



BSI Standards Publication

Communication cables

Part 2-35: Common design rules
and construction — Polyamide
sheathing compound

National foreword

This British Standard is the UK implementation of EN 50290-2-35:2016.

The UK participation in its preparation was entrusted to Technical Committee EPL/46, Cables, wires and waveguides, radio frequency connectors and accessories for communication and signalling.

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.

© The British Standards Institution 2016.

Published by BSI Standards Limited 2016

ISBN 978 0 580 93148 2

ICS 29.035.20; 33.120.10

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 September 2016.

Amendments/corrigenda issued since publication

Date	Text affected
-------------	----------------------

EUROPEAN STANDARD

EN 50290-2-35

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2016

ICS 29.035.20; 33.120.10

English Version

Communication cables - Part 2-35: Common design rules and construction - Polyamide sheathing compound

Câbles de communication - Partie 2-35: Règles de conception communes et construction - Mélange pour le gainage en polyamide

Kommunikationskabel - Teil 2-35: Gemeinsame Regeln für Entwicklung und Konstruktion - Polyamid-Mantelmischung

This European Standard was approved by CENELEC on 2016-07-22. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

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



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents	Page
European foreword	3
1 Scope	4
2 Normative references	4
3 Compound requirements	4
4 Cable test requirements	5
5 Health, Safety and Environmental Regulations	5

European foreword

This document (EN 50290-2-35:2016) has been prepared by CLC/TC 46X, "Communication cables".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2017-07-22
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2019-07-22

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.

1 Scope

This Part 2-35 of EN 50290 gives specific requirements for Polyamide and Polyamide alloys to be used for the inner and outer sheathing of cables.

It is essential to read this European Standard in conjunction with Part 2-20 of EN 50290, the product standards EN 50288-7 and EN 61158 and other applicable product standards.

Using raw material and type test data as outlined in this standard, the raw material supplier will have sufficient data to demonstrate compliance and warrant that the material is suitable for the specified application.

Table 1 — Polyamide sheathing compound

Type	Maximum operating temperature
PA	90 °C

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.

EN 60811-401, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 401: Miscellaneous tests — Thermal ageing methods — Ageing in an air oven (IEC 60811-401)*

EN 60811-404, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 404: Miscellaneous tests — Mineral oil immersion tests for sheaths (IEC 60811-404)*

EN 60811-501, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 501: Mechanical tests — Tests for determining the mechanical properties of insulating and sheathing compounds (IEC 60811-501)*

EN 60811-605, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 605: Physical tests — Measurement of carbon black and/or mineral filler in polyethylene compounds (IEC 60811-605)*

EN 60811-606, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 606: Physical tests — Methods for determining the density (IEC 60811-606)*

EN 60811-607, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 607: Physical tests — Test for the assessment of carbon black dispersion in polyethylene and polypropylene (IEC 60811-607)*

EN ISO 62, *Plastics — Determination of water absorption (ISO 62)*

EN ISO 868, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness) (ISO 868)*

3 Compound requirements

The tests are to be carried out on granules or moulded plaques (or other suitable forms) produced from granules of the supplied compound. This data shall describe the general performance of Polyamide compounds. The data shall be provided by the compound supplier and therefore can be included in any supply specification of the raw material. Test methods, relevant requirements and limits are shown in Table 2. In the case of special applications, additional requirements could be specified.

4 Cable test requirements

The anticipated performance assumes standard cable design and conventional process technology and is specified in Table 3. In case of specific applications, additional requirements could be specified.

5 Health, Safety and Environmental Regulations

The materials are subject to Health, Safety and Environmental (HSE) requirements as defined in EN 50290-2-20. Any deviations or compliance failures must be identified by the raw material supplier and necessary corrective actions to be undertaken agreed with the cable maker.

Table 2 — Polyamide sheathing compound – physical properties on granules

	Characteristics ^a	Test method	Unit	Value
1	Density (base polymer)	EN 60811-606	g/cm ³	<1,06
2	Hardness (Shore D, 15 s)	EN ISO 868	-	65-80
3	Moisture absorption (23°C; 50% HR)	EN ISO 62	%	<2,5
4	Water absorption (23 °C, in water)	EN ISO 62	%	<7
5	Carbon black content ^b	EN 60811-605	%	2,0 ± 0,5
6	Carbon black dispersion - agglomerate ^b	EN 60811-607	-	≤3
^a All values of Table 2 shall be provided by the compound supplier, see Clause 3. ^b Test is to be applied only for black compounds to be used for outer sheathings.				

Table 3 — Polyamide sheathing compound – properties on cable

Characteristics	Test method	Unit	PA
1	Mechanical properties		
1.1	Before ageing		
1.1.1	Tensile strength – median, min.	MPa	40
1.1.2	Elongation at break – median, min.	%	250
1.2	After ageing		
	Ageing conditions – temperature – duration	°C h	110±2 14x24
1.2.1	Elongation at break – median, min. – variation, max.	% %	250 ±20
2	Mineral oil immersion test ^a		
	Test conditions – temperature – duration	°C h	90 7x24
	Results to be obtained after oil immersion		
	Tensile strength – variation of values before and after immersion, max.	%	±25
	Elongation at break – variation of values before and after immersion, max.	%	±25
<p>NOTE As an optimal protection of outer sheathings against UV radiation the use of black compounds complying with the requirements of Clauses 5 and 6 of Table 2 is highly recommended. For outer sheathings in other colors than black, if required, the adding of suitable UV stabilisers is to be provided.</p> <p>^a The mineral oil to be used shall be oil No. 2 (IRM 902) as mentioned in part 404</p>			

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards-based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Copyright in BSI publications

All the content in BSI publications, including British Standards, is the property of and copyrighted by BSI or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use.

Save for the provisions below, you may not transfer, share or disseminate any portion of the standard to any other person. You may not adapt, distribute, commercially exploit, or publicly display the standard or any portion thereof in any manner whatsoever without BSI's prior written consent.

Storing and using standards

Standards purchased in soft copy format:

- A British Standard purchased in soft copy format is licensed to a sole named user for personal or internal company use only.
- The standard may be stored on more than 1 device provided that it is accessible by the sole named user only and that only 1 copy is accessed at any one time.
- A single paper copy may be printed for personal or internal company use only.

Standards purchased in hard copy format:

- A British Standard purchased in hard copy format is for personal or internal company use only.
- It may not be further reproduced – in any format – to create an additional copy. This includes scanning of the document.

If you need more than 1 copy of the document, or if you wish to share the document on an internal network, you can save money by choosing a subscription product (see 'Subscriptions').

Reproducing extracts

For permission to reproduce content from BSI publications contact the BSI Copyright & Licensing team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email subscriptions@bsigroup.com.

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Useful Contacts

Customer Services

Tel: +44 345 086 9001

Email (orders): orders@bsigroup.com

Email (enquiries): cservices@bsigroup.com

Subscriptions

Tel: +44 345 086 9001

Email: subscriptions@bsigroup.com

Knowledge Centre

Tel: +44 20 8996 7004

Email: knowledgecentre@bsigroup.com

Copyright & Licensing

Tel: +44 20 8996 7070

Email: copyright@bsigroup.com

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK