SLOVENSKI STANDARD
SIST HD 568 S1:1998

01-oktober-1998

Test methods for evaluating resistance to tracking and erosion of electrical insulating materials used under severe ambient conditions (IEC 60167:1964)

Methods of test for the determination of the insulation resistance of solid insulating materials

Prüfung von Isolierstoffen für die Elektrotechnik - Isolationswiderstand von festen isolierenden Werkstoffen

Méthodes d'essai pour la détermination de la résistance d'isolement des isolants solides

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METHODS OF TEST FOR THE DETERMINATION OF THE INSULATION RESISTANCE OF SOLID INSULATING MATERIALS

Méthodes d'essai pour la détermination de la résistance d'isolement des isolants solides

Prüfung von Isolierstoffen für die Elektrotechnik - Isolationswiderstand von festen, isolierenden Werkstoffen

BODY OF THE HD

The Harmonization Document consists of:

- IEC 167:1964; IEC/TC 15 (not appended)

This Harmonization Document was approved by CENELEC on 1990-05-01.

The English and French versions of this Harmonization Document are provided by the text of the IEC publication and the German version is the official translation of the IEC text.

According to the CEN/CENELEC Internal Regulations the CENELEC member National Committees are bound:

to announce the existence of this Harmonization Document at national level **by or before 1990-12-15**

to publish their new harmonized national standard **by or before 1991-06-15**

to withdraw all conflicting national standards **by or before 1991-06-15.**

Harmonized national standards are listed on the HD information sheet, which is available from the CENELEC National Committees or from the CENELEC Central Secretariat.

The CENELEC National Committees are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

INTERNATIONAL STANDARD

IEC 60167

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Methods of test for the determination of the insulation resistance of solid insulating materials

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

METHODS OF TEST FOR THE DETERMINATION OF THE INSULATION RESISTANCE OF SOLID INSULATING MATERIALS

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 this international unification, the IEC expresses the wish that all National Committees having as yet no national rules, when preparing such rules, should use the IEC recommendations as the fundamental basis for these rules in so far as national conditions will permit.

4) The desirability is recognized of extending international agreement on these matters through an endeavour to harmonize national standardization rules with these recommendations in so far as national conditions will permit. The National Committees pledge their influence towards that end.

PREFACE

This Recommendation was prepared by Technical Committee No. 15, Insulating Materials.

The study of standardized methods of measurement of the volume and surface resistivities and the insulation resistance of an insulating material were commenced by Technical Committee No. 15 at Scheveningen in September 1952. It was then decided to treat the methods of measurement in three parts dealing respectively with volume resistivity, surface resistivity and insulation resistance. The methods recommended for the measurement of the volume and surface resistivities were issued as an IEC Recommendation in Publication 93 (1958).

A draft concerning the methods of measurement of insulation resistance was submitted to the National Committees for approval under the Six Months' Rule in March 1960. Amendments to this draft were submitted to the National Committees for approval under the Two Months' Procedure in February 1962.

The following countries voted explicitly in favour of publication:

Austria	Japan
Belgium	Netherlands
Bulgaria	Norway
Canada	Romania
Czechoslovakia	Sweden
Denmark	Switzerland
France	United Kingdom
Germany	Union of Soviet Socialist Republics
Italy	United States of America

METHODS OF TEST FOR THE DETERMINATION OF THE INSULATION RESISTANCE OF SOLID INSULATING MATERIALS

SECTION ONE — GENERAL

1. Scope

These methods of test cover procedures for the determination of insulation resistance without discrimination between the volume and surface resistances involved. Because the test specimens are simply and easily prepared, these methods are particularly useful for rapidly determining values which will give a general indication of quality when great accuracy is not required.

2. Definitions

2.1 *Insulation resistance*

The insulation resistance between two electrodes which are in contact with, or embedded in, a specimen, is the ratio of the direct voltage applied to the electrodes to the total current between them at a given time after the application of that voltage. It is dependent upon both the volume and surface resistances of the specimen.

3. Significance

3.1 The methods for determining the insulation resistance of solid insulating materials give values of resistance which include, without discrimination, both volume and surface resistance. These methods consequently do not give well defined constants for the material, in contrast to the Recommended Methods of Test for Volume and Surface Resistivities (see IEC Publication 93). However, they give empirical values which can be used for the comparison of the quality of different insulating materials.

3.2 These methods are very useful for determining the influence of moisture on hygroscopic insulating materials, in which conditioning appreciably modifies not only the insulating properties of the surface but also those of the body of the material.

4. Test equipment

4.1 The insulation resistance may be determined either by a bridge method or by measuring the current and voltage. Brief descriptions of such measuring methods are given in Clause 14 *a*) of IEC Publication 93, Recommended Methods of Test for Volume and Surface Resistivities of Electrical Insulating Materials.

4.2 The applied voltage during the measurement shall be a direct voltage which is steady enough so that the charging current appearing when the voltage varies is negligible compared with the current flowing through the specimen. In some cases this may require the use of batteries.

SECTION TWO — ELECTRODES

5. Electrodes

The electrodes shall be made of such a material that they will not corrode under the conditions of test or react with the material being tested. The following electrodes have been found to be satisfactory. The taper pin electrodes are generally used when the volume resistance is of primary interest. The other electrodes are used when the surface resistance is of primary interest.

6. Taper pin electrodes (for flat plates, tubes and rods)

Clean brass or steel pins of approximately 5 mm diameter and having a taper of approximately 2% are used, the length being sufficient to comply with the requirements of Clause 9. These electrodes may be used with flat specimens, tubes and rods. (Figures 1 and 2, pages 16 and 17), and are used by inserting them in two transverse parallel holes whose centres are 25 ± 1 mm apart (see Clause 9).

7. Conducting paint electrodes (for flat plates; tubes and rods)

Conducting paint may be used as an electrode material. The vehicle of the conducting paint should be of such a nature that it will not have any effect on the insulation resistance to be measured. Two equidistant stripes of conducting paint 1 mm wide are applied around tubes and rods so that the nearest edges are 10 ± 0.5 mm apart. (This can be easily done by mounting the tube or rod in a lathe and rotating it against a small brush or drawing pen containing the paint). This type of electrode may also be used on plate specimens. In this case the electrodes are two parallel stripes of conducting paint, 1 mm wide; the total length of each electrode is 100 ± 1 mm, and they are spaced 10 ± 0.5 mm apart. (Figures 3 and 4, pages 18 and 19.)

8. Bar electrodes (for thin sheets and tapes)

The electrodes are metal bar clamps about 10 mm × 10 mm × 50 mm which are spaced 25 ± 0.5 mm apart (Figure 5, page 21). The electrodes are used for thin sheet material (usually 1 mm or less in thickness) and for flexible tapes. The bar electrodes may be mounted by means of insulating parts on a metal support to be used as a guard in the measurement of resistance (Figure 5 *a*)). Alternatively the electrodes may be supported by the test specimen, or by their connections to the insulated terminals (Figure 5 *b*)). For rigid materials the bars shall have tinfoil wrapped around them and, after the bars have been clamped onto the test specimen, the tinfoil shall be pressed down with a thin tool along the edge of the electrode to assure intimate contact with the test piece.

SECTION THREE — TEST SPECIMENS

9. Test specimens for taper pin electrodes

For measurements with taper pin electrodes, the test specimens shall be rectangular plates having a size a least 50 mm × 75 mm (Figure 1), or tubes or rods at least 20 mm in diameter and 75 mm in length (Figure 2). To introduce the electrodes, the plates, tubes and rods shall be drilled with two parallel transverse holes whose centres are 25 ± 1 mm apart and are of such a diameter that, after reaming with a reamer tapered as the pin electrodes, the diameter of each hole at the larger end is not less than 4.5 mm and not greater than 5.5 mm. The holes shall be drilled completely through the specimen — in the case of tubes, through one wall only—and shall be reamed throughout their full length.