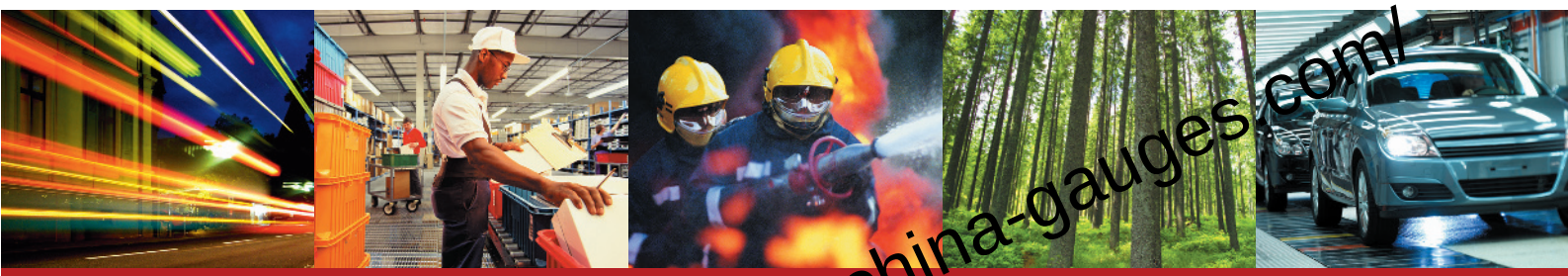
BS EN 60811-404:2012



BSI Standards Publication

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

Part 404: Miscellaneous tests — Mineral oil immersion tests for sheaths

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National foreword

This British Standard is the UK implementation of EN 60811-404:2012. It is identical to IEC 60811-404:2012.

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Superseded standards are withdrawn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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Compliance with a British Standard cannot confer immunity from legal obligations.

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Amendments issued since publication

Amd. No.	Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60811-404

June 2012

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Supersedes EN 60811-2-1:1998 (partially) + A1:2001 (partially)

English version

Electric and optical fibre cables - Test methods for non-metallic materials - Part 404: Miscellaneous tests - Mineral oil immersion tests for sheaths

(IEC 60811-404:2012)

Câbles électriques et à fibres optiques - Méthodes d'essai pour les matériaux non-métalliques - Partie 404: Essais divers - Essais de résistance à l'huile minérale pour les gaines (CEI 60811-404:2012)

Kabel, isolierte Leitungen und Glasfaserkabel - Prüfverfahren für nichtmetallene Werkstoffe - Teil 404: Sonstige Prüfungen - Ölbeständigkeitsprüfungen für Mäntel (IEC 60811-404:2012)

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Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 60811-404:2012 E

Foreword

The text of document 20/1288/FDIS, future edition 1 of IEC 60811-404, prepared by IEC/TC 20 "Electric cables" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60811-404:2012.

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 10 of EN 60811-2-1:1998 + A1:2001 (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 60811-2-1:1998 + A1:2001, 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 60811-404:2012 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
IEC 60811-501	-	Electric and optical fibre cables - Test methods for non-metallic materials - Part 501: Mechanical tests - Tests for determining the mechanical properties of insulating and sheathing compounds	EN 60811-501	-
ISO 1817	-	Rubber, vulcanized - Determination of the effect of liquids	-	-

CONTENTS

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 404: Miscellaneous tests – Mineral oil immersion tests for sheaths

1 Scope

This Part 404 of IEC 60811 specifies the method for a mineral oil immersion test, which typically applies to cross-linked compounds used for sheathing materials.

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*

IEC 60811-501, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 501: Mechanical tests – Tests for determining the mechanical properties of insulating and sheathing compounds*

ISO 1817, *Rubber, vulcanized – Determination of the effect of liquids*

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.

Unless otherwise specified, tests shall be carried out at room temperature.

4.2 Pre-conditioning

All the tests shall be carried out not less than 16 h after the extrusion or cross-linking, if any, of the sheathing compounds.

4.3 Sample and test piece preparation

Five test pieces shall be prepared in accordance with the procedures described in IEC 60811-501.

4.4 Determination of the cross-sectional area of the test piece

See the test method in IEC 60811-501.

4.5 Oil to be used

Unless otherwise agreed, the mineral oil to be used shall be oil no. 2 (IRM 902) as described in ISO 1817.

4.6 Procedure

The test pieces shall be immersed in the oil bath, previously heated to the specified test temperature, and shall be maintained in the oil at that temperature for the specified time (see standard for the type of cable).

At the end of the specific duration, the test pieces shall be removed from the oil, blotted lightly to remove excess oil and suspended in air at ambient temperature for at least 16 h but not more than 24 h, unless otherwise specified in the relevant cable standard. At the end of this period, any further excess oil shall be removed by lightly blotting the test pieces.

4.7 Determination of mechanical properties

See the test method in IEC 60811-501.

4.8 Expression of results

The calculation of tensile strength shall be based on the cross-sectional area of the test piece measured before immersion (see 4.2.2).

The difference between the median value obtained on the five test pieces immersed in oil and the median value of the values obtained for the untreated test pieces (see IEC 60811-501), expressed as a percentage of the latter, shall not exceed the percentage specified in the standard for the type of cable.

If required by the standard for the material in the relevant standard for the type of cable, the values found for the aged test pieces shall be calculated, in terms of variation compared to the untreated test pieces according to the following formulae:

$$V_T = \frac{T_E - T_U}{T_U} \times 100 \quad (1)$$

$$V_E = \frac{E_E - E_U}{E_U} \times 100 \quad (2)$$

where

V_T is the variation of the tensile strength in per cent;

T_E is the tensile strength of aged test piece;

T_U is the tensile strength of untreated test piece;

V_E is the variation of the elongation at break in per cent;

E_E is the elongation at break of aged test piece in per cent;

E_U is the elongation at break of untreated test piece in per cent.

NOTE The untreated specimen is kept at room temperature.

5 Test report

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

Bibliography

IEC 60811-2-1:1998, *Insulating and sheathing materials of electric and optical cables – Common test methods – Part 2-1: Methods specific to elastomeric compounds – Ozone resistance, hot set and mineral oil immersion test*
(withdrawn)

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