BS EN 60811-506:2012

BSI Standards Publication

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

Part 506: Mechanical tests — Impact test at low temperature for insulations and sheaths

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National foreword

This British Standard is the UK implementation of EN 60811-506:2012. It is identical to IEC 60811-506:2012.

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Superseded standards are withdrawn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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EN 60811-506

June 2012

ICS 29.035.01; 29.060.20

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English version

Electric and optical fibre cables - Test methods for non-metallic materials - Part 506: Mechanical tests - Impact test at low temperature for insulations and sheaths

(IEC 60811-506:2012)

Câbles électriques et à fibres optiques - Méthodes d'essai pour les matériaux non-métalliques - Partie 506: Essais mécaniques - Essai de choc à basse température pour les enveloppes isolantes et les gaines (CEI 60811-506:2012)

Kabel, isolierte Leitungen und Glasfaserkabel - Prüfverfahren für nichtmetallene Werkstoffe - Teil 506: Mechanische Prüfungen - Schlagprüfungen bei niedriger Temperatur für Isolierhüllen und Mäntel (IEC 60811-506:2012)

CENELEC

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

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Foreword

The text of document 20/1302/FDIS, future edition 1 of IEC 60811-506, prepared by IEC/TC 20 "Electric cables" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60811-506:2012.

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)	2013-01-17
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2015-04-17

This document supersedes 8.5 of EN 60811-1-4:1995 + A2:2001 (partially). Full details of the replacements are shown in Annex A of EN 60811-100:2012.

There are no specific technical changes with respect to EN 60811-1-4:1995, 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 60811-506:2012 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated :

IEC 60811-1-4:1985	NOTE	Harmonized as EN 60811-1-4:1995 (not modified).

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

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 506: Mechanical tests – Impact test at low temperature for insulations and sheaths

1 Scope

This Part 506 of IEC 60811 gives the procedure for performing impact tests at low temperature on extruded insulations and sheaths.

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.

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

Tests shall be carried out at the temperature specified in the relevant cable standard.

This cold impact test is intended for sheathed cables of any type, irrespective of the type of insulation of the cores, and for the insulation of wires, cables and flat cables without sheath if required by the relevant cable standard.

The insulation of sheathed cables is not subjected directly to the cold impact test.

4.2 Sampling and preparation of the test pieces

Three pieces of complete cable each having a length at least five times the diameter of the cable with a minimum of 150 mm, shall be taken. All covering external to the component shall be removed.

4.3 Apparatus

The apparatus to be used for this test is represented in Figure 1, with explanations.

The apparatus shall be placed on a pad of sponge rubber about 40 mm thick and held in a suitable low temperature cabinet before and during the test.

4.4 Test conditions

The test temperature shall be as specified for the type of compound in the relevant cable standard.

For power cables for fixed installations, the mass of the hammer for testing the samples shall not be less than the values as given in Table 1.

Table 1 – Mass of hammer for power cables in fixed installations

Overall diameter mm		Mass of the hammer g
Above	Up to and including	
–	4,0	100
4,0	6,0	200
6,0	9,0	300
9,0	12,5	400
12,5	20,0	500
20,0	30,0	750
30,0	50,0	1 000
50,0	75,0	1 250
75,0	–	1 500

For flexible cables and telecommunication cables, the mass of the hammer for testing the sample shall not be less than the values as shown in Table 2.

Table 2 – Mass of hammer for flexible cables and telecommunication cables

Overall diameter mm		Mass of the hammer g
Above	Up to and including	
Flat cables		100
–	6,0	100
6,0	10,0	200
10,0	15,0	300
15,0	25,0	400
25,0	35,0	500
35,0	–	600

The overall diameter referred to in Table 1 and Table 2 shall be measured on each test piece by a vernier calliper or a measuring tape.

Flat cables shall be tested with their minor axis perpendicular to the steel base.

4.5 Procedure

The apparatus and the pieces of cable to be tested shall be placed side by side in a suitable low temperature cabinet and maintained at the specified temperature. The contents of the refrigerator shall then be allowed to cool for a period not less than 16 h, which includes the time for the apparatus to cool down. If the apparatus has been pre-cooled, a shorter cooling period is permissible, but not less than 1 h provided that the test pieces have attained the prescribed test temperature.

At the end of the prescribed periods, each piece in turn shall be placed in position as shown in Figure 1, and the hammer shall be allowed to fall from a height of 100 mm.

Before examining the insulation of cables or cables without a sheath, the test pieces shall be allowed to attain approximately ambient temperature after the test.

The insulation shall then be examined after the test pieces have been twisted, while held straight, through an angle equal to 360° for each 100 mm length. If, however, it is not possible to twist the samples in this way, they shall be examined as specified for the sheath.

Before examining the sheath of cables, if any, the test pieces shall be allowed to attain approximately room temperature and then be immersed in hot water; the sheath shall then be cut open in the direction of the axis of the cables.

NOTE Hand-hot water (40 °C to 50 °C) has been found to be adequate.

The inside and outside of the sheath and the insulation shall then be examined. The insulation of cables with sheath shall be examined on the outside only.

4.6 Expression of results

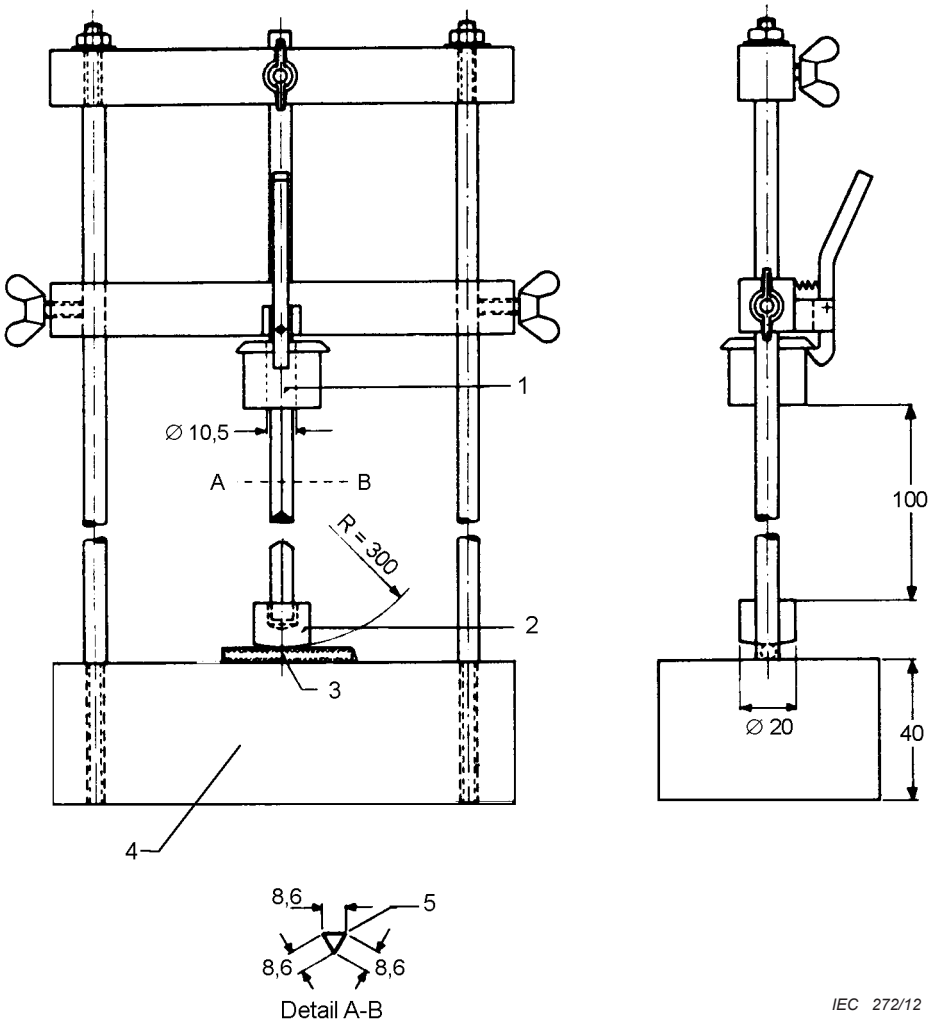
The three pieces shall show no cracks when examined with normal or corrected vision without magnification.

If only one sample of the three shows cracks, then the test shall be repeated on three further samples. If none of these shows cracks, then the requirements of the test are met. However, if any one of the three additional samples shows cracks, the insulation and/or sheath does not comply with the test requirements.

5 Test report

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

Dimensions in millimeters



Key

1 hammer
2 steel intermediate piece 100 g
3 test piece
4 steel 10 kg
5 slightly rounded edges

Figure 1 – Impact test apparatus

Bibliography

IEC 60811-1-4:1985, *Common test methods for insulating and sheathing materials of electric cables – Part 1: Methods for general application – Section four – Test at low temperature* (withdrawn)

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