

Tests on hollow insulators for use in electrical equipment (IEC 60233:1974)

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Tests on hollow insulators for use in electrical
equipment

Essais des enveloppes isolantes
destinées à des appareils
électriques

Prüfungen an Hohlisolierkörpern
zur Verwendung in elektrischen
Betriebsmitteln

RD: IEC 233 (1974) ed 2; IEC/SC 36C (not appended)

The Harmonization Document consists of the following:

- Title Page

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DK : NOS

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FI : NOS

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GB : BS 4963 : 1973 (1979)

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

(affiliée à l'Organisation Internationale de Normalisation — ISO)

RECOMMANDATION DE LA CEI

INTERNATIONAL ELECTROTECHNICAL COMMISSION

(affiliated to the International Organization for Standardization — ISO)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

TESTS ON HOLLOW INSULATORS
FOR USE IN ELECTRICAL EQUIPMENT

FOREWORD

- 1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
- 3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendations and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

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PREFACE
SIST HD 329 S1:2000

This recommendation has been prepared by Sub-Committee 36C, Insulators for Sub-stations, of IEC Technical Committee No. 36, Insulators

It supersedes the first edition issued in 1967.

Drafts were discussed at the meetings held in Tehran in 1969 and in Rome in 1970. As a result of this latter meeting, a final draft, document 36C(Central Office)13, was submitted to the National Committees for approval under the Six Months' Rule in November 1971.

The following countries voted explicitly in favour of publication:

| | |
|----------------|----------------------------|
| Czechoslovakia | Poland |
| Denmark | Portugal |
| Finland | South Africa (Republic of) |
| France | Sweden |
| Germany | Switzerland |
| Israel | Turkey |
| Italy | Union of Soviet |
| Japan | Socialist Republics |
| Netherlands | United Kingdom |
| Norway | United States of America |

TESTS ON HOLLOW INSULATORS FOR USE IN ELECTRICAL EQUIPMENT

SECTION ONE — GENERAL

1. Scope

This recommendation applies to insulating weather shields and containers made of ceramic material or glass and applies before any metal fittings are attached. These components are collectively referred to in this recommendation as hollow insulators. They are intended for use in electrical equipment operating on direct current or alternating current at a frequency not greater than 100 Hz.

The hollow insulators covered by this recommendation consist of hollow bodies, open from end to end, with or without sheds, intended for use in electrical apparatus such as:

- instrument transformers;
- lightning arresters;
- capacitors;
- bushings;
- cable sealing ends;
- circuit-breakers.

A hollow insulator may consist of a single insulating element or of several parts permanently joined together.

Hollow insulators are characterized by their shape and the dimensions given on the relevant drawings.

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2. Object

The object of this recommendation is:

- to prescribe methods of test;
 - to prescribe acceptance criteria.
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It is not the object of this recommendation to prescribe impulse voltage or power-frequency voltage type tests, because the withstand voltages are not characteristics of the hollow insulator itself, but of the apparatus of which it ultimately forms a part.

3. Tests

The hollow insulators shall be submitted to the following tests:

- visual inspection;
- electrical routine test;
- verification of dimensions;
- porosity test;
- temperature cycle test.

Note. — For certain applications, hollow insulators may have to be submitted to other tests, for example internal pressure tests or bending tests. Such tests should always be the subject of agreement between manufacturer and purchaser and will generally be considered as additional tests and not replacements for the normal tests listed above. Although the scope of this recommendation is limited to hollow insulators before the metal fittings are attached, these special tests may have to be done after the attachment of the metal fittings. Attention is drawn to the risk that excessive loads in these special tests may adversely affect the performance of insulators in service. In general, routine test loads should not exceed 70% of the minimum failing load.

4. Classification of tests

The tests in this recommendation are classified as routine tests and sample tests.

Routine tests comprise:

- visual inspection (Clause 5);
- electrical routine test (Clause 6).

These tests are made on every hollow insulator offered for acceptance.

Note. — In special cases, the verification of certain dimensions should be a routine test. In such cases, the relevant drawing or the order should specify which dimensions are to be verified as a routine test.

Sample tests comprise:

- verification of dimensions (Clause 7);
- porosity test (Clause 8);
- temperature cycle test (Clause 9).

These tests are made on a small number of hollow insulators taken from the batch after passing the routine tests (Clauses 5 and 6).

Unless otherwise specified, the number of samples shall be in accordance with the following table:

| Number (<i>n</i>) of hollow insulators of one type forming the batch | Number of hollow insulators to be taken for sample tests |
|--|---|
| 12 or less | None, provided that tests have already been made on hollow insulators of the same type and the test report is approved by the purchaser. One, if an approved test report is not available. |
| 13 to 24 | One |
| 25 to 100 | Two |
| 101 to 300 | Three |
| 301 to 500 | Four |
| 501 or more | The whole number equal to or next greater than: $4 + \frac{1.5n}{1000}$ |

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SECTION TWO — ROUTINE TESTS
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5. Visual inspection

a) *Hollow insulators of ceramic material*

The glaze shall be smooth and free from any faults prejudicial to satisfactory performance in service. The colour shall be as specified on the drawing, but small variations in colour shall be permitted and shall not constitute cause for rejection.

Glazed and unglazed areas shall be in accordance with the drawing.

In general, glaze faults which affect only the appearance of a hollow insulator shall be permitted on the parts visible in service if:

– their total surface area is less than: $100 + \frac{D \cdot L}{1000}$ mm²,

– the area of a single glaze fault is less than: $50 + \frac{D \cdot L}{10000}$ mm²,

where:

D is the greatest external diameter over the sheds and

L is the height of the hollow insulator (each expressed in millimetres).

The total area of glaze faults permitted by the formula given above may not be acceptable if the faults are concentrated in groups which unduly affect the appearance. Acceptance in such cases should be subject to agreement between manufacturer and purchaser.

For certain hollow insulators, it may be specified at the time of ordering or on the drawing that glaze faults on the surfaces not visible in service shall be in accordance with special requirements or, alternatively, that the above requirements for external surfaces shall apply also to internal surfaces. In the latter case, *D* shall be taken as the greatest inside diameter of the hollow insulator (expressed in millimetres).