

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

**Electric and optical fibre cables – Test methods for non-metallic materials –  
Part 513: Mechanical tests – Methods specific to polyethylene and  
polypropylene compounds – Wrapping test after conditioning**

**Câbles électriques et à fibres optiques – Méthodes d'essai pour les matériaux  
non-métalliques –  
Partie 513: Essais mécaniques – Méthodes spécifiques pour les mélanges  
polyéthylène et polypropylène – Essai d'enroulement après conditionnement**



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INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

PRICE CODE  
CODE PRIX

H

ICS 29.035.01; 29.060.20

ISBN 978-2-88912-992-8

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## CONTENTS

FOREWORD.....	3
1 Scope.....	6
2 Normative references .....	6
3 Terms and definitions .....	6
4 Test method .....	6
4.1 General .....	6
4.2 Conditioning procedure .....	6
4.3 Test procedure .....	7
4.4 Evaluation of results .....	7
5 Test report.....	7
Bibliography.....	8

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[IEC 60811-513:2012](#)

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRIC AND OPTICAL FIBRE CABLES –  
TEST METHODS FOR NON-METALLIC MATERIALS –****Part 513: Mechanical tests –  
Methods specific to polyethylene and polypropylene compounds –  
Wrapping test after conditioning**

## FOREWORD

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International Standard IEC 60811-513 has been prepared by IEC technical committee 20: Electric cables.

This Part 513 of IEC 60811 cancels and replaces Clause 9 of IEC 60811-4-2:2004, which is withdrawn.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
20/1309/FDIS	20/1358/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.

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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.

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

## Part 513: Mechanical tests – Methods specific to polyethylene and polypropylene compounds – Wrapping test after conditioning

### 1 Scope

This Part 513 of IEC 60811 gives procedures for a wrapping test after conditioning at elevated temperature. This test method applies specifically to polyethylene and polypropylene insulation.

This test is intended for samples from filled cables of polyolefin insulation having a wall thickness of less than or equal to 0,8 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*

### 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.

For multicore cables and cords, not more than three cores (of different colours, if any) shall be tested, unless otherwise specified in the relevant cable standard.

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

#### 4.2 Conditioning procedure

A sample of complete cable of sufficient length shall be conditioned in air (i.e. suspended in an oven). The duration of the test and temperature of the air maintained continuously shall be as follows:

- 7 × 24 h at  $(60 \pm 2)$  °C for filling compound having a nominal drop point above 50 °C and up to and including 70 °C;
- 7 × 24 h at  $(70 \pm 2)$  °C for filling compound having a nominal drop point above 70 °C.



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

After conditioning, the cable sample shall be left at ambient temperature for at least 16 h without being exposed to direct sunlight. The sheath and cores to be tested shall then be taken from the cable and shall be cleaned by suitable means.

### 4.3 Test procedure

Test pieces according to 4.2 shall be subjected to the following wrapping test:

The conductor shall be laid bare at one end. A weight shall be applied to the exposed conductor end, exerting a pull of  $15 \text{ N/mm}^2 \pm 20 \%$  with respect to the conductor cross-section. Ten windings shall be made on the other end of the test piece by means of a winding device on a metal mandrel, preferably mechanically driven, at a speed of about 1 revolution per 5 s.

The winding diameter shall be 1 to 1,5 times the test piece diameter. Subsequently, the test pieces wound on the mandrel shall be removed from the latter and shall be kept in their helical form for 24 h at  $(70 \pm 2) ^\circ\text{C}$  in a vertical position, substantially in the middle of an electrically heated cabinet having natural air flow.

For cellular insulations, including foam skin, having a wall thickness below or equal to 0,2 mm, the pull exerted on the exposed conductor shall be reduced to about  $7,5 \text{ N/mm}^2 \pm 20 \%$  with respect to the conductor cross-section.

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### 4.4 Evaluation of results

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After cooling down to ambient temperature, the test pieces shall show no cracks when examined with normal or corrected vision without magnification. The test may be repeated once only if one test piece fails.

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## 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*

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