

Railway applications - Railway rolling stock cables
having special fire performance - Thin wall - Part 1:
General requirements

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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English Version

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

Applications ferroviaires - Câbles pour matériel roulant
ferroviaire ayant des performances particulières de
comportement au feu - Isolation mince - Partie 1: Exigences
générales

Bahnanwendungen - Kabel und Leitungen für
Schienenfahrzeuge mit verbessertem Verhalten im
Brandfall - Reduzierte Isolierwanddicken - Teil 1:
Allgemeine Anforderungen

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 50306-1:2020) has been prepared by CLC/TC 20, "Electric cables".

The following dates are fixed:

- latest date by which this document has (dop) 2020-12-30
to be implemented at national level by
publication of an identical national
standard or by endorsement
- latest date by which the national (dow) 2022-12-30
standards conflicting with this document
have to be withdrawn

This document supersedes EN 50306-1:2002 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 range of the conductor cross sections has been extended;
- the reference to cited standards (e.g. 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 railway industry is generally concerned with the movement of people as well as goods. It is therefore essential that a high level of safety is achieved, even when failures occur which could involve fire, howsoever caused, affecting railway rolling stock.

Hence it is necessary to provide cables for use in railway environments which minimize the hazard to people when a fire could damage the cable, irrespective of whether the fire is caused by an external source or from within the electrical system.

The EN 50306 series specifies cables which, in the event of fire will limit the risk to people and improve the safety on railways in general. It covers cables with thin wall thickness of both insulation and sheath, based on halogen free materials, for use in railway rolling stock. There is provision for screening in some of the parts and also for a standard wall thickness sheath. In the event of a fire affecting cables to the EN 50306 series they will have a limited flame spread and limited emission of toxic gases. In addition these cables when burnt, produce limited amounts of smoke. This last characteristic will minimize loss of visibility in the event of a fire and will aid reduced evacuation times.

The objectives of this standard are:

- to standardize cables that are safe and reliable when properly used;
- to state the characteristics, performance, and construction requirements directly or indirectly bearing on safety;
- to specify methods for checking conformity with these requirements.

The EN 50306 series, which covers a range of cables of rated voltage $U_0 = 300\text{V}$ with conductor sizes $0,5\text{ mm}^2$ up to $2,5\text{ mm}^2$, is divided into 4 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.

These cables are intended for a limited number of applications. Further information on these applications is given in EN 50355 and EN 50343.

Special test methods referred to in the EN 50306 series are given in EN 50305.

A separate European Standard, the EN 50264 series covers cables for similar applications up to 3,6/6 kV rating with a conductor temperature at 90°C , but with standard wall and medium wall thicknesses of both insulation and sheath, and provides for a maximum conductor size of 400 mm^2 .

A separate European Standard, the EN 50382 series covers cables for similar applications up to 3,6/6 kV rating with a conductor temperature at 120°C and 150°C , and provides for a maximum conductor size of 400 mm^2 .

1 Scope

EN 50306-1 specifies the general requirements applicable to the cables given in EN 50306-2, EN 50306-3 and EN 50306-4. It includes the detailed requirements for S2 sheathing materials and other components called up in the separate parts.

NOTE Detailed requirements for insulation systems are given in EN 50306-2.

In particular, EN 50306-1 specifies those requirements relating to fire safety which enable the cables to satisfy Hazard Level 3 of EN 45545-1 and EN 45545-2.

These cables are rated for occasional thermal stresses which causes ageing equivalent to continuous operational life at a temperature of 105 °C or 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 125 °C or 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.

EN 50306-1 is expected to be used in conjunction with one or more of the other parts of EN 50306.

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 50264-1, *Railway applications — Railway rolling stock power and control cables having special fire performance — Part 1: General requirements*

EN 50305:2020, *Railway applications — Railway rolling stock cables having special fire performance - Test methods*

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

EN 50306-3:2020, *Railway applications — Railway rolling stock cables having special fire performance — Thin wall — Part 3: Single core and multicore cables screened and thin wall sheathed*

EN 50306-4:2020, *Railway applications — Railway rolling stock cables having special fire performance — Thin wall — Part 4: Multicore and multipair screened or not screened sheathed cables*

EN 50355, *Railway applications — Railway rolling stock cables having special fire performance — Guide to use*

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 IEC 60332-3-24:2018, *Tests on electric and optical fibre cables under fire conditions — Part 3-24: Test for vertical flame spread of vertically-mounted bunched wires or cables — Category C*

EN 60332-3-25, *Tests on electric and optical fibre cables under fire conditions — Part 3-25: Test for vertical flame spread of vertically-mounted bunched wires or cables — Category D*

EN 60754-1, *Test on gases evolved during combustion of materials from cables — Part 1: Determination of the halogen acid gas content*

EN 60754-2, *Test on gases evolved during combustion of materials from cables — Part 2: Determination of acidity (by pH measurement) and conductivity*

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

EN 60684-2, *Flexible insulating sleeving — Part 2: Methods of test*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 50306 (series) and the following apply.

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

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

3.1

insulation system insulation

- polymers, copolymers or alloys which contain aromatic groups and heteroelements such as N, O or Si in the main chain of the polymer molecules;
- polymers, copolymers or alloys of olefinic type, crosslinked if necessary

3.2

sheathing system sheath

- type S2 sheath materials are compounds which contain aromatic groups and hetero-elements such as N, O or Si in the main chain of the polymer molecules, or polymers or copolymers in which the characteristic constituent is a copolymer of ethylene, cross-linked if necessary;
- type EM 101, EM 102, EM 103 and EM 104 sheath materials as given in EN 50264-1 for standard wall sheathed cables

3.3

halogen-free material

combustible material which, when tested in accordance with the designated method, conforms to the requirements given in EN 50305:2020, Annexes F and G

3.4

type tests

T

tests required to be performed before supplying a type of cable covered by this document on a general commercial basis in order to demonstrate satisfactory performance characteristics to meet the intended application

Note 1 to entry: These tests are of such a nature that, after they have been made, they need not be repeated unless changes are made in the cable materials, design or type of manufacturing process which might change the performance characteristics.