
Koaksialni kabli - 9-1. del: Področna specifikacija za koaksialne kable za analogni in digitalni prenos signala - Notranji priključni kabli za sisteme, ki delujejo v območju od 5 MHz do 1000 MHz

Coaxial cables - Part 9-1: Sectional specification for coaxial cables for analogue and digital signal transmission - Indoor drop cables for systems operating at 5 MHz - 1 000 MHz

Koaxiale Kabel - Teil 9-1: Rahmenspezifikation für koaxiale Kabel für analoge und digitale Signalübertragung - Innenkabel für Systeme im Bereich von 5 MHz - 1 000 MHz

Câbles coaxiaux - Partie 9-1: Spécification intermédiaire pour câbles coaxiaux pour la transmission de signaux analogiques et numériques - Câbles de raccordement à usage intérieur pour les systèmes fonctionnant entre 5 MHz et 1 000 MHz

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Coaxial cables - Part 9-1: Sectional specification for coaxial cables for analogue and digital signal transmission - Indoor drop cables for systems operating at 5 MHz - 1 000 MHz

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This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2021-02-19.

It has been drawn up by CLC/SC 46XA.

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).

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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.

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European Committee for Electrotechnical Standardization
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European foreword

This document (prEN 50117-9-1:2020) has been prepared by CLC/SC 46XA "Coaxial cables" of CLC/TC 46X "Communication cables".

This document is currently submitted to the Enquiry.

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)

This document will supersede EN 50117-9-1:2019 and all of its amendments and corrigenda (if any).

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with the EU Directive 2014/35/EU see informative Annex ZZ, which is an integral part of this document.

This document covers the Principle Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits (LVD 2014/35/EU).

All materials used for cables according to this document are expected to fulfil the requirements of the current REACH Regulation and ROHS Directives.

1 Scope

This part of the EN 50117 series which is a sectional specification applies to coaxial indoor drop cables for analogue and digital one and two way signal transmission, e.g. for cable networks for television signals, sound signals and interactive services in accordance with EN 60728-1:2014, EN 60728-1-1:2014, EN 60728-101:2017, EN 60728-10:2014, EN 50173-1:2018 and EN 50173-4:2018. This includes also the transmission of BCT signals provided by a CATV, MATV or SMATV cable network.

The purpose of this document is to specify the applicable test methods and requirements for the electrical, mechanical and environmental characteristics and for fire performance of the cables.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 50117-1:2019, *Coaxial cables - Part 1: Generic specification*

EN 50289-3-9:2001, *Communication cables - Specifications for test methods - Part 3-9: Mechanical test methods - Bending tests*

EN 50290-1-2:2004, *Communication cables - Part 1-2: Definitions*

EN 50290-2-1:2005, *Communication cables - Part 2-1: Common design rules and construction*

EN 50290-2-22:2001, *Communication cables - Part 2-22: Common design rules and construction - PVC sheathing compounds*

EN 50290-2-27:2002, *Communication cables - Part 2-27: Common design rules and construction - Halogen free flame retardant thermoplastic sheathing compounds - 1:2021*

<https://standards.iteh.ai/catalog/standards/sist/fce0289e-f709-4ec4-9b1e->

EN 50290-2-37:2016, *Communication cables - Part 2-37: Common design rules and construction - Polyethylene insulation for coaxial cables*

EN 50290-2-38:2016, *Communication cables - Part 2-38: Common design rules and construction - Polypropylene insulation for coaxial cables*

EN 50290-4-1:2014, *Communication cables - Part 4-1: General considerations for the use of cables - Environmental conditions and safety aspects*

EN 50290-4-2:2014, *Communication cables - Part 4-2: General considerations for the use of cables - Guide to use*

EN 60728-1:2014, *Cable networks for television signals, sound signals and interactive services - Part 1: System performance of forward paths (IEC 60728-1:2014)*

EN 62153-1-1:2004, *Metallic communication cables test methods - Part 1-1: Electrical - Measurement of the pulse/step return loss in the frequency domain using the Inverse Discrete Fourier Transformation (IDFT) (IEC 62153-1-1:2003)*

IEC 61196-1-112:2006, *Coaxial communication cables - Part 1-112: Electrical test methods - Test for return loss (uniformity of impedance)*

IEC 61196-1-115:2006, *Coaxial communication cables - Part 1-115: Electrical test methods - Test for regularity of impedance (pulse/step function return loss)*

IEC 62153-4-3:2013, *Metallic communication cable test methods - Part 4-3: Electromagnetic compatibility (EMC) - Surface transfer impedance - Triaxial method*

IEC 62153-4-4:2015, *Metallic communication cable test methods - Part 4-4: Electromagnetic compatibility (EMC) - Test method for measuring of the screening attenuation as up to and above 3 GHz, triaxial method*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 50290-1-2:2004, EN 50117-1:2019, EN 60728-1:2014 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

drop cable

coaxial cable which is used to connect from:

- a) subscriber tap or a directional coupler to a system outlet,
- b) subscriber tap to a subscriber splitter,
- c) subscriber splitter to a system outlet

3.2

indoor drop cable

drop cable for indoor application

4 Requirements for cable construction, design and installation

4.1 General

Cables according to this document are designed for an operating temperature range from -40 °C to $+70\text{ °C}$ ¹⁾ and at frequencies between 5 MHz and 1 000 MHz.

When designing the cable, consideration should be given to the maximum admissible current stated in the detail specification. It is assumed that the raise of temperature of the inner conductor when submitted to the maximum current under nominal ambient conditions does not affect the mechanical and electrical properties of the cable.

Cables according to this document may be operated at voltages $> 50\text{ V AC}$ or $> 75\text{ V DC}$ according to the detail specification of the manufacturer. However, these cables are not intended for direct connection to the mains electricity supply or other low impedance sources.

Cables according to this document shall be designed and constructed according to EN 50290-2-1:2005, *Communication cables Part 2-1: Common design rules and construction* and according to EN 50290-4-1:2014, *Communication cables - Part 4-1: General considerations for the use of cables - Environmental conditions and safety aspects* Compliance with the essential requirements of the LVD is described in subclause 4.2.2 of EN 50290-4-1²⁾.

The use of cables according to this document including delivery, storage and installation shall be in accordance with EN 50290-4-2:2014, *Communication cables - Part 4-2: General considerations for the use of cables - Guide to use*, unless otherwise specified.

1) This value is valid for applications without ampacity only, see also Table A.1 concerning max. DC current.

2) EN 50290-4-1:2014, 4.2.2 requires the use raw materials according to EN 50290-2-xx series, design according to EN 50290-2-1 and dielectric tests according to EN 50289-1-3 and to EN 50290-2-1. Voltage withstanding tests shall be performed between conductors and between the conductors or screen and the outer surface of the sheath.

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When designed and constructed in accordance with EN 50290-2-1:2005 and EN 50117-1:2019 and submitted to spark testing, (see 5.1.2.5 in Table 1), CATV cables according to this document may be installed together with Low Voltage cables.

Moreover, the tests according to Clause 5 of this document shall be performed after environmental and ageing tests. In addition, the raw materials of these cables are defined in the EN 50290 series.

This ensures sufficient stability of the cables related to this characteristic for its life cycle.

Thus these cables are considered safe when:

- they are used for their intended purpose and applications;
- they are used under voltages and currents that do not exceed the limits given in the relevant detail specification.

All cables covered by this document do not fall under the scope of the RED or the EMC Directive. Nevertheless, transfer impedance and screening attenuation according to 5.1.3.6 and 5.1.3.7 in Table 2 shall be specified in the relevant detail specification, if the intended application of the cable is the use in combination with equipment under the RED or the EMC Directive, see also EN 50290-4-1:2014, 4.2.1.

4.2 Inner conductor

The conductor shall meet the requirements of EN 50117-1:2019, 4.2 and shall be solid and may be plain or metal coated. Dimensions shall be in accordance with the detail specification.

There shall be no joint made subsequent to the last drawing operation.

In case of metal coated conductor, consideration shall be taken for the compatibility of the connector.

4.3 Dielectric

The dielectric material(s) shall be in accordance with EN 50117-1:2019, 4.3 and shall consist of polyolefin materials, with EN 50290-2-37:2016 (polyethylene), EN 50290-2-38:2016 (polypropylene). Dimensions shall be in accordance with the detail specification.

Unless otherwise specified, the nominal diameter over the dielectric should be one of the preferred values, namely 3,7 mm, 4,8 mm and 7,2 mm.

4.4 Outer conductor or screen

The construction and material of the outer conductor (or screen) shall meet the requirements of EN 50117-1:2019, 4.4 items b), f) or g). Where option b) is used, a double braid layer is required.

For braid constructions or helically wound wires, the braid angle shall be between 15° and 45°. The coverage factor shall be greater than or equal to 65 %, or, when the cable is provided with a metal foil, greater than or equal to 25 %. These values are also valid for cables with two bi-directional layers of helically wound wires.

Dimensions shall be in accordance with the detail specification.

4.5 Filling compounds

Not applicable.

4.6 Moisture barriers

Not applicable.

4.7 Wrapping layers

Not applicable.

4.8 Sheath

Sheath material(s) shall be polyvinylchloride (PVC) meeting the requirements of EN 50290-2-22:2001 or halogen free flame retardant (HFFR) materials meeting the requirements of EN 50290-2-27:2002.

The sheath shall also meet the requirements of EN 50117-1:2019, 4.8.

Sheath colour of shall be agreed between the provider and the customer.

Dimensions and minimum wall thickness shall be in accordance with the detail specification.

4.9 Metallic protection

Not applicable.

4.10 Cable integral suspension strand (Messenger wire)

Not applicable.

4.11 Oversheath

Not applicable.

4.12 Fauna proofing

Not applicable.

4.13 Chemical and/or environmental proofing

Not applicable.

4.14 Cable identification

4.14.1 General

Cable identification shall be in accordance with EN 50117-1:2019, 4.14.

4.14.2 Sheath marking

Sheath marking shall be achieved as a non-degradable print (as tested according to see 5.2.6 in Table 3, Abrasion resistance of the sheath markings) with a distinctive mark every metre of cable containing the following minimum information:

- designation of the cable;
- attenuation value (in dB/100 m at 800 MHz, rounded);
- screening class;
- Euro-class (CPR);
- name of supplier.

EXAMPLE EN 50117-9-1 21 < XXX > Class A < YYY >

NOTE The Construction Products Regulation (CPR) defines classes for the fire performance of cables. The CPR is applicable for cables installed in a construction.

For more information about CPR, see EN 50290-4-1:2014, 4.2 and EN 50290-4-2:2014, 5.3 among others.

4.15 Labelling

Unless otherwise specified in the detail specification, drums or coils shall be provided with a label with a durable print containing the following minimum information:

- designation of the cable;
- attenuation value (in dB/100 m at 800 MHz, rounded);
- screening class;

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- Euro-class;
- name of supplier;
- batch part number;
- length of cable;
- CE – mark (for all applicable European Directives and Regulations) when the cable is intended to be placed on the European market.

EXAMPLE EN 50117-9-1 21 < XXX > Class A < YYY > 03/12 543m

5 Tests and requirements for completed cables**5.1 General**

When tested in accordance with EN 50117-1:2019, the parameters and requirements given below shall apply.

Mechanical, electrical and transmission characteristics are specified at room temperature.

5.2 Electrical parameters and requirements**5.2.1 Low-frequency and DC electrical parameters and requirements**

Low-frequency and DC electrical parameters and requirements are given in Table 1.

Table 1 — Low-frequency and DC electrical parameters and requirements

EN 50117-1:2019 Subclause No	Parameter	Requirements/Remarks
5.1.2.1	Conductor resistance - Inner conductor - outer conductor	Applicable, values in accordance with the detail specification,
5.1.2.2	Dielectric strength	2 kV DC or 1,5 kV AC for 1 min
5.1.2.3	Insulation resistance	$\geq 10^4$ M Ω x km
5.1.2.4	Mutual capacitance	When required, in accordance with the detail specification
5.1.2.5	Voltage test of sheath (spark test)	2,5 kV AC or 3,75 kV DC, unless otherwise specified in the relevant detail specification.
5.1.2.6	Discharge (corona) test	Not applicable

5.2.2 High-frequency electrical and transmission parameters and requirements

High-frequency electrical and transmission parameters and requirements are given in Table 2.

Table 2 — High-frequency electrical and transmission parameters and requirements

EN 50117-1:2019 Subclause No.	Parameter	Requirements/Remarks
5.1.3.1	Velocity of propagation	Shall be specified for information purposes only in the detail specification