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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electric and optical fibre cables – Test methods for non-metallic materials – Part 407: Miscellaneous tests – Measurement of mass increase of polyethylene and polypropylene compounds

**Câbles électriques et à fibres optiques – Méthodes d'essai pour les matériaux non-métalliques –
Partie 407: Essais divers – Mesure de l'augmentation de la masse des mélanges polyéthylène et polypropylène**

IEC 60811-407:2012

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRIC AND OPTICAL FIBRE CABLES – TEST METHODS FOR NON-METALLIC MATERIALS –

Part 407: Miscellaneous tests – Measurement of mass increase of polyethylene and polypropylene compounds

FOREWORD

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International Standard IEC 60811-407 has been prepared by IEC technical committee 20: Electric cables.

This Part 407 of IEC 60811 cancels and replaces Clause 11 of IEC 60811-4-2:2004, which is withdrawn. Full details of the replacements are shown in Annex A of IEC 60811-100:2012.

There are no specific technical changes with respect to the previous edition, but see the Foreword to IEC 60811-100:2012.

The text of this standard is based on the following documents:

FDIS	Report on voting
20/1291/FDIS	20/1340/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This part of IEC 60811 shall be used in conjunction with IEC 60811-100.

A list of all the parts in the IEC 60811 series, published under the general title *Electric and optical fibre cables – Test methods for non-metallic materials*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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- withdrawn,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

INTRODUCTION

The IEC 60811 series specifies the test methods to be used for testing non-metallic materials of all types of cables. These test methods are intended to be referenced in standards for cable construction and for cable materials.

NOTE 1 Non-metallic materials are typically used for insulating, sheathing, bedding, filling or taping within cables.

NOTE 2 These test methods are accepted as basic and fundamental and have been developed and used over many years principally for the materials in all energy cables. They have also been widely accepted and used for other cables, in particular optical fibre cables, communication and control cables and cables for ships and offshore applications.

ELECTRIC AND OPTICAL FIBRE CABLES – TEST METHODS FOR NON-METALLIC MATERIALS –

Part 407: Miscellaneous tests – Measurement of mass increase of polyethylene and polypropylene compounds

1 Scope

This Part 407 of IEC 60811 gives the procedure to examine possible interaction between insulation material and filling compound of filled cable.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60811-100:2012, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 100: General*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60811-100 apply.

4 Test method

4.1 General

This part of IEC 60811 shall be used in conjunction with IEC 60811-100.

This test is used to examine the possible interaction between insulation materials and filling compounds of filled cables. It is intended only for the purpose of material selection.

4.2 Apparatus

For the purpose of this test, the different equipment used is as follows:

a) a glass vessel;

b) an oven with natural air flow;

c) an analytical balance with a precision of 0,1 mg.

4.3 Sampling and test pieces preparation

Three samples of each colour of insulated core shall be taken from a cable before the filling process. Each sample of about 2 m shall be cut into three pieces of length 600 mm, 800 mm and 600 mm.

4.4 Test procedure

The 800 mm test piece shall be immersed in about 200 g of filling compound contained in a glass vessel and pre-heated to the following temperature:

– (60 ± 2) °C for filling compound having a drop-point above 50 °C and up to and including 70 °C;

– (70 ± 2) °C for filling compound having a drop-point above 70 °C.

NOTE For an explanation of the drop-point, see IEC 60811-601.

At least 500 mm of the middle part of this test piece shall be immersed in the compound without contact with the glass vessel or another specimen. The ends of the test piece shall be kept out of the compound.

The glass vessel shall be stored for 10 × 24 h in an oven and the temperature shall be maintained continuously at the value specified above for the relevant filling compound.

At the end of the period, the test piece shall be removed from the filling compound and carefully cleaned with absorbent paper. The ends of the test piece shall then be cut away leaving at least 500 mm of the middle part that has been immersed in the filling compound. The two dry 600 mm pieces shall be cut back to the same length as the immersed test piece and the conductor shall be removed from all three.

4.5 Measurements

The three test pieces shall be weighed at ambient temperature to the nearest 0,5 mg.

4.6 Expression of the result

The mass increase W, expressed in per cent, shall be determined as follows:

$$W = \frac{M_2 - M_1}{M_1} \times 100$$

where

M_1 is the mean mass of the two dry test pieces;

M_2 is the mass of test piece immersed in the filling compound.

5 Test report

The test report shall be in accordance with that given in IEC 60811-100.

Bibliography

IEC 60811-4-2:2004, *Insulating and sheathing materials of electric and optical cables – Common test methods – Part 4-2: Methods specific to polyethylene and polypropylene compounds – Tensile strength and elongation at break after conditioning at elevated temperature – Wrapping test after conditioning at elevated temperature – Wrapping test after thermal ageing in air – Measurement of mass increase – Long-term stability test – Test method for copper-catalyzed oxidative degradation*
(withdrawn)

IEC 60811-601, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 601: Physical tests – Measurement of the drop point of filling compounds*