

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

Isolateurs composites creux – Isolateurs avec ou sans pression interne pour utilisation dans des appareillages électriques de tensions alternatives assignées supérieures à 1 000 V et de tensions continues supérieures à 1 500 V – Définitions, méthodes d'essai, critères d'acceptation et recommandations de conception



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CONTENTS

| | |
|---|----|
| FOREWORD..... | 5 |
| INTRODUCTION..... | 7 |
| 1 Scope..... | 8 |
| 2 Normative references | 9 |
| 3 Terms and definitions | 9 |
| 4 Relationships of mechanical loads | 13 |
| 4.1 Loads from outside the insulator | 13 |
| 4.2 Pressures | 13 |
| 5 Marking | 14 |
| 6 Classification of tests..... | 14 |
| 6.1 General..... | 14 |
| 6.2 Design tests..... | 14 |
| 6.3 Type tests | 16 |
| 6.4 Sample tests | 16 |
| 6.5 Routine tests..... | 16 |
| 7 Design tests | 17 |
| 7.1 General..... | 17 |
| 7.2 Tests on interfaces and connections of end fittings | 17 |
| 7.2.1 General | 17 |
| 7.2.2 Test specimen | 17 |
| 7.2.3 Reference disruptive – discharge dry power frequency test | 17 |
| 7.2.4 Thermal-mechanical pre-stressing test | 17 |
| 7.2.5 Water immersion pre-stressing test..... | 18 |
| 7.2.6 Verification tests..... | 18 |
| 7.3 Tests on shed and housing material..... | 19 |
| 7.3.1 Hardness test | 19 |
| 7.3.2 Accelerated weathering test..... | 19 |
| 7.3.3 Tracking and erosion test – 1000 h salt fog AC voltage test | 19 |
| 7.3.4 Flammability test | 19 |
| 7.3.5 Hydrophobicity transfer test..... | 19 |
| 7.4 Tests on the tube material | 19 |
| 7.4.1 General | 19 |
| 7.4.2 Porosity test (Dye penetration test)..... | 20 |
| 7.4.3 Water diffusion test..... | 20 |
| 7.5 Water diffusion test on core with housing | 20 |
| 8 Type tests (only mechanical tests)..... | 20 |
| 8.1 General..... | 20 |
| 8.2 Test specimens..... | 20 |
| 8.3 Preparation of the test specimen..... | 21 |
| 8.4 Internal pressure test..... | 22 |
| 8.4.1 General | 22 |
| 8.4.2 Test procedure | 22 |
| 8.4.3 Acceptance criteria | 23 |
| 8.5 Bending test..... | 23 |
| 8.5.1 General | 23 |
| 8.5.2 Test procedure | 23 |

| | | |
|--------------|---|----|
| 8.5.3 | Acceptance criteria | 24 |
| 9 | Sample tests | 24 |
| 9.1 | Selection and number of insulators | 24 |
| 9.2 | Testing | 25 |
| 9.3 | Verification of dimensions | 25 |
| 9.3.1 | Test procedure | 25 |
| 9.3.2 | Acceptance criteria | 25 |
| 9.4 | Mechanical tests | 25 |
| 9.4.1 | General | 25 |
| 9.4.2 | Test procedure | 25 |
| 9.4.3 | Acceptance criteria | 26 |
| 9.5 | Galvanizing test | 26 |
| 9.6 | Re-test procedure | 26 |
| 10 | Routine tests | 27 |
| 10.1 | General..... | 27 |
| 10.2 | Visual examination..... | 27 |
| 10.3 | Routine mechanical test..... | 27 |
| 10.4 | Routine pressure test..... | 27 |
| 10.5 | Routine tightness test | 28 |
| 11 | Documentation | 28 |
| Annex A | (normative) Tolerances of form and position | 33 |
| Annex B | (informative) General recommendations for design and construction..... | 36 |
| B.1 | Guidance for design..... | 36 |
| B.2 | Guidance for the maximum service pressure..... | 36 |
| B.3 | Guidance on sample testing of tube material..... | 36 |
| B.4 | Guidance for the temperature required by the equipment manufacturer..... | 37 |
| B.5 | Guidance for the mechanical loads required by the equipment manufacturer | 37 |
| B.6 | Summary of the tests | 37 |
| Annex C | (informative) Principles of damage limit and use of reversible and irreversible strain caused by internal pressure and/or bending loads on composite hollow insulator tubes | 41 |
| C.1 | Overview..... | 41 |
| C.2 | Definition | 41 |
| C.3 | Example of determining the strain tolerance..... | 41 |
| Annex D | (informative) Principle sketch of hollow insulators design assembly | 44 |
| Annex E | (informative) Type tests on tapered (conical) insulators | 46 |
| E.1 | General..... | 46 |
| E.2 | Minimum length on the most stressed cylindrical parts on shortened test specimens | 46 |
| E.3 | Internal pressure test..... | 47 |
| E.4 | Bending test..... | 47 |
| E.5 | References | 49 |
| Bibliography | | 50 |
| Figure 1 | – Thermal-mechanical pre-stressing test – Typical cycles | 29 |
| Figure 2 | – Thermal-mechanical pre-stressing test – Typical test arrangement..... | 30 |
| Figure 3 | – Test arrangement for the leakage rate test..... | 31 |
| Figure 4 | – Examples of sealing systems for composite hollow insulators | 32 |

| | |
|---|----|
| Figure A.1 – Parallelism, coaxiality and concentricity | 33 |
| Figure A.2 – Angular deviation of fixing holes: Example 1 | 34 |
| Figure A.3 – Angular deviation of fixing holes: Example 2 | 34 |
| Figure A.4 – Tolerances according to standard drawing practice..... | 35 |
| Figure B.1 – Relationship of bending loads | 40 |
| Figure B.2 – Relationship of pressures | 40 |
| Figure C.1 – Position of strain gauges for pressure load and bending load | 42 |
| Figure C.2 – Strain/time curve, reversible elastic phase..... | 42 |
| Figure C.3 – Strain/time curve, irreversible plastic phase, damage limit | 43 |
| Figure D.1 – Interface description for insulator with housing made by modular assembly | 44 |
| Figure D.2 – Interface description for insulator with housing made by injection molding and overmolded end fitting..... | 45 |
| Figure E.1 – Illustration of tapered insulators in bending | 47 |
| Figure E.2 – Illustration of axial membrane stress along the insulator when the length of the cylindrical parts is changed | 48 |
| Table 1 – Mechanical loads applied to the insulator | 13 |
| Table 2 – Pressures applied to the insulator | 13 |
| Table 3 – Tests to be carried out after design changes | 15 |
| Table 4 – Sample sizes..... | 24 |
| Table 5 – Choice of re-test procedure | 26 |
| Table B.1 – Loads/stress and classification of tests | 38 |
| Table B.2 – Example of pressure/bending values – Practical relationship of the values..... | 39 |

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**COMPOSITE HOLLOW INSULATORS –
PRESSURIZED AND UNPRESSURIZED INSULATORS FOR USE
IN ELECTRICAL EQUIPMENT WITH AC RATED VOLTAGE GREATER
THAN 1 000 V AND DC VOLTAGE GREATER THAN 1 500 V –
DEFINITIONS, TEST METHODS, ACCEPTANCE CRITERIA
AND DESIGN RECOMMENDATIONS**

FOREWORD

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IEC 61462 has been prepared by IEC technical committee 36: Insulators. It is an International Standard.

This new edition cancels and replaces the previous edition published in 2007. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) modifications of terms and definitions;
- b) modifications of tests procedures included in IEC TR 62039 and IEC 62217 (Hydrophobicity transfer test; Water diffusion test on the core with housing);
- c) modification of Clause 8 (type tests) to reflect common practice and to also consider tapered (conical) insulators;

- d) modification of order of the stages of mechanical sample test (9.4) by setting the tightness test as last stage;
- e) harmonization of Table 3 (Tests to be carried out after design changes) with other product standards;
- f) addition of a new informative Annex D: Principle sketch of hollow insulators design assembly;
- g) addition of a new informative Annex E: Type tests on tapered (conical) insulators.

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

| Draft | Report on voting |
|-------------|------------------|
| 36/567/FDIS | 36/586/RVD |

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 International Standard 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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- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

Composite hollow insulators consist of an insulating tube bearing the mechanical load protected by an elastomeric housing, the loads being transmitted to the tube by metal fittings. Despite these common features, the materials used and the construction details employed by different manufacturers may vary.

Some tests have been grouped together as "Design tests" to be performed only once for insulators of the same design and material. The design tests are performed in order to eliminate designs and materials not suitable for high-voltage applications.

The relevant design tests defined in IEC 62217 are applied for composite hollow insulators; additional specific mechanical tests are given in this document. The influence of time on the electrical and mechanical properties of the complete composite hollow insulator and its components (tube material, housing material, interfaces, etc.) has been considered in specifying the design tests in order to ensure a satisfactory lifetime under normal service conditions. These conditions may also depend on the equipment inside or outside the composite hollow insulators; however, this matter has not been covered in this document. It is possible for test methods not specified in this document to be considered for specific combinations of materials and specific applications, and are a matter of agreement between manufacturers and users. In this document, the term "user" in general means the equipment manufacturer using composite hollow insulators.

Composite hollow insulators are used in both AC and DC applications. Before the appropriate standard for DC applications will be issued, the majority of tests listed in this document can also be applied to DC insulators. In spite of this, a specific tracking and erosion test procedure for DC applications as a design test is still being considered to be developed. Some information about the difference of AC and DC material erosion test can be found in the CIGRE Technical Brochure 611. For the time being, the 1 000 h AC tracking and erosion test of IEC 62217 is used to establish a minimum requirement for the tracking and erosion resistance, for both AC and DC

This document distinguishes between design tests and type tests because several general characteristics of a specific design and specific combinations of materials do not vary for different insulator types. In these cases results from design tests can be adopted for different insulator types.

Pollution tests according to IEC 60507 or IEC 61245 are not included in this document since they are designed for non-polymeric items. Specific pollution tests for polymeric insulators are still under consideration.

The mechanical characteristics of composite hollow insulators are quite different compared to those of hollow insulators made of ceramics. In order to determine the onset of mechanical deterioration of composite hollow insulators under the influence of mechanical stress, strain gauge measurements are used.

This document refers to different characteristic pressures which are used for design and testing of composite hollow insulators. The term "maximum service pressure" (MSP) is equivalent to the term "design pressure" which is used in other standards for ceramic hollow insulators; however, this latter term is not used in this standard in order to avoid confusion with "design" as used in "design tests".

General recommendations for the design and construction of composite hollow insulators are presented in Annex B.