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Interested committees:

Title: Draft BS EN IEC 61857-33 Electrical insulation systems - Procedures for thermal evaluation. Part 33: Multifactor evaluation with increased factors at elevated temperature.

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



112/533/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER: IEC 61857-33 ED1	
DATE OF CIRCULATION: 2021-05-14	CLOSING DATE FOR COMMENTS: 2021-08-06
SUPERSEDES DOCUMENTS: 112/448/CDV, 112/482A/RVC	

IEC TC 112 : EVALUATION AND QUALIFICATION OF ELECTRICAL INSULATING MATERIALS AND SYSTEMS	
SECRETARIAT: Germany	SECRETARY: Mr Bernd Komanschek
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 2,TC 14,TC 23,TC 42,TC 55,TC 96	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY	

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Electrical insulation systems - Procedures for thermal evaluation - Part 33: Multifactor evaluation with increased factors at elevated temperature

NOTE FROM TC/SC OFFICERS:

The project title has been changed from "with increased factors" to "with increased ageing factors".

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRICAL INSULATION SYSTEMS –
PROCEDURES FOR THERMAL EVALUATION –****Part 33: Multifactor evaluation with increased ageing factors
at elevated temperature**

FOREWORD

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International Standard IEC 61857-33 has been prepared by IEC technical committee 112: Evaluation and qualification of electrical insulating materials and systems.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
112/XXX/FDIS	112/XXX/RVD

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

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

104 A list of all parts in the IEC 61857 series, published under the general title Electrical insulation
105 systems – *Procedures for thermal evaluation*, can be found on the IEC website.

106 The committee has decided that the contents of this document will remain unchanged until the
107 stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to
108 the specific document. At this date, the document will be

- 109 • reconfirmed,
- 110 • withdrawn,
- 111 • replaced by a revised edition, or
- 112 • amended.

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INTRODUCTION

Accelerated thermal ageing of an electrical insulation system (EIS) is intended to evaluate the thermal classification of the EIS. Many applications need to include the evaluation of other ageing stresses in addition to the thermal stress.

IEC 60505 provides four categories of ageing stresses which influence the performance of products in use under a wide range of operating conditions. In IEC 60505 the stresses are presented as thermal (T), electrical (E), environmental (E) and mechanical (M). In this part of IEC 61857, environmental (E) is replaced with ambient (A) to avoid the confusion of having two stresses represented by the same letter. In this part of IEC 61857-33 the stresses are therefore presented as thermal (T), electrical (E), ambient/environmental (A) and mechanical (M).

This document follows the structure presented in the Scope of IEC 60505, the evaluation of the combination of either thermal, electrical, ambient/environmental, mechanical or combination if these is multifactor stresses.

In order to determine the thermal endurance of an EIS, ageing tests are carried out in accordance with the selected test method of IEC TR 61857-2. To obtain the results within reasonable time these tests are performed at several temperatures considerably higher than the normal service temperature. This document deals with testing where the test objects are exposed to other possible ageing stresses, such as E, A, and/or M in combination with T.

Both the reference EIS and the candidate EIS undergo thermal ageing at three or more elevated temperatures. In this document the examples use three ageing temperatures of high, middle, and low. A total of three sets of test objects for the reference EIS plus a total of three sets of test objects for the candidate EIS are used in comparisons. The preferred number of test objects per set is provided in the selected EIS test method from IEC TR 61857-2.

This document provides the structure for the evaluation of one or more of the three additional stresses E, A and M in combination with T by direct comparison to the baseline established by T. Without the baseline, analysis of the influence of the additional factors is limited.

A test is performed with thermal stress as the only ageing stress. Similar tests are then performed with one or more of the other ageing factors E, A and/or M simultaneously added. Analyses of the results are made to reveal the influence of the E, A and/or M factors.

While similar in their conception, IEC 61857-32 (Multifactor evaluation by diagnostic procedures) and IEC 61857-33 (Multifactor evaluation with increased factors at elevated temperature) have different structure and evaluation conditions. IEC 61857-32 uses thermal exposure as the only intended ageing stress and applies additional stress(es) only during the diagnostic part of each test cycle. IEC 61857-33 combines two or more of the stresses and the combination of the stresses are applied continually at elevated temperatures. The evaluation is ongoing and not interrupted into tests or ageing cycles.

ELECTRICAL INSULATION SYSTEMS – PROCEDURES FOR THERMAL EVALUATION –

Part 33: Multifactor evaluation with increased ageing factors at elevated temperature

1 Scope

This part of IEC 61857 series is applicable to the evaluation of an EIS for applications where the stresses of the application are a combination of the multifactor ageing stresses identified in IEC 60505. The increased stress factors are expected to occur during operation at elevated temperatures.

This document establishes the procedure to evaluate the influence of stresses on the performance established following the thermal classification of the EIS. The thermal classification is established in Step 1 where the only ageing stress is thermal. The candidate EIS is first evaluated based on thermal stress only. This evaluation is defined as the baseline of the candidate EIS. In Step 2, the evaluation of the additional stresses applied at elevated temperatures provides the measurement needed to establish the influence of the additional factors on the performance of the baseline EIS.

This document is about thermal endurance testing with one or more stress added during the thermal ageing process. It provides guidance regarding interpretation of the test results.

For performance requirements of any product designed and constructed using the EIS established in accordance with this document refer to the appropriate IEC Technical Committee applicable to the application.

This document is applicable to a range of established EIS test standards. IEC TR61857-2 provides a list of many established EIS test standards which cover low-voltage [up to 1kV a.c.] and high-voltage [above 1kV a.c.]. The use of 1kV as the transition voltage can be found in standards such as for IEC TC 17 High-voltage switchgear and control gear.

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 60505, *Evaluation and qualification of electrical insulation systems*

IEC TR 61857-2 *Electrical insulation systems – Procedures for thermal evaluation – Part 2: Selection of the appropriate test method for evaluation and classification of electrical insulation systems*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60505 and the following apply.

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