BS EN 60811-411:2012

BSI Standards Publication

Electric and optical fibre cables — Test methods for non-metallic materials

Part 411: Miscellaneous tests — Low-temperature brittleness of filling compounds

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National foreword

This British Standard is the UK implementation of EN 60811-411:2012. It is identical to IEC 60811-411:2012.

In the UK, the relationship between the supersessions of BS EN 60811 series can be summarized as follows.

BS EN 60811-100 together with	Supersedes -
-201, -202, -203, -501	BS EN 60811-1-1:1995
-301, -302, -411, -601, -602, -603, -604	BS EN 60811-5-1:2000
-401, -412	BS EN 60811-1-2:1995
-402, -502, -503, -606	BS EN 60811-1-3:1995
-403, -404, -507	BS EN 60811-2-1:1998
-405, -409	BS EN 60811-3-2:1995
-406, -511, -605, -607	BS EN 60811-4-1:2004
-407, -408, -410, -510, -512, -513	BS EN 60811-4-2:2004
-504, -505, -506	BS EN 60811-1-4:1995
-508, -509	BS EN 60811-3-1:1995

Superseded standards are withdrawn

The UK participation in its preparation was entrusted by Technical Committee GEL/20, Electric cables, to Subcommittee GEL/20/17, Electric Cables - Low voltage.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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EUROPEAN STANDARD

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English version

Electric and optical fibre cables - Test methods for non-metallic materials - Part 411: Miscellaneous tests - Low-temperature brittleness of filling compounds

(IEC 60811-411:2012)

Câbles électriques et à fibres optiques - Méthodes d'essai pour les matériaux non-métalliques - Partie 411: Essais divers - Fragilité à basse température des matières de remplissage (CEI 60811-411:2012)

Kabel, isolierte Leitungen und Glasfaserkabel - Prüfverfahren für nichtmetallene Werkstoffe - Teil 411: Sonstige Prüfungen - Kälterissbeständigkeit von Füllmassen (IEC 60811-411:2012)

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

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Foreword

The text of document 20/1295/FDIS, future edition 1 of IEC 60811-411, prepared by IEC/TC 20 "Electric cables" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60811-411:2012.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2013-01-16
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2015-04-16

This document supersedes Clause 6 of EN 60811-5-1:1999 + A1:2004 (partially). Full details of the replacements are shown in Annex A of EN 60811-100:2012.

There are no technical changes with respect to EN 60811-5-1:1999 + A1:2004, but see the Foreword to EN 60811-100:2012.

This standard is to be read in conjunction with EN 60811-100.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This standard covers the Principle Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits (LVD - 2006/95/EC).

Endorsement notice

The text of the International Standard IEC 60811-411:2012 was approved by CENELEC as a European Standard without any modification.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60811-100	2012	Electric and optical fibre cables - Test methods for non-metallic materials - Part 100: General	EN 60811-100	2012

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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 411: Miscellaneous tests – Low-temperature brittleness of filling compounds

1 Scope

This Part 411 of IEC 60811 gives the procedure to evaluate lower temperature brittleness which typically applies to filling compounds used for communication and optical fibre cables.

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 adhesion between the compound and other elements of the cable.

NOTE The test method does not apply to filling compounds with a drop-point higher than 80 °C.

4.2 Apparatus

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

a) strips of lead alloy of dimensions 170 mm × 14 mm × 0,9 mm;

b) sheet brass pattern of dimensions 160 mm × 160 mm × 1 mm having a rectangular opening of 100 mm × 10 mm and a locating edge to avoid movement on the strips;

c) metal mandrel having a 10 mm diameter;

d) cold enclosure for –10 °C ± 1 °C.

4.3 Sample and test pieces preparation

From a sample of finished cable take the filling compound to be tested. Ten test pieces shall be prepared with this compound as described below.

Each strip of lead alloy shall be cleaned with a wire brush and laid on a plain base.

The pattern is placed on the strip so that the longitudinal edges of the strip are covered symmetrically.

The compound to be tested is spatulated at ambient temperature into the opening of the pattern, and excess material shall be removed by a warmed spatula or other suitable device. The pattern is then removed from the strip.

4.4 Ageing procedure

The test pieces shall be conditioned for at least 16 h at room temperature and then cooled to –10 °C ± 1 °C for at least 1 h. Each sample shall then immediately be wound helically around a metal mandrel having a 10 mm diameter and which is fixed in a horizontal position and pre-cooled to –10 °C. The rate of winding shall be about one revolution per second.

4.5 Evaluation of the results

Each test piece shall be examined for cracks, with normal or corrected vision, without magnification.

Not more than two of the ten test pieces shall show cracks. If more than two samples fail, the test may be repeated one more time.

NOTE A slight lifting off at the corners of the compound layer is acceptable.

5 Test report

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

Bibliography

IEC 60811-5-1:1990, *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*
(withdrawn)

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