

Insulating and sheathing materials of electric cables

Part 5. Methods of test specific to filling compounds

**Section 5.1 Drop-point — Separation of
oil — Lower temperature brittleness —
Total acid number — Absence of
corrosive components — Permittivity
at 23 °C — D.C. resistivity at 23 °C
and 100 °C**

(Implementation of HD 505.5.1 S1)

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Cables and Insulation Standards Policy Committee (CIL/-) to Technical Committee CIL/20, upon which the following bodies were represented:

- Aluminium Federation
- Association of Consulting Engineers
- Association of Manufacturers of Domestic Electrical Appliances
- British Approvals Service for Cables
- British Cable Makers' Confederation
- British Plastics Federation
- British Steel Industry
- British Telecommunications plc
- Department of the Environment (Property Services Agency)
- Department of Trade and Industry (Consumer Safety Unit, CA Division)
- Electricity Association
- Engineering Equipment and Materials Users' Association
- Institution of Electrical Engineers
- London Regional Transport

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- British Railways Board
- British Rubber Manufacturers' Association Ltd.
- ERA Technology Ltd.
- GAMBICA (BEAMA Ltd.)
- Institution of Incorporated Executive Engineers
- London Underground Ltd.
- Queen Mary and Westfield College
- Telecommunications Cables Group of BCMC

This British Standard, having been prepared under the direction of the Cables and Insulation Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 15 August 1992

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National foreword

This Section of BS 6469 has been prepared under the direction of the Cables and Insulation Standards Policy Committee. BS 6469 : Parts 1 to 5 and Part 99 supersede BS 6469 : 1990 which is withdrawn.

Parts 1 to 5 implement CENELEC HD 505 : Parts 1 to 5 which were derived from IEC 811 : Parts 1 to 5. Part 99 describes test methods having national applicability only.

The International Electrotechnical Commission has completed its comprehensive update of the test methods previously given in IEC 538, IEC 538A and IEC 540, which are now largely brought together in IEC 811. Electrical tests from IEC 540 have been incorporated into IEC 885. The technical changes introduced during this update, and endorsed by CENELEC in HD 505, are now included in BS 6469.

BS 6469 : Section 4.2 includes a number of test methods described in BS 6234. Other test methods from BS 6234, from BS 6746 and from BS 6899 have been incorporated in BS 6469 : Part 99. The status of these test methods in BS 6234, BS 6746 and BS 6899 will be reviewed separately.

BS 6469 describes methods of test, but does not specify requirements for products or materials. These will be specified in the relevant cable standards or cable material standards.

This Section of BS 6469 implements CENELEC Harmonization Document HD 505.5.1 S1 : 1992, which is identical with IEC 811-5-1 : 1990.

Definitions of terms relating to electric cables are given in BS 4727 : Part 2 : Group 08.

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

WARNING. The methods of test described in this British Standard do not necessarily detail all precautions necessary to meet the requirements of the Health and Safety at Work etc. Act 1974. Attention should be paid to any appropriate safety precautions and the tests should be carried out only by trained personnel.

Cross-references between the relevant clauses in BS 6469 : 1990 and those in BS 6469 : Parts 1 to 5 and Part 99 are given in table NB.1. Tests included in BS 6469 : Sections 1.3 and 5.1 which were not given in BS 6469 : 1990 are listed in table NC.1.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

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Descriptors: Electric cable, insulated cable, electrical insulation, outer sheath, test method, drop-point, oil, separation, brittleness, acid number, permittivity, resistivity

English version

Common test methods for insulating and sheathing materials of electric cables

Part 5. Methods specific to filling compounds

Section 1 — Drop point — Separation of oil — Lower temperature brittleness — Total acid number — Absence of corrosive components — Permittivity at 23 °C — D.C. resistivity at 23 °C and 100 °C

(IEC 811-5-1 : 1990)

Méthodes d'essais communes pour les matériaux d'isolation et de gainage des câbles électriques
Cinquième partie: Méthodes spécifiques pour les matières de remplissage
Section un: Point de goutte — Séparation d'huile — Fragilité à basse température — Indice d'acide total — Absence de composés corosifs — Permittivité à 23 °C — Résistivité en courant continu à 23 °C et 100 °C
(CEI 811-5-1 : 1990)

Allgemeine Prüfungen für Isolier- und Mantelwerkstoffe für Kabel und isolierte Leitungen
Teil 5: Besondere Prüfungen für Füllmassen
Abschnitt eins: Tropfpunkt — Ölausscheidung — Kältesprödigkeit Gesamtsäurezahl — Fehlen korrosiver Bestandteile — Dielektrizitätskonstante bei 23 °C — Spezifischer Widerstand bei 23 °C und 100 °C
(IEC 811-5-1 : 1990)

This Harmonization Document was approved by CENELEC on 1991-12-10. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this Harmonization Document on a national level.

Up-to-date lists and bibliographical references concerning national implementation may be obtained on application to the Central Secretariat or to any CENELEC member.

This Harmonization Document exists in three official versions (English, French, German).

CENELEC members 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.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 811-5-1 : 1990 could be accepted without textual changes, has shown that no CENELEC common modifications were necessary for the acceptance as Harmonization Document.

The reference document was submitted to the CENELEC members for formal vote and was approved by CENELEC as HD 505.5.1 S1 on 10 December 1991.

The following dates were fixed:

- latest date of
announcement of the
HD at national level (doa) 1992-06-01
- latest date of
publication of a
harmonized national
standard (dop) 1992-12-01
- latest date of
withdrawal of
conflicting national
standards (dow) 1992-12-01

For products which have complied with the relevant national standard before 1992-12-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1997-12-01.

Annexes designated “normative” are part of the body of the standard. In this standard, annex ZA is normative.

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COMMON TEST METHODS FOR INSULATING AND SHEATHING MATERIALS OF ELECTRIC CABLES

Part 5: Methods specific to filling compounds
Section One - Drop-point - Separation of oil -
Lower temperature brittleness - Total acid number -
Absence of corrosive components - Permittivity at 23 °C -
D.C. resistivity at 23 °C and 100 °C

1. Scope

This standard specifies the test methods for filling compounds of electric cables used with telecommunication equipment.

This Section One of Part 5 gives the methods for drop-point, separation of oil, lower temperature brittleness, total acid number, absence of corrosive components, permittivity at 23 °C, d.c. resistivity at 23 °C and 100 °C.

2. Test values

Any test requirements which are given in this standard may be modified by the relevant cable standard to suit the needs of a particular type of cable.

3. Applicability

Conditioning values and testing parameters are specified for the most common types of insulating and sheathing compounds and of cables, wires and cords.

4. Drop-point

Note. - These tests are intended for classification purposes only.

4.1 General

The drop-point test may be used as an indication of the maximum temperature to which a filling compound can be exposed without complete liquefaction or excessive oil separation.

4.2 Method A (reference method)

4.2.1 Apparatus

A chromium plated brass cup conforming to the dimensions shown in figure 1.

A heat-resistant glass test tube conforming to the dimensions shown in figure 2 with three indentations to support the cup.

Thermometers with a range -5°C to 300°C (76 mm immersion) marked in degrees Celsius with a scale accuracy of 1°C . The bulb lengths shall be 10 mm to 15 mm, and the bulb diameters shall be 5 mm to 6 mm.

An oil bath consisting of a 400 ml beaker and suitable oil, a ring stand and ring for the support of the oil bath, clamps for the thermometers, two corks as shown in figure 2, a polished metal rod 1.2 mm to 1.6 mm in diameter and 150 mm in length, and a suitable means for heating and stirring the oil bath.

4.2.2 *Test procedure*

Place the corks on one of the thermometers as shown in figure 2 and adjust the position of the upper cork so that the tip of the thermometer bulb is about 3 mm above the bottom of the cup when the apparatus is assembled for test. Suspend a second thermometer in the oil bath so that its bulb is at approximately the same level as the bulb of the thermometer in the test tube.

Fill the cup by presenting its larger opening into the filling compound until the cup is filled, taking care to avoid working the filling compound as far as possible. Cut away excess compound. The cup shall be held in a vertical position with its smaller opening at the bottom while it is gently pressed down over the metal rod until the rod protrudes about 25 mm above the larger opening. Press the rod against the cup in such a manner that the rod makes contact with both the upper and lower peripheries of the cup. Maintain this contact while rotating the cup around its axis and simultaneously moving the cup down the rod until the cup passes over the lower end of the rod. This spiral-like motion will cause the compound to adhere along the rod leaving a conical void of compound in the cup and a compound coating having reproducible geometry on the inside of the cup.

Place the cup and the thermometer in the test tube and suspend the test tube in the oil bath with the oil level within 6 mm of the rim. If the cork holding the thermometer in the test tube has been properly chosen, the 76 mm immersion mark on the thermometer will coincide with the lower edge of the cork. The assembly should be immersed to this point.

Stir the oil bath and heat at a rate of 4 K/min to 7 K/min until the bath reaches a temperature approximately 17°C below the expected drop-point of the compound. Then reduce the rate of heating so that the temperature in the test tube will be within 2°C or less of the temperature in the oil bath before the oil bath temperature increases an additional 2.5 K.