

Communication cables —

Part 2-24: Common design rules and construction — PE sheathing

ICS 29.035.20; 33.120.01

National foreword

This British Standard is the UK implementation of EN 50290-2-24:2002+A1:2008. It supersedes BS EN 50290-2-24:2002 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CENELEC text carry the number of the CENELEC amendment. For example, text altered by CENELEC amendment A1 is indicated by **A1** **A1**.

The UK participation in its preparation was entrusted by Technical Committee EPL/46, Cables, wires and waveguides, RF connectors and accessories for communication and signalling, to Subcommittee EPL/46/1, Communication cables.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

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Amendments/corrigenda issued since publication

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30 April 2009	Implementation of CENELEC amendment A1:2008
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English version

Communication cables
Part 2-24: Common design rules and construction –
PE sheathing

Câbles de communication
Partie 2-24: Règles de conception
communes et construction –
Polyéthylène pour gainage

Kommunikationskabel
Teil 2-24: Gemeinsame Regeln
für Entwicklung und Konstruktion –
PE-Mantelmischungen

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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

Foreword

This European Standard was prepared by a joint working group of the Technical Committees CENELEC TC 46X, Communication cables, and CENELEC TC 86A, Optical fibres and optical fibre cables.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50290-2-24 on 2001-11-01.

This European Standard supersedes HD 624.4 S1:1996.

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) 2002-08-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2004-08-01

Annexes designated "normative" are part of the body of the standard.
In this standard, annexes A, B and C are normative.

This European Standard has been prepared under the European Mandate M/212 given to CENELEC by the European Commission and the European Free Trade Association.

Foreword to amendment A1

This amendment was prepared by a Joint Working Group of the Technical Committees CENELEC TC 46X, Communication cables, and CENELEC TC 86A, Optical fibres and optical fibre cables.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as amendment A1 to EN 50290-2-24:2002 on 2008-11-01.

The purpose of this amendment is to align EN 50290-2-24:2002 with new grades available.

The following dates were fixed:

- latest date by which the amendment has to be implemented
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standard or by endorsement (dop) 2009-11-01
- latest date by which the national standards conflicting
with the amendment have to be withdrawn (dow) 2011-11-01

1 Scope

This Part 2-24 of EN 50290 gives specific requirements for PE sheathing compounds used in communication cables.

It is to be read in conjunction with Part 2-20 of EN 50290.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 60811-1-1:1995	Insulating and sheathing materials of electric and optical cables - Common test methods -- Part 1-1: General application - Measurement of thickness and overall dimensions - Tests for determining the mechanical properties (IEC 60811-1-1:1993)
EN 60811-1-2:1995	Insulating and sheathing materials of electric cables - Common test methods Part 1-2: General application -- Thermal ageing methods (IEC 60811-1-2:1985 + corr. May 1986 + A1:1989)
EN 60811-1-3:1995	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 (IEC 60811-1-3:1993)
EN 60811-1-4:1995	Insulating and sheathing materials of electric and optical cables - Common test methods -- Part 1-4: General application - Tests at low temperature (IEC 60811-1-4:1985 + corr. May 1986 + A1:1993)
EN 60811-4-1:1995	Insulating and sheathing materials of electric cables - Common test methods - - Part 4: Methods specific to polyethylene and polypropylene compounds - - Section 1: Resistance to environmental stress cracking - Wrapping test after thermal ageing in air - Measurement of the melt flow index - Carbon black and/or mineral content measurement in PE (IEC 60811-4-1:1985)
EN 60811-4-2:1999	Insulating and sheathing materials of electric and optical fibre cables - Common test methods - - Part 4: Methods specific to polyethylene and polypropylene compounds Section 2: Tensile strength and elongation at break after pre-conditioning - Wrapping test after thermal ageing in air - Measurement of mass increase - Long - term stability test - Test method for copper - catalysed oxidative degradation (IEC 60811-4-2:1990, mod.)

3 Requirements

In case of specific applications, additional performances could be needed. Relevant test methods and requirements shall be included in the detail specifications of the cables.



Table 1 – Black PE sheathing compound

Characteristics		Test method	Unit	Grades ^a (see Note 1)			
				LD	MD	HD	LLD
1	Maximum rated temperature at cable for which the compound can be used		° C	70	80	80	80
2	Density ^a (without carbon black)	EN 60811-1-3, Clause 8	g/cm ³	< 0,930	≥ 0,930 ≤ 0,940	> 0,940	< 0,930
3	Melt flow index ^a (see Note 2)	EN 60811-4-1, Clause 10	g/10 min	≤ 0,4	≤ 2,0	≤ 2,0	≤ 3,0
4	Mechanical characteristics	EN 60811-1-1, 9.2					
4.1	In state of delivery Tensile strength – median, min.		MPa	10	18	18	16
	Elongation at break – median, min.		%	300	300	300	500
4.2	After ageing	EN 60811-1-2, 8.1					
	Ageing conditions – temperature		° C	100 ± 2	100 ± 2	100 ± 2	100 ± 2
	– duration		h	24 x 10	24 x 10	24 x 10	24 x 10
	Elongation at break – median, min.		%	300	300	300	500
5	Shrinkage ^b	EN 60811-1-3, Clause 11					
	Test conditions						
	– sample length (if not otherwise specified)		mm	200	200	200	200
	– temperature		° C	c	c	c	c
	– duration		h	c	c	c	c
	Result to be obtained						
	– shrinkage, max.		%	c	c	c	c





Table 1 – Black PE sheathing compound (continued)

Characteristics		Test method	Unit	Grades ^a (see Note 1)			
				LD	MD	HD	LLD
6	Performance after pre-conditioning (for sheath in direct contact with filling compound)	Annex A					
	Test conditions – temperature		° C	60/70 ± 2	60/70 ± 2	60/70 ± 2	60/70 ± 2
	– duration		h	7 x 24	7 x 24	7 x 24	7 x 24
	Result to be obtained						
	Tensile strength – median, min.		MPa	10	18	18	16
	Elongation at break – median, min.		%	300	300	300	500
7	Carbon black content ^d	EN 60811-4-1, Clause 11	%	2,5 ± 0,5	2,5 ± 0,5	2,5 ± 0,5	2,5 ± 0,5
8	Carbon black dispersion ^d	Annex B		To meet	To meet	To meet	To meet
9	Stress cracking ^d (see Note 3)	EN 60811-4-1, Clause 8, Procedure B		> 1 000 h	> 1 000 h	> 1 000 h	> 1 000 h

NOTE 1 In order to differentiate LD from LLD-Polyethylene the melting point according to ISO 11357-3 ^e can be measured. The melting point of LD is < 120 °C and of LLD is ≥ 120 °C.

NOTE 2 If required, MFI may be measured on sheath with other values to be specified.

NOTE 3 Stress cracking test on raw material may not be sufficient to guarantee a stress cracking performance on finished product. Therefore an additional test has to be performed either on complete cable or on a piece of sheath taken from complete cable, in accordance with the test methods described in Annex C.

^a To be given by the supplier.

^b For special application.

^c In the relevant cable specification.

^d For inner sheath applications, non-black PE compounds can be used, then items 7, 8, 9 may not apply.

^e ISO 11357-3, *Plastics – Differential scanning calorimetry (DSC) – Part 3: Determination of temperature and enthalpy of melting and crystallization*





Table 2 – Coloured PE sheathing compounds

Characteristics		Test method	Unit	Grades ^a (see Note 1)			
				LD	MD	HD	LLD
1	Maximum rated temperature at cable for which the compound can be used		° C	70	80	80	80
2	Density ^a	EN 60811-1-3, Clause 8	g/cm ³	< 0,930	≥ 0,930 ≤ 0,940	> 0,940	< 0,930
3	Melt flow index ^a (see Note 2)	EN 60811-4-1, Clause 10	g/10 min	≤ 0,4	≤ 2,0	≤ 2,0	≤ 3,0
4	Mechanical characteristics	EN 60811-1-1, 9.2					
4.1	In state of delivery Tensile strength – median, min.		MPa	10	18	18	16
	Elongation at break – median, min.		%	300	300	300	500
4.2	After ageing	EN 60811-1-2, 8.1					
	Ageing conditions – temperature		° C	100 ± 2	100 ± 2	100 ± 2	100 ± 2
	– duration		h	24 x 10	24 x 10	24 x 10	24 x 10
	Elongation at break – median, min.		%	300	300	300	500
5	Shrinkage ^b	EN 60811-1-3, Clause 11					
	Test conditions						
	– sample length (if not otherwise specified)		mm	200	200	200	200
	– temperature		° C	c	c	c	c
	– duration		h	c	c	c	c
	Result to be obtained						
	– shrinkage, max.		%	c	c	c	c

