SLOVENSKI STANDARD

SIST EN 60811-4-1:2005

marec 2005

Materiali za izoliranje in oplaščenje električnih in optičnih kablov – Splošne preskusne metode – 4-1. del: Posebne metode za polietilenske in polipropilenske mase – Odpornost proti razpokanju zaradi okoljskih vplivov - Merjenje indeksa talilnega lezenja - Merjenje količine saj oziroma mineralov v polietilenu pri direktnem zgorevanju – Merjenje količine saj s termogravimetrično analizo (TGA) - Ugotavljanje disperzije/disperzivnosti/razpršenosti saj v polietilenu z uporabo mikroskopa (IEC 60811-4-1:2004)

Insulating and sheathing materials of electric and optical cables – Common test methods – Part 4-1: Methods specific to polyethylene and polypropylene compounds – Resistance to environmental stress cracking – Measurement of the melt flow index – Carbon black and/or mineral filler content measurement in polyethylene by direct combustion – Measurement of carbon black content by termogravimetric analysis (TGA) – Assesment of carbon black dispersion in polyethylene using a microscope (IEC 60811-4-1:2004)

ICS 29.035.20; 29.060.20

Referenčna številka
SIST EN 60811-4-1:2005(en)

EUROPEAN STANDARD **EN 60811-4-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM August 2004

ICS 29.035.20; 29.060.20 Supersedes EN 60811-4-1:1995

English version

Insulating and sheathing materials of electric and optical cables – Common test methods
Part 4-1: Methods specific to polyethylene and polypropylene compounds - Resistance to environmental stress cracking - Measurement of the melt flow index - Carbon black and/or mineral filler content measurement in polyethylene by direct combustion - Measurement of carbon black content by termogravimetric analysis (TGA) - Assessment of carbon black dispersion in polyethylene using a microscope

(IEC 60811-4-1:2004)

Matériaux d'isolation et de gainage des câbles électriques et optiques - Méthodes d'essais communes
Partie 4-1: Méthodes spécifiques pour les mélanges polyéthylène et polypropylène - Résistance aux craquelures sous contraintes dues à l'environnement - Mesure de l'indice de fluidité à chaud - Mesure dans le polyéthylène du taux de noir de carbone et/ou des charges minérales par méthode de combustion directe - Mesure du taux de noir de carbone par analyse thermogravimétrique - Evaluation de la dispersion du noir de carbone dans le polyéthylène au moyen d'un microscope
(CEI 60811-4-1:2004)

Isolier- und Mantelwerkstoffe für Kabel und isolierte Leitungen - Allgemeine Prüfverfahren
Teil 4-1: Besondere Verfahren für Polyethylen- und Polypropylen-Verbindungen - Spannungsrissbeständigkeit - Messung des Schmelzindexes - Bestimmung des Ruß- und/oder Füllstoffgehaltes in Polyethylen durch direkte Verbrennung - Bestimmung des Rußgehaltes durch thermogravimetrische Analyse (TGA) - Bewertung der Rußverteilung in Polyethylen unter Verwendung eines Mikroskops
(IEC 60811-4-1:2004)

This European Standard was approved by CENELEC on 2004-07-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. EN 60811-4-1:2004 E

Foreword

The text of document 20/687/FDIS, future edition 2 of IEC 60811-4-1, prepared by IEC TC 20, Electric cables, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60811-4-1 on 2004-07-01.

This European Standard supersedes EN 60811-4-1:1995.

The principal changes with respect to EN 60811-4-1:1995 are:

a) the wrapping test after thermal ageing in air is deleted from this part of EN 60811. It is now given only in EN 60811-4-2;

b) a thermogravimetic method is added for determination of carbon black content;

c) a method is introduced for assessment of carbon black dispersion.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2005-04-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2007-07-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60811-4-1:2004 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60811-4-2	NOTE	Harmonized as EN 60811-4-2:2004 (not modified).
ISO 1133	NOTE	Harmonized as EN ISO 1133:1997 (not modified).

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

Publication	Year	Title	EN/HD	Year
IEC 60811-1-3	1993	Insulating and sheathing materials of electric and optical cables - Common test methods Part 1-3: General application - Methods for determining the density - Water absorption tests - Shrinkage test	EN 60811-1-3	1995
ISO 18553	2002	Method for the assesment of the degree of pigment or carbon black dispersion in polyolefin pipes, fittings and compounds	-	-

NORME INTERNATIONALE

INTERNATIONAL STANDARD

CEI
IEC
60811-4-1

Deuxième édition
Second edition
2004-06

Matériaux d'isolation et de gainage des câbles électriques et optiques – Méthodes d'essais communes –

Partie 4-1:
Méthodes spécifiques pour les mélanges polyéthylène et polypropylène – Résistance aux craquelures sous contraintes dues à l'environnement – Mesure de l'indice de fluidité à chaud – Mesure dans le polyéthylène du taux de noir de carbone et/ou des charges minérales par méthode de combustion directe – Mesure du taux de noir de carbone par analyse thermogravimétrique – Evaluation de la dispersion du noir de carbone dans le polyéthylène au moyen d'un microscope

Insulating and sheathing materials of electric and optical cables – Common test methods –

Part 4-1:
Methods specific to polyethylene and polypropylene compounds – Resistance to environmental stress cracking – Measurement of the melt flow index – Carbon black and/or mineral filler content measurement in polyethylene by direct combustion – Measurement of carbon black content by thermogravimetric analysis (TGA) – Assessment of carbon black dispersion in polyethylene using a microscope

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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International Standard IEC 60811-4-1 has been prepared by IEC technical committee 20: Electric cables.

This second edition cancels and replaces the first edition, published in 1985, amendment 1 (1988) and amendment 2 (1993), and constitutes a technical revision.

The principal changes with respect to the previous edition are listed below:

a) the wrapping test after thermal ageing in air is deleted from this part of IEC 60811. It is now given only in IEC 60811-4-2;

b) a thermogravimetric method is added for determination of carbon black content;

c) a method is introduced for assessment of carbon black dispersion.

The text of this standard is based on the following documents:

FDIS	Report on voting
20/687/FDIS	20/701/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.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

INSULATING AND SHEATHING MATERIALS OF ELECTRIC AND OPTICAL CABLES – COMMON TEST METHODS –

Part 4-1: Methods specific to polyethylene and polypropylene compounds – Resistance to environmental stress cracking – Measurement of the melt flow index – Carbon black and/or mineral filler content measurement in polyethylene by direct combustion – Measurement of carbon black content by thermogravimetric analysis (TGA) – Assessment of carbon black dispersion in polyethylene using a microscope

1 General

1.1 Scope

This part of IEC 60811 specifies the test methods to be used for testing polymeric insulating and sheathing materials of electric and optical fibre cables for power distribution and telecommunications, including cables used on ships and in offshore applications. These test methods apply specifically to PE and PP compounds, including cellular compounds and foam skin for insulation.

1.2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60811-1-3:1993, *Insulating and sheathing materials of electric cables – Common test methods – Part 1: General application – Section 3: Methods for determining the density – Water absorption tests – Shrinkage test*

ISO 18553:2002, *Method for the assessment of the degree of pigment or carbon black dispersion in polyolefin pipes, fittings and compounds*

2 Terms and definitions

For the purposes of this document, a distinction is made between low-density, medium-density and high-density PE as shown below:

Type of polyethylene	Density at 23 °C [a] g/cm^3
Low-density polyethylene	≤0,925
Medium-density polyethylene	>0,925 ≤0,940
High-density polyethylene	>0,940

[a] These densities refer to unfilled resins as determined by the method specified in Clause 8 of IEC 60811-1-3.