SLOVENSKI STANDARD
SIST EN 50306-3:2020

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Nadomešča:
SIST EN 50306-3:2003

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: EN 50306-3:2020

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

SIST EN 50306-3:2020 en

EUROPEAN STANDARD
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EN 50306-3

March 2020

ICS 13.220.40; 29.060.20; 45.060.01

Supersedes EN 50306-3:2002 and all of its amendments and corrigenda (if any)

English Version

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

Applications ferroviaires - Câbles pour matériel roulant ferroviaire ayant des performances particulières de comportement au feu - Isolation mince - Partie 3 : Câbles monoconducteurs et multiconducteurs blindés avec gaine d'épaisseur mince

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

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

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Contents

Page

European foreword

This document (EN 50306-3:2020) has been prepared by CLC/TC 20, “Electric 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)	2020-12-30
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2022-12-30

This document supersedes EN 50306-3:2002 and all of its amendments and corrigenda (if any).

This edition includes the following significant technical changes with respect to the previous edition:

— The documents have been updated to reflect the changes in the test standard EN 50305;

— The reference to cited standards (e.g. EN 60811 series) has been updated.

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.

Introduction

The EN 50306 series 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 screened or not screened sheathed cables.

Special test methods referred to in the EN 50306 series are given in EN 50305. A guide to use is given in EN 50355 and rules for installation are given in EN 50343.

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

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 mm^2 to 2,5 mm^2, 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. If the customer were to require lifetime predictions this would 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 and EN 45545-2.

EN 50306-3:2020 is expected to be used in conjunction with EN 50306-1:2020, General Requirements, and EN 50306-2:2020, 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 50305:2020, *Railway applications - Railway rolling stock cables having special fire performance - Test methods*

EN 50306-1:2020, *Railway applications - Railway rolling stock cables having special fire performance - Thin wall - Part 1: General requirements*

EN 50306-2:2020, *Railway applications - Railway rolling stock cables having special fire performance - Thin wall - Part 2: Single core cables*

EN 60811 (all parts), *Electric and optical fibre cables - Test methods for non-metallic materials*

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

3 Terms and definitions

No terms and definitions are listed in this document.

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

— ISOOnline browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Single and multicore screened cables

4.1 General

The completed cable shall conform to the applicable general requirements given in EN 50306-1:2020 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.

4.2 Marking and code designation

4.2.1 Marking of cable

Cables shall be marked with the following:

— Manufacturer's name;

— EN reference;

— Voltage rating (U_0);

— Conductor size;

— A code designation according for use of the cable (see 4.2.2);

— Screening (S);

— Conductor temperature rating

For example:

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

The marking shall conform to the requirements of EN 50306-1:2020, Clause 5.

4.2.2 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.

4.2.3 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 EN 50306-2:2020, 4.2.1. However, the core number 1 may be marked as the relevant single core in accordance with the requirements of EN 50306-2:2020, 4.3.1. Durability of marking shall be in accordance with EN 50305:2020, 10.1.

4.3 Rated voltage

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

$U_0/\ U$ = 300 V /500 V

NOTE See EN 50355 and EN 50343 for further information.

4.4 Construction

4.4.1 Cores

Each insulated single core shall conform to the requirements given in EN 50306-2:2020.

4.4.2 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.

4.4.3 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:

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

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:

$$1{,}072 < \left(1 + \frac{\pi^2\phi^2}{L^2}\right) \leq 1{,}490$$

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