SLOVENSKI STANDARD
SIST EN 50288-12-1:2017

01-oktober-2017

Večelementni kovinski kabli za analogne in digitalne komunikacije in krmiljenje - 12-1. del: Področna specifikacija za zaslonjene kable z lastnostmi od 1 MHz do 2000 MHz - Vodoravni (etažni) in stavbni hrbtenični (medetažni) kabli

Multi-element metallic cables used in analogue and digital communications and control - Part 12-1: Sectional specification for screened cables characterised from 1 MHz up to 2 000 MHz - Horizontal and building backbone cables

Câbles métalliques à éléments multiples utilisés pour les transmissions et les commandes analogiques et numériques - Partie 2-1: Spécification intermédiaire pour les câbles écrantés caractérisés de 1 MHz à 2 000 MHz - Câbles horizontaux et verticaux de bâtiment

Ta slovenski standard je istoveten z: EN 50288-12-1:2017

ICS:

33.120.20	Žice in simetrični kabli	Wires and symmetrical cables

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Multi-element metallic cables used in analogue and digital communications and control - Part 12-1: Sectional specification for screened cables characterised from 1 MHz up to 2 000 MHz - Horizontal and building backbone cables

Câbles métalliques à éléments multiples utilisés pour les transmissions et les commandes analogiques et numériques - Partie 2-1: Spécification intermédiaire pour les câbles écrantés caractérisés de 1 MHz à 2 000 MHz - Câbles horizontaux et verticaux de bâtiment

Mehradrige metallische Daten- und Kontrollkabel für analoge und digitale Übertragung - Teil 12-1: Rahmenspezifikation für geschirmte Kabel für Frequenzen von 1 MHz bis 2 000 MHz - Kabel für Horizontal- und Steigbereich

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

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European foreword

This document (EN 50288-12-1:2017) has been prepared by WG 2 of CLC/SC 46XC "Multicore, multipair and quad data communication cables" of 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) 2018-05-30
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2020-05-30

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

EN 50288-12-1 is meant to be read in conjunction with EN 50288-1:2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

1 Scope

EN 50288-12-1 is a sectional specification for screened cables, characterised up to 2 000 MHz, to be used in horizontal and building backbone wiring for information technology, generic-cabling systems.

This sectional specification contains the electrical, mechanical, transmission and environmental performance characteristics and requirements of the cables when tested in accordance with the referenced test methods.

This sectional specification is to be read in conjunction with EN 50288-1, which contains the essential provisions for its application.

The cables covered in this sectional specification are intended to operate with voltages and currents normally encountered in communications systems. These cables are not intended to be used in conjunction with low impedance sources, for example the electrical power supplies of public utility mains.

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.

EN 50288-1:2013, *Multi-element metallic cables used in analogue and digital communication and control - Part 1: Generic specification*

EN 50289 (all parts), *Communication cables — Specifications for test methods*

EN 50290 (all parts), *Communication cables*

3 Terms, definitions, symbols and abbreviations

For the purposes of this document, the terms and definitions, symbols and abbreviations given in Clause 3 of EN 50288-1:2013 and the following apply.

Ex – Exogenous (derived or originating externally)

4 Cable construction

4.1 Conductor

The conductor shall be solid copper and meet the requirements of 4.1 of EN 50288-1:2013. The conductor shall be plain copper (with or without additional metal coating).

The nominal conductor diameter shall be ≥ 0,50 mm and ≤ 0,80 mm.

NOTE Constructions with ‘copper clad’ conductors do not meet the requirements.

4.2 Insulation

The insulation shall be of a suitable material according to the appropriate part of EN 50290-2.

4.3 Cabling elements

The cable element shall be a pair or quad.

4.4 Identification of cabling elements

Unless otherwise specified, the colour coding for identification is given in IEC 60189-2 or EN 60708, as appropriate. The colours shall meet the requirements of 4.4 of EN 50288-1:2013.

4.5 Screening of cabling elements

Where appropriate, screening of the cabling elements shall be applied in accordance with 4.5 of EN 50288-1:2013. When a braid is used the minimum braid coverage (for mechanical purposes) shall be 60 %. When a foil and braid are used the minimum braid coverage (for mechanical purposes) shall be 30 %. Coverage is defined in EN 50290-2-1.

4.6 Cable make-up

The cable elements shall be laid up in concentric layer(s) or units to form the cable core.

4.7 Filling compound

Not applicable.

4.8 Interstitial fillers

Where fillers are used they shall meet the requirements of 4.8 of EN 50288-1:2013.

4.9 Screening of the cable core

The screening of the cable core shall be applied in accordance with 4.9 of EN 50288-1:2013. When a braid is used the minimum braid coverage (for mechanical purposes) shall be 60 %. When a foil and braid are used, and/or where a foil is used over elements / the core, the minimum braid coverage (for mechanical purposes) shall be 30 %. Coverage is defined in EN 50290-2-1.

4.10 Moisture barriers

Not applicable.

4.11 Wrapping layers

Where wrapping layers are used they shall be in accordance with 4.11 of EN 50288-1:2013.

4.12 Sheath

The sheath shall be of a suitable material according to the appropriate part of EN 50290-2.

5 Test methods and requirements for completed cables

5.1 General

The following tables give the tests to be applied, together with the respective limits, in order to demonstrate compliance with this specification.

5.2 Electrical tests

5.2.1 Low-frequency and d.c. electrical measurements

Table 1 — Low-frequency and d.c. electrical measurements

EN 50288–1:2013, **Clause**	**Parameter**	**Requirement**
5.1.1.1	Conductor loop resistance	The maximum value shall be ≤ 17 Ω/100 m *Note:* *Resistance values for wire sizes are expected to be:* *0,6 mm 13,4 Ω/100 m loop* *0,8 mm 7,7 Ω/100 m loop*
5.1.1.2	Conductor resistance unbalance	≤ 2 %
5.1.1.2.1	Resistance unbalance between pairs	≤ 4 %
5.1.1.3	Dielectric strength conductor/conductor and conductor/screen	1,0 kV d.c. or 0,7 kV a.c. for 1 min or 2,5 kV d.c. or 1,7 kV a.c. for 2 s
5.1.1.4	Insulation resistance	≥ 5 000 MΩ.km using (100–500) V test voltage
5.1.1.5	Mutual capacitance	No requirement specified
5.1.1.6	Capacitance unbalance to earth	≤ 1 200 pF/km

5.2.2 High-frequency electrical and transmission measurements

High frequency tests in some cases cannot be tested over 100 m, these tests should be made with a 30 m length.

Table 2 — High-frequency electrical and transmission measurements

EN 50288–1:2013, **Clause**	**Parameter**	**Requirement**
5.1.2.1	Velocity of propagation [h]	Phase delay ≤ 534 + 36/√f ns/100 m, 1 MHz ≤ f ≤ 2 000 MHz
5.1.2.2	Propagation delay difference (skew)	≤ 25 ns/100 m at 100 MHz

<table>
<tr><th>EN 50288–1:2013, Clause</th><th>Parameter</th><th>Requirement</th></tr>
<tr><td>5.1.2.3</td><td>Attenuation [b c f g]</td><td>
<table>
<tr><td>1</td><td>4</td><td>10</td><td>62,5</td><td>100</td><td>155</td><td>200</td><td>300</td><td>400</td><td>600</td><td>800</td><td>1 000</td><td>MHz</td></tr>
<tr><td>2,1</td><td>3,8</td><td>5,8</td><td>14,6</td><td>18,5</td><td>23,2</td><td>26,5</td><td>32,7</td><td>38,0</td><td>47,1</td><td>54,9</td><td>61,9</td><td>dB/100 m</td></tr>
<tr><td></td><td>1,0</td><td>1,1</td><td>1,2</td><td>1,3</td><td>1,4</td><td>1,5</td><td>1,6</td><td>1,7</td><td>1,8</td><td>1,9</td><td>2,0</td><td>GHz</td></tr>
<tr><td></td><td>61,9</td><td>62,5</td><td>68,4</td><td>71,4</td><td>74,4</td><td>77,2</td><td>80.0</td><td>82,7</td><td>85,4</td><td>88,0</td><td>90,5</td><td>dB/100m</td></tr>
</table>
α ≤ 1,80 √f + 0,005 f + 0,25/√f, 1 MHz ≤ f ≤ 2 000 MHz
</td></tr>
<tr><td>5.1.2.5</td><td>Near-end Crosstalk (NEXT) [a b]</td><td>
<table>
<tr><td>1</td><td>4</td><td>10</td><td>62,5</td><td>100</td><td>155</td><td>200</td><td>300</td><td>400</td><td>600</td><td>800</td><td>1 000</td><td>MHz</td></tr>
<tr><td>78</td><td>78</td><td>78</td><td>78</td><td>75,4</td><td>72,5</td><td>70,9</td><td>68,2</td><td>66,4</td><td>63,7</td><td>61,9</td><td>60,4</td><td>dB/100 m</td></tr>
<tr><td></td><td>1,0</td><td>1,1</td><td>1,2</td><td>1,3</td><td>1,4</td><td>1,5</td><td>1,6</td><td>1,7</td><td>1,8</td><td>1,9</td><td>2,0</td><td>GHz</td></tr>
<tr><td></td><td>60,4</td><td>59,8</td><td>59,2</td><td>58,7</td><td>58,2</td><td>57,8</td><td>57,3</td><td>59,9</td><td>56,6</td><td>56,2</td><td>55,9</td><td>dB/100 m</td></tr>
</table>
≥ 105,4 – 15 logf 1 MHz < f ≤ 2 000 MHz (78 dB max.)
</td></tr>
<tr><td>5.1.2.7.1</td><td>Power sum Near-end Crosstalk [b] (PSNEXT)</td><td>
<table>
<tr><td>1</td><td>4</td><td>10</td><td>62,5</td><td>100</td><td>155</td><td>200</td><td>300</td><td>400</td><td>600</td><td>800</td><td>1 000</td><td>MHz</td></tr>
<tr><td>78</td><td>78</td><td>78</td><td>75,5</td><td>72,4</td><td>69,5</td><td>67,9</td><td>65,2</td><td>63,4</td><td>60,7</td><td>58,9</td><td>57,4</td><td>dB/100 m</td></tr>
<tr><td></td><td>1,0</td><td>1,1</td><td>1,2</td><td>1,3</td><td>1,4</td><td>1,5</td><td>1,6</td><td>1,7</td><td>1,8</td><td>1,9</td><td>2,0</td><td>GHz</td></tr>
<tr><td></td><td>57,4</td><td>56,8</td><td>56,2</td><td>55,7</td><td>55,2</td><td>54,8</td><td>54,3</td><td>53,9</td><td>53,6</td><td>53,2</td><td>52,9</td><td>dB/100 m</td></tr>
</table>
≥ 102,4 – 15 logf 1 MHz ≤ f ≤ 2 000 MHz (64 dB max.)
</td></tr>
<tr><td>5.1.2.6</td><td>Attenuation to crosstalk ratio at the far end [b d g] (ACR-F)</td><td>
<table>
<tr><td>1</td><td>4</td><td>10</td><td>62,5</td><td>100</td><td>155</td><td>200</td><td>300</td><td>400</td><td>600</td><td>800</td><td>1 000</td><td>MHz</td></tr>
<tr><td>90</td><td>83,3</td><td>75,3</td><td>59,4</td><td>55,3</td><td>51,5</td><td>49,3</td><td>45,8</td><td>43,3</td><td>39,7</td><td>37,2</td><td>35,3</td><td>dB/100 m</td></tr>
<tr><td></td><td>1,0</td><td>1,1</td><td>1,2</td><td>1,3</td><td>1,4</td><td>1,5</td><td>1,6</td><td>1,7</td><td>1,8</td><td>1,9</td><td>2,0</td><td>GHz</td></tr>
<tr><td></td><td>35,3</td><td>34,5</td><td>33,7</td><td>33,0</td><td>32,4</td><td>31,8</td><td>31,2</td><td>30,7</td><td>30,2</td><td>29,7</td><td>29,3</td><td>dB/100 m</td></tr>
</table>
≥ 95,3 - 20 logf, 1 MHz ≤ f ≤ 2 000 MHz (90 dB max.), values referenced to 100 m
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