SLOVENSKI STANDARD
oSIST prEN 50306-3:2019

01-januar-2019

Železniške naprave - Kabli v železniških vozilih s posebno požarno odpornostjo - Tanka stena - 3. del: Enožilni in večžilni kabli, zaslonjeni in tanko oplaščeni

Railway applications - Railway rolling stock cables having special fire performance - Thin wall - Part 3: Single core and multicore cables screened and thin wall sheathed

Bahnanwendungen - Kabel und Leitungen für Schienenfahrzeuge mit verbessertem Verhalten im Brandfall - Reduzierte Isolierwanddicken - Teil 3: Ein- und mehradrige Kabel und Leitungen geschirmt mit reduzierten Mantelwanddicken

Applications ferroviaires - Câbles pour matériel roulant ferroviaire ayant des performances particulières de comportement au feu - Isolation mince - Partie 3: Conducteurs et câbles blindés (paires, tierces et quartes) avec gaine d'épaisseur mince

Ta slovenski standard je istoveten z: **prEN 50306-3:2018**

ICS:

13.220.40	Sposobnost vžiga in obnašanje materialov in proizvodov pri gorenju	Ignitability and burning behaviour of materials and products
29.060.20	Kabli	Cables
45.060.01	Železniška vozila na splošno	Railway rolling stock in general

oSIST prEN 50306-3:2019 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 50306-3

November 2018

ICS

Will supersede EN 50306-3:2002

English Version

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This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2019-02-08.

It has been drawn up by CLC/TC 20.

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
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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European foreword

This document (prEN 50306-3:2018) has been prepared by Working Group 12, “Railway cables”, of Technical Committee CENELEC TC 20, “Electric cables”, as part of the overall programme of work in CENELEC TC 9X, “Electrical and electronic applications for railways”.

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 50306-3:2002.

Introduction

EN 50306 covers a range of sheathed and unsheathed cables with thin wall thickness insulation and based on halogen free materials, for use in railway rolling stock. It is divided into four parts.

Part 1: General requirements;

Part 2: Single core cables;

Part 3: Single core and multicore cables screened and thin wall sheathed;

Part 4: Multicore and multipair cables standard wall sheathed.

Special test methods referred to in EN 50306 are given in EN 50305. A guide to use is given in EN 50355 and EN 50343.

EN 50306-1, General requirements, contains a more extensive introduction to EN 50306, and should be read in conjunction with this European Standard.

1 Scope

This document specifies requirements for, and constructions and dimensions of, multicore cables, rated voltage U_0/ U = 300/500 V, of the following type:

- Screened
  (0,5 mm² to 2,5 mm², number of cores from 1 to 8).

All cables have stranded tinned copper conductors, and thin wall thickness, halogen-free, insulation and sheath. They are for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered.

These cables are rated for occasional thermal stresses causing ageing equivalent to continuous operational life at a temperature of 90 °C. For standard cables this is determined by the acceptance test defined in EN 50305, using accelerated long-term (5 000 h) thermal ageing indicating a 110 °C/20 000 h temperature index. Should the customer require lifetime predictions this should be demonstrated based on the temperature index of the product as supplied by the manufacturer. The maximum temperature for short circuit conditions is 160 °C based on duration of 5 s.

Under fire conditions the cables exhibit special performance characteristics in respect of maximum permissible flame propagation (flame spread) and maximum permissible emission of smoke and toxic gases. These requirements are specified to permit the cables to satisfy Hazard Level 3 of EN 45545-1.

prEN 50306-3:2018 has to be used in conjunction with prEN 50306-1:2018, General Requirements, and prEN 50306-2:2018, Single core 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 45545-1, *Railway applications - Fire protection on railway vehicles - Part 1: General*

EN 60332-1-2, *Tests on electric and optical fibre cables under fire conditions - Part 1-2: Test for vertical flame propagation for a single insulated wire or cable - Procedure for 1 kW pre-mixed flame*

EN 61034-2, *Measurement of smoke density of cables burning under defined conditions - Part 2: Test procedure and requirements*

EN 50305:2002, *Railway applications - Railway rolling stock cables having special fire performance - Test methods*

prEN 50306-1:2018, *Railway applications-Railway rolling stock cables having special fire performance - Thin wall - Part 1: General requirements*

prEN 50306-2:2018, *Railway applications - Railway rolling stock cables having special fire performance - Thin wall - Part 2: Single core cables*

EN 60811 (all parts), *Common test methods for insulating and sheathing materials of electric cables*

EN 62230, *Electric cables - Spark-test method*

3 Single and multicore cables

3.1 General

The completed cable shall conform to the applicable general requirements given in prEN 50306-1:2018 and to the specific requirements of this Part 3.

Conformity with the requirements shall be checked by inspection and by the tests given in Table 2.

3.2 Marking and code designation

3.2.1 Marking of cable

Cables shall be marked with the following:

- Manufacturer's name;
- EN reference;
- Voltage rating (U_O);
- Conductor size;
- A code designation according for use of the cable (see 3.2.2);
- Screening (S);
- Conductor temperature rating

For example:

XYZ EN 50306-3P 300 V 1x1,5 MM S 90

The marking shall conform to the requirements of Clause 5 of prEN 50306-1:2018.

3.2.2 Code Designation

The following letters shall be used as a code to identify the suitability of a particular cable for use under one of the Hazard Levels of EN 45545-1, and to indicate performance levels relating to low temperature and to oil and fuel resistance:

Hazard Level EN 45545-1 HL3

– low temperature / oil resistance C

– extra low temperature / oil resistance F

– low temperature / extra oil and fuel resistance J

– extra low temperature / extra oil and fuel resistance M

For sheathed cables two letters are required, one for the insulation and one for the sheath.

3.2.3 Marking on the insulation of cores for multi core cables

The cores shall be marked 1, 2, etc. in accordance with the requirements given in 3.2.1 of prEN 50306-2:2018. However, the core number 1 may be marked as the relevant single core in accordance with the requirements of 3.3.1 of prEN 50306-2:2018. Durability of marking shall be in accordance with 3.3.1 of EN 50306.

3.3 Rated voltage

The rated voltage recognized for the purposes of this standard shall be

U_0/ U = 300 V /500 V.

NOTE See EN 50355 and EN 50343 for further information.

3.4 Construction

3.4.1 Cores

Each insulated single core shall conform to the requirements given in prEN 50306-2:2018.

3.4.2 Laying-up of cores in multicore cables

The cores of multicore cables shall be twisted together.

The pitch of lay for the cores shall not be greater than 20 times the diameter of the laid up cores in the cable.

3.4.3 Metallic braid screening

The braid shall consist of tinned, annealed copper wires. There shall be no more than one splice in any spindle of the braid over any 100 mm length of the braid. The braid shall be applied evenly, and it should neither slip nor leave an imprint on the insulation.

The filling factor Kr shall be according to the formula:

$$\mathrm{Kr} = \frac{\mathrm{m.n.d}}{2\pi\phi} \times \left[1 + \frac{\pi^2\phi^2}{\mathrm{L}^2}\right]^{0,5}$$

The wires of the braid shall be greater than or equal to 0,10 mm diameter. The filling factor Kr shall be 0,55 minimum.

The lay angle (the angle of a braid wire and the centreline of the cable) shall be between 15° and 35°, and shall be checked by application of the following formula:

$$1{,}072 < \left[1 + \frac{\pi^2\phi^2}{\mathrm{L}^2}\right] \leq 1{,}490$$

where

ϕ = diameter under the braid + 2d

d = nominal diameter of a wire

m = total number of spindles

n = number of wires per spindle

L = braiding pitch

3.4.4 Sheath

The sheath shall be S2 as defined in prEN 50306-1:2018, and shall meet the requirements specified in Table 1 of that EN. The sheath shall be applied by extrusion. The sheath thickness shall conform to the specified value given in Table 1 below.

The sheath colour shall be black unless otherwise specified.

Table 1 — Requirements for construction of cables - screened and sheathed

1	2	3	
Number of cores and nominal cross section mm²	Minimum thickness of sheath at any point mm	Overall diameter mm	
		min.	max.
1 × 0,5	0,20	2,3	2,9
2 × 0,5	0,20	3,5	4,4
3 × 0,5	0,20	3,7	4,7
4 × 0,5	0,20	4,0	5,2
6 × 0,5	0,20	5,5	6,5
8 × 0,5	0,20	6,1	7,1
1 × 0,75	0,20	2,5	3,1
2 × 0,75	0,20	3,9	4,8
3 × 0,75	0,20	4,0	5,2
4 × 0,75	0,20	4,5	5,7
6 × 0,75	0,20	6,1	7,1
8 × 0,75	0,20	7,3	8,3
1 × 1	0,20	2,7	3,3
2 × 1	0,20	4,2	5,3
3 × 1	0,20	4,5	5,7
4 × 1	0,20	5,0	6,2
6 × 1	0,20	6,3	7,3
8 × 1	0,20	7,5	8,5
1 × 1,5	0,20	3,1	3,7
2 × 1,5	0,20	5,1	6,2
3 × 1,5	0,20	5,4	6,6
4 × 1,5	0,20	6,0	7,2
6 × 1,5	0,20	7,3	8,3
8 × 1,5	0,20	8,5	9,5
1 × 2,5	0,20	3,6	4,5
2 × 2,5	0,20	6,4	7,5
3 × 2,5	0,20	6,8	8,0
4 × 2,5	0,20	7,5	8,7

For other compositions (number of cores), insulation and sheath thicknesses shall follow in principle the value mentioned in the Table 1 or ask the manufacturer for adequate technical design depending on the application requirements. The cable marking shall keep the standard name as prEN 50306-3:2018.