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Artificial pollution tests on high-voltage polymeric insulators to be used on AC and DC systems

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Artificial pollution tests on high-voltage polymeric insulators to be used on AC and DC systems

FOREWORD

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IEC TS 63414 has been prepared by subcommittee 36B: Insulators for overhead lines, of IEC technical committee 36: Insulators. It is a Technical Specification.

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

Draft	Report on voting
36/630/DTS	36/637/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/publications.

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1 Scope

This technical specification is applicable for the determination of the AC and DC pollution flashover and withstand voltage characteristics of insulators with polymeric housing, to be used outdoors in HV applications and exposed to polluted environments. This is also applicable for insulators with hydrophobic coatings. This document refers to AC systems with a rated voltage greater than 1 000 V and DC systems with a rated voltage greater than 1 500 V.

The object of this technical specification is to prescribe standardized test methods, requirements and procedures for artificial pollution tests applicable to polymeric insulators for overhead lines including traction lines, station post and hollow insulators of equipment. Available test experience with polymeric station post and hollow insulators, especially for DC applications, is limited.

The proposed tests are not applicable to ceramic and glass insulators without polymeric housing, to greased insulators or to special types of insulators (e.g., insulators with semiconducting glaze).

Differently to ceramic and glass insulators without polymeric housing:

– The pollution performance of insulators with polymeric housing varies with the hydrophobicity condition of the surface. The specific conditions simulated by standardized tests might not represent the actual dynamic field conditions.
– The determination of the flashover and/or withstand voltage under pollution conditions is not enough for dimensioning. Additional constraints related to possible ageing are also to be considered.
– If the Hydrophobicity Transfer Material (HTM) test according to IEC TR 62039 [1][1] confirms that an insulator is non-HTM, it can be tested according to IEC 60507 [2] or IEC TS 61245 [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 60060-1, *High-voltage test techniques - Part 1: General terminology and test requirements*

IEC 60060-2, *High-voltage test techniques - Part 2: Measuring systems*

IEC TS 60815-1, *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions - Part 1: Definitions, information and general principles*

IEC TS 62073:2016, *Guidance on the measurement of hydrophobicity of insulator surfaces*

[1] Numbers in square brackets refer to the Bibliography.

Bibliography

[1] IEC TR 62039:2021, *Selection guidelines for polymeric materials for outdoor use under HV stress*

[2] IEC 60507, *Artificial pollution tests on high-voltage ceramic and glass insulators to be used on a.c. systems*

[3] IEC TS 61245, *Artificial pollution tests on high-voltage ceramic and glass insulators to be used on d.c. systems*

[4] IEC TS 60815-3, *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions - Part 3: Polymer insulators for a.c. systems*

[5] IEC TS 60815-4, *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions - Part 4: Insulators for d.c. systems*

[6] CIGRÉ Working Group D1.44, *Guidelines for altitude correction of polluted performance of insulators*, CIGRÉ Technical Brochure No. 705, 2017

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