

SLOVENSKI STANDARD

SIST EN 50306-1:2003

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

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

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

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

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en

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EUROPEAN STANDARD

EN 50306-1

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

STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 50306-1:2003

This European Standard was approved by CENELEC on 2002-06-01. 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.

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

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

This European Standard was 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.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50306-1 on 2002-06-01.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2003-07-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2008-07-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annex A is normative and annex B is informative.

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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 may involve fire, howsoever caused, affecting railway rolling stock.

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

EN 50306 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 EN 50306 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 minimise loss of visibility in the event of a fire and will aid reduced evacuation times.

The objects of this standard are

- to standardise 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.

EN 50306, which covers a range of cables rated at 300 V to earth with conductor sizes 0,5 mm² up to 2,5 mm², is divided into 4 parts:

- Part 1: General requirements;
- Part 2: Single core cables;
- Part 3: Single core and multicore cables (pairs, triples and quads) screened and thin wall sheathed;
- Part 4: Multicore and multipair cables standard wall sheathed.

These cables are intended for a limited number of applications. Further information on these applications is given in EN 50355 ¹⁾.

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

A separate European Standard, EN 50264 covers cables for similar applications up to 3,6 kV/6 kV rating, but with standard wall thickness of both insulation and sheath, and provides for a maximum conductor size of 400 mm².

¹⁾ At draft stage.

1 Scope

EN 50306-1 specifies the general requirements applicable to the cables given EN 50306-2, EN 50306-3 and EN 50306-4. It includes the detailed requirements for S1 and S2 sheathing materials and other components called up in the separate Parts.

NOTE 1 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 Levels 2, 3 or 4 of EN 45545-1 ²⁾.

NOTE 2 Requirements for the emission of smoke and gases are not specified for Hazard Level 1 of EN 45545-1.

NOTE 3 EN 45545-1 is still under development and should be consulted.

These cables are rated for occasional thermal stresses causing ageing equivalent to continuous operational life at temperatures of 90 °C or 105 °C dependent upon the sheath system type. These temperatures are based upon an acceptance test, using long-term thermal endurance ageing at 110 °C and 125 °C respectively, and extrapolation of data to 20 000 h. The maximum temperature for short circuit conditions is 160 °C based on a duration of 5 s.

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

2 Normative references (standards.iteh.ai)

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of these references apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 45545-1 ²⁾	Railway applications - Fire protection of railway vehicles Part 1: General
EN 50264-1	Railway applications - Railway rolling stock cables having special fire performance - Standard wall - Part 1: General requirements
EN 50265-2-1	Common test methods for cables under fire conditions - Test for resistance to vertical flame propagation for a single insulated conductor or cable - Part 2-1: Procedures - 1 kW pre-mixed flame
EN 50266-2-4	Common test methods for cables under fire conditions - Test for vertical flame spread of vertically-mounted bunched wires or cables Part 2-4: Procedures - Category C
EN 50267-2-1	Common test methods for cables under fire conditions - Tests on gases evolved during combustion of materials from cables Part 2-1: Procedures - Determination of the amount of halogen acid gas

²⁾ At draft stage.

EN 50267-2-2	Common test methods for cables under fire conditions - Tests on gases evolved during combustion of materials from cables Part 2-2: Procedures - Determination of degree of acidity of gases for materials by measuring pH and conductivity
EN 50268-2	Common test methods for cables under fire conditions - Measurement of smoke density of cables burning under defined conditions Part 2: Procedure
EN 50305	Railway applications - Railway rolling stock cables having special fire performance - Test methods
EN 50306-2	Railway applications - Railway rolling stock cables having special fire performance - Thin wall - Part 2: Single core cables
EN 60811-1-1	Insulating and sheathing materials of electric and optical cables - Common test methods - Part 1-1: General application - Measurement of thickness and overall dimensions - Tests for determining the mechanical properties (IEC 60811-1-1)
EN 60811-1-2	Insulating and sheathing materials of electric cables - Common test methods - Part 1-2: General application - Thermal ageing methods (IEC 60811-1-2)
EN 60811-1-3	Insulating and sheathing materials of electric and optical cables - Common test methods - Part 1-3: General application - Methods for determining the density - Water absorption tests - Shrinkage test (IEC 60811-1-3)
EN 60811-1-4	Insulating and sheathing materials of electric and optical cables - Common test methods - Part 1-4: General application - Test at low temperature (IEC 60811-1-4)
EN 60811-2-1	Insulating and sheathing materials of electric and optical cables - Common test methods - Part 2-1: Methods specific to elastomeric compounds - Ozone resistance, hot set and mineral oil immersion tests (IEC 60811-2-1)
EN 60684-2	Flexible insulating sleeving - Part 2 - Methods of test (IEC 60684-2)

3 Definitions

For the purpose of all parts of EN 50306 the following definitions apply.

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 S1 sheath materials are compounds which contain aromatic groups and heteroelements such as N, O or Si in the main chain of the polymer molecules;
- type S2 sheath materials are polymers or copolymers in which the characteristic constituent is a copolymer of ethylene, crosslinked 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

NOTE Different performance levels in terms of thermal endurance, fuel resistance and suitability for use at low temperature can be obtained depending on the exact composition used.

3.3

halogen-free material

combustible material which, when tested in accordance with the designated method, conforms to the following:

- maximum evolution of HCl - 0,5 % to EN 50267-2-1
- minimum pH - 4,3 to EN 50267-2-2
- maximum conductivity - 10,0 μ S/mm to EN 50267-2-2

NOTE This value of "maximum conductivity" is subject to further consideration and review.

- maximum fluorine content - 0,1 % to EN 60684-2

3.4

type tests (symbol T)

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

3.5

sample tests (symbol S)

tests made on samples of completed cable, or components taken from a completed cable adequate to verify that the finished product meets the design specification

3.6

routine tests (symbol R)

tests made on all complete cable lengths to demonstrate their integrity

4 Rated voltage

The rated voltage recognized for the purposes of EN 50306 shall be 300 V to earth.

NOTE See EN 50355 for further information.

5 Marking

5.1 Indication of origin

Cables shall be provided with an indication of origin consisting of the continuous marking of the manufacturer's name, trademark, or registered identification number by one of the following methods:

- 1) printing on the insulation of at least one core;
- 2) printing, indenting or embossing on the outer surface of sheathed cable;
- 3) printing on the outer surface of single core cables;
- 4) printing on inner layer of multi-layer systems - the covering layers shall be transparent.

5.2 Continuity of marks

Each specified mark shall be regarded as continuous if the distance between the end of the mark and the beginning of the next identical mark does not exceed

- 550 mm if the marking is on the outer surface of the cable,
- 275 mm if the marking is on the insulation of a sheathed cable.

NOTE 1 A "specified mark" is any mandatory mark covered by this Part 1 of EN 50306 or by the particular requirements of Part 2, 3 or 4.

NOTE 2 An example of marking on the outer surface of the cable is given in Figure 1.

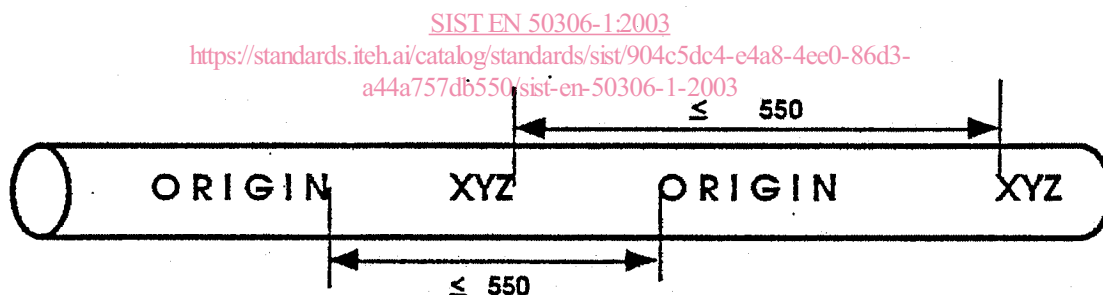


Figure 1 - Example of marking

Conformity shall be checked by visual examination and measurement.

5.3 Durability

Printed markings is durable. Conformity is checked by the test given in 10.1 of EN 50305.

5.4 Legibility

All markings shall be legible. Printed markings shall be in contrasting colours.

5.5 Additional marking

Additional marking, specific to the individual cable type, shall be given in the particular specification.

5.6 Use of the name CENELEC

The name CENELEC, in full or abbreviated, shall not be directly marked on, or in, the cables.

6 General requirements for the construction of cables

6.1 Conductors

6.1.1 Material

The conductors shall be tin coated annealed copper.

6.1.2 Construction

Conductors shall be stranded in such a manner as to achieve a smooth uniform substantially circular outer surface.

The conductor diameter shall be within the limits specified in Table 1 of EN 50306-2.

6.1.3 Check of construction

Conformity with the requirements of 6.1.1 and 6.1.2 is checked by inspection and by measurement.

6.1.4 Electrical resistance

The resistance of each conductor at 20 °C shall be in accordance with the requirements of the relevant table in EN 50306-2.

Conformity is checked by the test given in 6.1 of EN 50305.

6.2 Insulation system

6.2.1 Material

The insulation system shall be manufactured from material as defined in 3.1 of this part and shall conform to the requirements given in EN 50306-2.

6.2.2 Application

The insulation system shall be applied by extrusion and may consist of one or more closely adherent layers. The insulation system shall form a compact and homogeneous body and shall be so applied that it fits closely on the conductor and it shall be possible to remove the insulation without damage to the remaining insulation, or to the tinned conductor.

The insulation system shall be smooth, uniformly applied and be substantially circular.

Conformity is checked by inspection and by manual testing.