



SLOVENSKI STANDARD
oSIST prEN 50290-2-29:2016
01-maj-2016

Komunikacijski kabli - 2-29. del: Skupna pravila za snovanje in konstruiranje - Zamrežene polietilenske izolacijske zmesi: kabli za instrumente, krmiljenje in zunanja vodila

Communication cables - Part 2-29: Common design rules and construction - Crosslinked polyethylene insulation compounds: instrumentation, control and field bus cables

Kommunikationskabel - Teil 2-29: Gemeinsame Regeln für Entwicklung und Konstruktion - Vernetzte PE-Isolier-Mischungen

Câbles de communication - Partie 2-29: Règles de conception communes et construction – PE réticulé pour enveloppes isolantes

Ta slovenski standard je istoveten z: prEN 50290-2-29:2016

ICS:

29.035.20	Plastični in gumeni izolacijski materiali	Plastics and rubber insulating materials
33.120.10	Koaksialni kabli. Valovodi	Coaxial cables. Waveguides

oSIST prEN 50290-2-29:2016 **en**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 50290-2-29

March 2016

ICS 29.035.20; 33.120.10

Will supersede EN 50290-2-29:2002

English Version

Communication cables - Part 2-29: Common design rules and construction - Crosslinked polyethylene insulation compounds: instrumentation, control and field bus cables

Câbles de communication - Partie 2-29: Règles de conception communes et construction - PE réticulé pour enveloppes isolantes

Kommunikationskabel - Teil 2-29: Gemeinsame Regeln für Entwicklung und Konstruktion - Vernetzte PE-Isoliermischungen

This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2016-06-17.

It has been drawn up by CLC/TC 46X.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CENELEC 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.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

1	Contents	
2	European foreword	2
3	1 Scope	3
4	2 Normative references	3
5	3 Compound test requirements	4
6	4 Cable test requirements	4
7	5 Health, Safety and Environmental Regulations	4
8	Bibliography	8
9		

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 50290-2-29:2016](https://standards.iteh.ai/catalog/standards/sist/0939e160-a3f2-443d-975a-f8aa8a498a37/sist-en-50290-2-29-2016)

<https://standards.iteh.ai/catalog/standards/sist/0939e160-a3f2-443d-975a-f8aa8a498a37/sist-en-50290-2-29-2016>

prEN 50290-2-29:2016 (E)

10 European foreword

11 This document (prEN 50290-2-29:2016) has been prepared by a joint working group of the Technical
12 Committees CENELEC TC 46X, "Communication cables", and CENELEC TC 86A, "Optical fibres and
13 optical fibre cables".

14 This document is currently submitted to the Enquiry.

15 The following dates are proposed:

- latest date by which the existence of this document has to be announced at national level (doa) dor + 6 months
- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) dor + 12 months
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) dor + 36 months (to be confirmed or modified when voting)

16 This document will supersede EN 50290-2-29:2002.

17 This document has been prepared under a mandate given to CENELEC by the European
18 Commission and the European Free Trade Association.

19 This standard covers the Principle Elements of the Safety Objectives for Electrical Equipment
20 Designed for Use within Certain Voltage Limits (LVD - 2006/95/EC).

[SIST EN 50290-2-29:2016](https://standards.iteh.ai/catalog/standards/sist/0939e160-a3f2-443d-975a-f8aa8a498a37/sist-en-50290-2-29-2016)

<https://standards.iteh.ai/catalog/standards/sist/0939e160-a3f2-443d-975a-f8aa8a498a37/sist-en-50290-2-29-2016>

21 1 Scope

22 This Part 2-29 of EN 50290 gives specific requirements for Crosslinked Polyethylene (XLPE)
 23 compounds to be used for the insulation of instrumentation, control and field bus cables. There are
 24 several routes used for manufacture of XLPE insulated cables and as a consequence a number of
 25 different types of polyethylene compound may be specified. The compounds required for the different
 26 manufacturing processes are described (Table 1). The unstabilised materials require antioxidant to be
 27 added during the cable extrusion process.

28 **Table 1 - XLPE Materials**

Material	Stabilisation	Manufacturing process
PE	None	Base polymer for irradiation/one step silane
PE-S	Yes	Stabilised compound for irradiation/one step silane
SXPE	None	Silane grafted compound or copolymer for two step process
SXPE-S	Yes	Stabilised silane grafted compound or copolymer for two step process

29 It is to be read in conjunction with Part 2-20 of EN 50290, the product standards EN 50288-7 and
 30 EN 61158 and other applicable product standards.

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

34 2 Normative references

35 The following documents, in whole or in part, are normatively referenced in this document and are
 36 indispensable for its application. For dated references, only the edition cited applies. For undated
 37 references, the latest edition of the referenced document (including any amendments) applies.

38 EN ISO 1183 (all parts), *Plastics – Methods for determining the density of non-cellular plastics (ISO*
 39 *1183)*

40 EN ISO 1133 (all parts), *Plastics – Determination of the melt mass-flow rate (MFR) and the melt*
 41 *volume-flow rate (MVR) of thermoplastics (ISO 1133)*

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

44 EN ISO 11357-6, *Plastics - Differential scanning calorimetry (DSC) - Part 6: Determination of*
 45 *oxidation induction time (isothermal OIT) and oxidation induction temperature (dynamic OIT) (ISO*
 46 *11357-6)*

47 EN 60216 (all parts), *Electrical insulating materials – Thermal endurance properties (IEC 60216)*

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

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

53 EN 60811-502, *Electric and optical fibre cables - Test methods for non-metallic materials - Part 502:*
 54 *Mechanical tests - Shrinkage test for insulations (IEC 60811-502)*

prEN 50290-2-29:2016 (E)

55 EN 60811-507, *Electric and optical fibre cables - Test methods for non-metallic materials - Part 507:*
56 *Mechanical tests - Hot set test for cross-linked materials (IEC 60811-507)*

57 EN 60811-510, *Electric and optical fibre cables - Test methods for non-metallic materials - Part 510:*
58 *Mechanical tests - Methods specific to polyethylene and polypropylene compounds - Wrapping test*
59 *after thermal ageing in air (IEC 60811-510)*

60 EN 50288-7, *Multi-element metallic cables used in analogue and digital communication and control -*
61 *Part 7: Sectional specification for instrumentation and control cables*

62 EN 61158 (all parts), *Industrial communication networks – Fieldbus specifications (IEC 61158)*

63 ISO 6502, *Rubber — Guide to the use of curemeters*

64 ISO 974, *Plastics — Determination of the brittleness temperature by impact*

65 **3 Compound test requirements**

66 The tests are to be carried out on granules or moulded plaques produced from granules of compound.
67 This data shall be provided by the compound supplier. Relevant test methods, requirements and limits
68 shall be included in any supply specification of the compound.

69 Specific requirements are shown in Table 2. In the case of special applications, additional
70 requirements could be specified.

71 **4 Cable test requirements**

72 The anticipated performance assumes standard cable design and conventional process technology
73 and is specified (Table 3). To achieve the indicated values, the addition of antioxidant and/or catalyst
74 is necessary for materials PE, PES, SXPE & SXPES. Using type test data the compound supplier is
75 expected to demonstrate compliance and warrant that the material is suitable for the specified
76 application.

77 In the case of special applications, additional requirements could be specified.

78 **5 Health, Safety and Environmental Regulations**

79 The compounds are subject to Health, Safety and Environmental requirements as defined in
80 EN 50290-2-20. Any deviations or compliance failures must be identified by the compound supplier.

81

Table 2 - Insulation compounds - physical properties of granules

Characteristics ¹⁾	Test method	Unit	Value	Applicability
1 Density ²⁾	EN ISO 1183	g/cm ³	≤ 0,950	All
2 Melt flow index ³⁾ (190°C/2,16 kg)	EN ISO 1133	g/10 min	D	PE, PE-S, SXPE & SXPE-S
3 Storage stability Retention of melt flow index (190°C/2,16 kg) after storage 1 month at 20°C, RH 50%	EN ISO 1133	%	>TBD ³⁾	SXPE and SXPE-S
4 Elastograph	ISO 6502	N*m	>0,5 ³⁾	VXPE-S
5 Hardness Shore D (1s)	EN ISO 868	[-]	TBD ⁴⁾	All
6 Low temperature brittleness	ISO 974	°C	< -70	All
7 Oxidative Induction Time (200 °C)	EN ISO 11357-6 ⁵⁾	min	>TBD	PE-S, SXPE-S & VXPE-S

1) All values of Table 2 shall be provided by the compound supplier, see Clause 3.

2) Tolerance for the nominal value of a specific compound is +/- 0,003 g/cm³.

3) Tolerance for the nominal value of a specific compound is +/- 25%.

4) Tolerance for the nominal value of a specific compound is +/- 3.

5) Alternative methods which correlate with the antioxidant content are permitted.

SIST EN 50290-2-29:2016

<https://standards.iteh.ai/catalog/standards/sist/0939e160-a3f2-443d-975a-f8aa8a498a37/sist-en-50290-2-29-2016>

Table 3 – Wire insulation properties

Characteristics		Test method	Unit	Values
1	Maximum rated temperature of cable for which the compound can be used	EN 60216 ¹⁾	°C	90
2	Mechanical characteristics	EN 60811-501		
2.1	Before ageing			
2.1.1	Tensile strength- median,min.		MPa	12.5
2.1.2	Elongation at break- median,min		%	250
2.2	Mechanical characteristics after ageing	EN 60811-401 and -501		
	Ageing conditions		°C	135 ± 2
	- Temperature		h	10 x 24
2.2.1	- Duration			
	Tensile strength		MPa	12.5
2.2.2	- Median, minimum value			
	Elongation at break		%	200
2.2.3	- Median, minimum value		%	>75
	Retention of Mechanical properties after ageing ²⁾			
3	Wrapping after ageing ³⁾	EN 60811-510	°C	150 ± 2
	- temperature		h	7 x 24
	- duration			No crack
	Result to be obtained			
4	Ageing test on complete cable (compatibility test) ⁴⁾	EN 60811-501		
4.1	Before ageing			
4.1.1	Tensile strength- median,min.		MPa	12.5
4.1.2	Elongation at break- median,min.		%	250
4.2	Mechanical characteristics after ageing	EN 60811-401 and -501		
	Ageing conditions		°C	100 ± 2
	- Temperature		h	7 x 24
4.2.1	- Duration		MPa	12.5
	Tensile strength - Median, minimum value			
4.2.2	Elongation at break - Median, minimum value		%	200
4.2.3	Retention of Mechanical properties after ageing ²⁾		%	>75
5	Hot set	EN 60811-507		
	Test conditions			
	- Temperature		°C	200 ± 2
	- Time under load		min	15

	<ul style="list-style-type: none"> - Mechanical stress Results to be obtained <ul style="list-style-type: none"> - Elongation under load, median, maximum - Elongation after cooling, median, maximum 		N/mm² % %	0.2 175 15
6	Shrinkage Test conditions <ul style="list-style-type: none"> - temperature - duration Result to be obtained, median, max.	EN 60811-502	°C h %	 130 ± 2 1 4

- 1) Any procedure based on the Arrhenius principals which can predict 20.000h life expectancy at the indicated temperature.
- 2) In cases where the specified limit is not achieved, the initial mechanical properties (2.1 and 4.1) shall be measured after conditioning of new samples for 24h at the specified ageing temperature. Additional testing of aged samples is not needed.
- 3) Only to be carried out if elongation at break cannot be done
- 4) Only to be carried out for cables where the insulation is in direct contact with material (eg. sheath or bedding) containing oils, plasticisers or other extenders which could migrate into the insulation

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 50290-2-29:2016

<https://standards.iteh.ai/catalog/standards/sist/0939e160-a3f2-443d-975a-f8aa8a498a37/sist-en-50290-2-29-2016>