WORKING VOLTAGES, INSULATION BETWEEN CIRCUITS AND USE OF PELV IN TC 34 STANDARDS

1 Scope

This document is related to the insulation coordination in TC 34 standards and provides explanations on mathematical addition of working voltages, insulation between circuits, use of protective extra low voltage (PELV) and insulation between LV supply and control line conductors in order to cover new technologies associated with the use of LED light sources and controllable products.

It describes in which way the addition of supply voltages and working voltages can be arranged for an assessment of the electrical insulation requirements (e.g. creepage distances and clearances) in a system if a first failure occurs.

Furthermore the actual failure scenarios given in IEC 60598-1:2014 and IEC 60598-1:2014/AMD1:2017, Annex X and IEC 61347-1:2015, Clause 15 are explained in greater detail and the rationale behind the protective requirement for each situation is given (e.g. possible LV primary to ELV secondary does not lead to an overburden of the insulation in the second circuit).

This document also describes the possibility to increase immunity and reliability of electronic circuits, used in combination with LEDs, with the use of PELV and the associated safety consequences for this system.

The insulation between LV supply and control line conductors is also important and this document explains why this is an essential safety consideration for a complete installation system.

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 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

4 Mathematical addition of working voltages

Insulation requirements between live parts and accessible conductive parts as function of the controlgear input/output insulation classification and the insulation class of the luminaire are given in IEC 60598-1:2014, Table X.1 and IEC 61347-1:2015, Table 6.

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

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