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Edition 1.2 2023-11
CONSOLIDATED VERSION

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Electric and optical fibre cables – Test methods for non-metallic materials – Part 508: Mechanical tests – Pressure test at high temperature for insulation and sheaths

Câbles électriques et à fibres optiques – Méthodes d'essai pour les matériaux non-métalliques – Partie 508: Essais mécaniques – Essai de pression à température élevée pour les enveloppes isolantes et les gaines



IEC 60811-508:2012-03+AMD1:2017-07+AMD2:2023-11 CSV(en-fr)



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VERSION REDLINE

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 508: Mechanical tests – Pressure test at high temperature for insulation and sheaths

FOREWORD

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This consolidated version of the official IEC Standard and its amendments has been prepared for user convenience.

IEC 60811-508 edition 1.2 contains the first edition (2012-03) [documents 20/1304/FDIS and 20/1353/RVD], its amendment 1 (2017-07) [documents 20/1735/FDIS and 20/1740/RVD] and its amendment 2 (2023-11) [documents 20/1735/FDIS and 20/1740/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendments 1 and 2. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 60811-508 has been prepared by IEC technical committee 20: Electric cables.

Significant technical changes with respect to the previous edition are as follows:

– re-statement of oven characteristics, especially relating to anti-vibration and to temperature control;
– enhanced detail as to the preparations and testing of flat cables;
– enhanced detail as to thickness and dimensional measurements.

See also the Foreword to IEC 60811-100:2012.

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 document and its amendments will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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- withdrawn,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

IMPORTANT – The *'colour inside'* logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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 508: Mechanical tests – Pressure test at high temperature for insulation and sheaths

1 Scope

This Part 508 of IEC 60811 gives the procedure for a pressure test at high temperature, which typically applies to thermoplastic compounds used for insulating and sheathing materials.

NOTE 1 The method is principally intended for thermoplastic materials, but may be used for cross-linked materials when specifically required by the relevant cable standard.

NOTE 2 The test method is not recommended for thicknesses below 0,7 mm.

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 60811-201, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 201: General tests – Measurement of insulation thickness*

IEC 60811-202, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 202: General tests – Measurement of thickness of non-metallic sheaths*

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 standard gives the method for the pressure test at high temperature which applies to insulation and sheathing compounds.

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

4.2 Apparatus

4.2.1 Air oven

The test shall be carried out in an oven. ~~The oven shall use natural air circulation.~~ Either an oven with natural air circulation or one with fan-assisted circulation may be used. If vibrations from a fan-assisted oven causes inconsistent results, an oven with natural air circulation shall be used instead.

~~NOTE 1 Forced or continuous air circulation is not required. Ovens fitted with air stirring mechanisms are likely to cause vibration.~~

The oven shall not incorporate any equipment likely to cause vibration, nor shall it include exposed heating elements. The temperature of the air shall be maintained continuously at the value specified in the relevant cable standard. The oven shall be capable of operating to within ±2 K of the specified test temperature.

~~NOTE 2 The need for a temperature control to ±2 K is crucial. This is especially so if the material under test is a thermoplastic with a sharp melting point (such as some ethylene polymers) as a small temperature rise above that specified can result in a large increase in indentation.~~

NOTE Thermoplastic materials with a sharp melting point (as some ethylene polymers) can experience a large increase in indentation with a small temperature rise above the specified test temperature.

In operation, the oven shall be located in a position free from vibration.

4.2.2 Indentation device

A device according to Figure 1 shall be used. It shall consist of a rectangular blade with ~~an~~ a flat edge (0,70 ±0,01) mm wide which can be pressed against the test piece under the influence of an applied force.

4.3 Insulation

4.3.1 Sample and test piece preparation

For each core to be tested, three adjacent pieces shall be taken from a sample having a length of 250 mm to 500 mm. The length of each piece shall be 50 mm to 100 mm.

From each core piece taken, any covering – including the semi-conducting layer, if any – shall be removed mechanically. According to the type of cable, the test piece may have a circular, flat or sector-shaped cross-section of length (45 ± 5) mm.

The cores of twin- and multiple-grouped-core flat cables without sheath shall not be separated individually, except if the individual conductor cross-section is ≥ 10 mm^2. If so, a test piece taken from the insulation of an individual core shall be tested.

The minimum thickness of insulation to be tested shall be 0,7 mm.

NOTE Insulation thickness down to 0,4 mm may be tested under certain circumstances, but it is not recommended. If tests are made with samples having a thickness below 0,7 mm, it should be recorded as such in the test report.

4.3.2 Procedure

4.3.2.1 Fixing of test pieces

The final test piece shall consist of a piece of the sample from 4.3.1.

Circular cores shall be mounted in the position shown in Figure 1 (3a).

A flat cable without sheath shall be laid on its flat/major axis side.