

TECHNICAL REPORT

**Electrical insulation systems – Thermal evaluation of modifications to an established electrical insulation system (EIS)
Part 3: Clarification of electrical insulating materials (EIMs) and auxiliary materials**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRICAL INSULATION SYSTEMS – THERMAL EVALUATION OF
MODIFICATIONS TO AN ESTABLISHED ELECTRICAL
INSULATION SYSTEM (EIS)**

**Part 3: Clarification of electrical insulating
materials (EIMs) and auxiliary materials**

FOREWORD

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IEC TR 61858-3 has been prepared by IEC technical committee 112: Evaluation and qualification of electrical insulating materials and systems. It is a Technical Report.

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

Draft	Report on voting
112/465/DTR	112/500A/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/standardsdev/publications.

A list of all parts in the IEC 61858 series, published under the general title *Electrical insulation systems – Thermal evaluation of modifications to an established electrical insulation system (EIS)*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://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- withdrawn,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.

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INTRODUCTION

This part of IEC 61858 describes procedures for the evaluation of changes to an established electrical insulation system (EIS) and the effect of these changes on the thermal classification of the established EIS.

Part 1 of IEC 61858 covers wire-wound winding EISs. Part 2 of IEC 61858 addresses modifications of form-wound winding EISs.

This Part 3 provides guidance for the selection of appropriate procedures (as defined in Part 1 and Part 2) for the evaluation of changes of individual materials, which have functions of different importance in the EIS, also known as "major" electrical insulating materials (EIMs) and "minor" (auxiliary) materials.

General principles for the evaluation and qualification of EISs can be found in IEC 60505. Unless the procedures of this document indicate otherwise, the principles of IEC 60505 should be followed.

The thermal classification of an EIS is established either by known service life, in accordance with IEC 60505, or evaluated in accordance with IEC 61857 (all parts).

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ELECTRICAL INSULATION SYSTEMS – THERMAL EVALUATION OF MODIFICATIONS TO AN ESTABLISHED ELECTRICAL INSULATION SYSTEM (EIS)

Part 3: Clarification of electrical insulating materials (EIMs) and auxiliary materials

1 Scope

This part of IEC 61858 provides information on the identification of electrical insulating materials and auxiliary components for the assessment of modifications to an established insulation system and gives guidance on the selection of feasible test procedures.

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 61857 (all parts), *Electrical insulation systems. Procedures for thermal evaluation*

3 Terms and definitions

[IEC TR 61858-3:2020](https://standards.iteh.ai/catalog/standards/sist/9310b30f-e42e-4a4b-81db-ed08ebf1091f/iec-tr-61858-3-2020)

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For the purposes of this document, the following terms and definitions 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

insulation coordination

mutual correlation of insulation characteristics of electrical equipment taking into account the expected micro-environment and other influencing stresses

Note 1 to entry: Expected voltage stresses are characterized in terms of the characteristics defined in IEC 60664-1:2020, 3.1.7 to 3.1.16.

[SOURCE: IEC 60664-1:2020, 3.1.3]

3.2

electrical insulation system

EIS

insulating structure containing one or more electrical insulating materials (EIMs) together with associated conducting parts employed in an electrotechnical device

[SOURCE: IEC 61858-1:2014, 3.8]

3.3

generic identical material

material which, related to a specific application, shows identical chemical and physical properties or performance in regard to the thermal endurance

3.4

electrical insulating material

EIM

material with negligibly low electric conductivity, used to separate conducting parts at different electrical potentials

Note 1 to entry: Used in an electrical insulation system, EIMs are part of the electrical structure in either creep distance design or strike distance design of the specific parts in the electrical apparatus.

[SOURCE: IEC 61858-1:2014, 3.9, modified – Addition of the note to entry.]

3.5

auxiliary material

material used in an EIS which is not considered as part of the insulation coordination (additions to an insulation system)

Note 1 to entry: Auxiliary materials are typically required for mechanical reinforcement, thermal conductivity, or manufacturing processes. They are not considered essential to prevent risk of electrical shock, fire or, other hazards.

3.6

single-point thermal aging test

thermal aging test for the established EIS and the candidate EIS under one temperature

4 General information

IEC TR 61858-3:2020

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4.1 Purpose of evaluation

This document provides relatively quick and low-cost methods by which the user can make modifications to an established EIS by selecting the following evaluation procedures:

- Procedure G: Proof of generic identical materials in accordance with 5.1;
- Procedure A: Without test;
- Procedure B: Compatibility test in accordance with 5.3;
- Procedure C: Single-point thermal aging test in accordance with 5.4;
- Procedure D: Full thermal aging test in accordance with 5.5.

The main evaluation points are the following:

- a) the impact on the thermal life of the EIS if the thickness of an EIM is changed;
- b) the compatibility, under thermal stress, of a substituted EIM;
- c) the compatibility, under thermal stress, of other components used in intimate contact with an established EIS.

4.2 Categories of evaluation

Electrical insulating materials, which are not generic identical to the original EIM shall be evaluated with a single-point or full thermal aging.

Auxiliary materials shall be evaluated by a suitable compatibility test according to 5.3 (procedure B), or if the definition of a compatibility test is not possible, with a single-point aging.