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Composite insulators with integrated optical fibres for AC voltages greater than 1 000 V and DC voltage greater than 1 500 V - Definitions, test methods and acceptance criteria

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IEC TS 63264 has been prepared by 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
36/633/DTS	36/651/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.

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– withdrawn, or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

Composite insulators with integrated optical fibres, herein after referred to as "fibre optic composite insulators", consist of an insulating tube or core, bearing the mechanical load and protected by a polymeric housing. In addition, optical fibres (fibre optic elements) are incorporated into the insulator to transfer electromagnetic waves (e.g. light), energy, data (information), or other types of signals. Despite these common features, the materials used, and the design details employed by different manufacturers may differ. The mechanical load is transmitted to the core by metallic end fittings. When implementing a fibre optic element within the insulator, the electrical integrity of the element needs to be ensured by the manufacturer and it will not be tested and verified within this document in lifetime aspects. This document considers three design principles:

– Implementation of the fibre optic element into the polymeric housing,

– Implementation of the fibre optic element into the load-bearing core, or

– Implementation of the fibre optic element into the inner volume of a hollow core.

The grouping of the tests in this document follows the structure of IEC 62217 and the product standards. It provides additions and modifications to design-, type-, sample and routine tests to be considered when optical elements are incorporated into the respective fibre optic product.

Fibre optic composite insulators need to take into consideration the specific product application or standards, such as IEC 61109 for composite Long Rod insulators or IEC 61462 for composite hollow-core insulators. For easier use, Annex A offers an overview on the applicability of tests on the respective fibre optic composite insulator design. Guidance on the application of fibre optic elements in some examples are given in Annex B.

1 Scope

This Technical Specification applies to composite insulators equipped with optical fibres (fibre optic element), consisting of a load-bearing insulating core or tube, a housing (surrounding the insulating core) made of polymeric material, a fibre optic element integrated into the core or housing, or embedded in a filling media inside the inner volume of a hollow core, and end fittings permanently attached to the insulating core.

The object of this document is to

– define the terms used,

– specify additional test methods and provide additions and modifications to tests referred,

– specify acceptance criteria.

This document is to be used in addition to the respective product standard applicable to the product, application and design to which the fibre optic element has been added. Furthermore, this document does not include requirements dealing with the choice of insulators for specific operating conditions or environments.

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 60050-471, *International Electrotechnical Vocabulary (IEV) - Part 471: Insulators*

IEC 61109:2008, *Insulators for overhead lines - Composite suspension and tension insulators for a.c. systems with a nominal voltage greater than 1 000 V - Definitions, test methods and acceptance criteria*

IEC 61300-2-18, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-18: Tests - Dry heat*

IEC 61300-2-22, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-22: Tests - Change of temperature*

IEC 61300-3-4, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-4: Examinations and measurements - Attenuation*

IEC 61462, *Composite hollow insulators - Pressurized and unpressurized insulators for use in electrical equipment with AC rated voltage greater than 1 000 V AC and D.C. voltage greater than 1500V - Definitions, test methods, acceptance criteria and design recommendations*

IEC 62217, *Polymeric HV insulators for indoor and outdoor use - General definitions, test methods and acceptance criteria*

Bibliography

IEC 60050-426, *International Electrotechnical Vocabulary (IEV) - Part 426: Explosive atmospheres*

IEC 60050-731, *International Electrotechnical Vocabulary (IEV) - Part 731: Optical fibre communication*

IEC 60383-2, *Insulators for overhead lines with a nominal voltage above 1000 V - Part 2: Insulator strings and insulator sets for a.c. systems - Definitions, test methods and acceptance criteria*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 61467, *Insulators for overhead lines - Insulator strings and sets for lines with a nominal voltage greater than 1 000 V - AC power arc tests*

IEC 61952, *Insulators for overhead lines - Composite line post insulators for A.C. systems with a nominal voltage greater than 1 000 V - Definitions, test methods and acceptance criteria*

IEC 62231, *Composite station post insulators for substations with a.c. voltages greater than 1 000 V up to 245 kV - Definitions, test methods and acceptance criteria*

IEC 62772, *Composite hollow core station post insulators with a.c. voltage greater than 1 000 V and d.c. voltage greater than 1 500 V - Definitions, test methods and acceptance criteria*

IEC 62896, *Hybrid insulators for AC and DC for high-voltage applications greater than 1 000 V AC and 1 500 V DC - Definitions, test methods and acceptance criteria*

IEC/IEEE 62582-5, *Nuclear power plants - Instrumentation and control important to safety - Electrical equipment condition monitoring methods - Part 5: Optical time domain reflectometry*

CIGRE WG 22.03, *Composite insulator handling guide*, CIGRE Technical Brochure 184, 2001

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