SLOVENSKI STANDARD
SIST EN 50355:2014

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Nadomešča:
SIST EN 50355:2004

Železniške naprave - Kabli (in ožičenje) s posebno požarno odpornostjo v železniških vozilih - Vodilo za uporabo

Railway applications - Railway rolling stock cables having special fire performance - Guide to use

Bahnanwendungen - Kabel und Leitungen für Schienenfahrzeuge mit verbessertem Verhalten im Brandfall - Leitfaden für die Verwendung

Applications ferroviaires - Câbles à comportement au feu spécifié pour matériel roulant ferroviaire - Guide d'emploi

Ta slovenski standard je istoveten z: **EN 50355:2013**

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13.220.20	Požarna zaščita	Fire protection
29.060.20	Kabli	Cables
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EUROPEAN STANDARD

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EN 50355

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Supersedes EN 50355:2003

English version

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CENELEC

European Committee for Electrotechnical Standardization
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Foreword

This document (EN 50355:2013) has been prepared by CLC/TC 20 "Electric cables" by Working Group 12 “Railway cables” as part of the overall programme of work in the Technical Committee CENELEC TC 9X “Electrical and electronic applications for railways”.

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) 2014-07-01
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2016-07-01

This document supersedes EN 50355:2003.

EN 50355:2013 includes the following significant technical changes with respect to EN 50355:2003:

- requirements for additional cable type: EN 50264-3-1, EN 50264-3-2 and EN 50382-2;
- modified voltage table.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] 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 safety is achieved, even when failures occur which may involve fire, however 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.

The aims of this European Standard are to:

– inform railway vehicle manufacturers, installers of cables and railway operators of the properties and limiting conditions of rolling stock cables in order to safeguard life and equipment;

– avoid misuse of rolling stock cables.

The information is given as limiting values and illustrated by examples which cannot be exhaustive but nevertheless indicate ways by which safety (a tolerable level of risk) can be obtained.

It has been assumed in the preparation of this guidance document that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

This European Standard should be used in conjunction with:

— EN 50264 series, *Railway applications — Railway rolling stock power and control cables having special fire performance*

— EN 50306 series, *Railway applications — Railway rolling stock cables having special fire performance — Thin wall*

— EN 50382 series, *Railway applications — Railway rolling stock high temperature power cables having special fire performance*

— EN 50343, *Railway applications — Rolling stock — Rules for installation of cabling*

1 Scope

This European Standard gives guidance on the safe use of rolling stock cables specified in EN 50264, EN 50306 and EN 50382.These cables will only be used for the wiring of railway rolling stock and within the limits given in the manner described in this European Standard. All these cables are for fixed installation where there is no free movement of cable, except for stresses due to typical service.

This European Standard will be applied in conjunction with the relevant product and installation standards. Stricter requirements than those given in this standard could be necessary; see in particular EN 50343.

This European Standard is not applicable to:

– intercarriage jumpers;
– cables subject to continual flexing;
– pantograph cables;
– coaxial, data and fibre optic cables;
– wire wrap;
– cables rated at voltages greater than 3,6/6 kV;
– applications other than the cabling of railway rolling stock;
– cables requiring circuit integrity.

Legal or statutory requirements do take precedence over the guidance given in this document.

In cases where no guidance exists or where it cannot be derived from general information, it is recommended that advice be sought from the cable manufacturer.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50121-1 *Railway applications — Electromagnetic compatibility — Part 1: General*

EN 50125-1 *Railway applications – Environmental conditions for equipment — Part 1: Equipment on board rolling stock*

EN 50163 *Railway Applications — Supply voltages of traction systems*

EN 50200 *Method of test for resistance to fire of unprotected small cables for use in emergency circuits*

EN 50264-2-1 *Railway applications — Railway rolling stock power and control cables having special fire performance — Part 2-1: Cables with crosslinked elastomeric insulation — Single core cables*

EN 50264-2-2 *Railway applications — Railway rolling stock power and control cables having special fire performance — Standard wall — Part 2-2:Cables with crosslinked elastomeric insulation — Multicore cables*

EN 50264-3-1	*Railway applications — Railway rolling stock power and control cables having special fire performance — Part 3-1: Cables with crosslinked elastomeric insulation with reduced dimensions — Single core cables*
EN 50264-3-2	*Railway applications — Railway rolling stock power and control cables having special fire performance — Part 3-2: Cables with crosslinked elastomeric insulation with reduced dimensions — Multicore cables*
EN 50306-2	*Railway applications — Railway rolling stock cables having special fire performance — Thin wall — Part 2: Single core cables*
EN 50306-3	*Railway applications — Railway rolling stock cables having special fire performance — Thin wall — Part 3: Single core and multicore cables (pairs, triples and quads) screened and thin wall sheathed*
EN 50306-4	*Railway applications — Railway rolling stock cables having special fire performance — Thin wall — Part 4: Multicore and multipair cables standard wall sheathed*
EN 50343	*Railway applications — Rolling stock — Rules for installation of cabling*
EN 50362	*Method of test for resistance to fire of larger unprotected power and control cables for use in emergency circuits*
EN 50382-2	*Railway applications — Railway rolling stock high temperature power cables having special fire performance — Part 2: Single core silicone rubber insulated cables for 120 °C or 150 °C*
EN 60216-1	*Electrical Insulating Materials — Thermal endurance properties — Part 1: Ageing procedures and evaluation of test results.*

3 Terms, definitions

For the purposes of this document the definitions given in EN 50264, EN 50306 and EN 50382 apply.

4 Requirements for safety

4.1 Fundamental requirements

4.1.1 Railway rolling stock cables are intended for the transmission and distribution of electricity in monitoring, control and power circuits. In the case of normal use, they are to be regarded as safe. Safety of a cable means that the product does not present an unacceptable risk of danger to life or property whilst being used in its intended manner.

4.1.2 Unless otherwise stated in the appropriate part of EN 50264, EN 50306 or EN 50382, cables shall not be used for any other purpose than the transmission and distribution of electricity in control, monitoring and power circuits.

4.1.3 The test parameters and requirements described in EN 50264, EN 50306 and EN 50382, and the test methods in EN 50305, are only for the purposes of checking with respect to safety and quality assurance. They shall not be regarded as providing guidance that the cables are suitable for service under conditions equivalent to the test conditions.

4.2 General requirements

4.2.1 All cables shall be selected so as to be suitable for the voltages and currents likely to occur under all conditions which are or shall have been anticipated in the equipment or rolling stock or that part thereof in which they are used.

Care shall be taken when selecting cables that will be subject to traction line voltages due to transient voltages that may occur (see EN 50163).

4.2.2 Cables shall be constructed, installed, protected, used and maintained so to prevent danger so far as it is reasonably practical.

4.2.3 All cables shall be selected so as to be suitable for both standard or special ambient conditions encountered in rolling stock (see EN 50125-1).

The limiting conditions under which the cables can be reasonably expected to operate under normal circumstances are given in Tables 4 to 14.

These conditions are those considered capable of ensuring an expected period of use which has been accepted as reasonable by experience of the particular type of cable and in particular conditions of use. The duration of acceptable performance of a particular type of cable depends upon the type of use, installation or electrical apparatus and on the particular combination of influences relating thereto. For example, the acceptable period of use considered as reasonable for a cable used in a fixed installation, for the distribution of electricity in rolling stock, is more than that for a cable subject to continual flexing.

For further information on operational life of cables see 6.4 e).

EN 50264, EN 50306 and EN 50382 contain cables with different properties with respect to temperature, mineral oil and fuel resistance.

Table 1 — Properties Available

Low temperature [a]	Fuel resistance [b]	Code
Normal	Normal	C
Extra	Normal	F
Normal	Extra [c]	J
Extra	Extra [c]	M

[a] Normal low temperature cables are subject to test at –25 °C, extra low temperature cables at -40 °C.

[b] Normal fuel resistance cables are tested in the test fluid (IRM902). Extra fuel resistance cables are tested in two test fluids (IRM902 & IRM903) for longer periods of time, at increased temperature.

[c] This test is not applicable for EN 50382 cables.

Although the sheaths of cables may be considered resistant to certain fluids, the insulation used may not be, and this shall be taken into account where cables will be subject to prolonged exposure to fluids. Care shall also be exercised where fluid can gain access to the cores at the termination. These cables are not suitable for continuous immersion in fluids; for this application the advice of the manufacturer shall be sought.

4.2.4 Cables shall be selected so that they are suitable for the operating conditions. Examples of operating conditions are:

– voltage,
– current,
– protective measures,
– grouping of cables,
– method of installation,
– accessibility.

4.2.5 Cables shall be selected so that they are suitable for any external influences which may exist. Examples of external influences are:

– ambient temperature,
– presence of rain, steam or accumulation of water,
– presence of corrosive, chemical or polluting substances,
– mechanical stresses (such as through holes or sharp edges in metal work),
– radiation (such as sunlight or luminaires or any sources of ultra violet emission).

In respect to solar radiation, it shall be noted that colour is important, black giving a higher degree of protection against degradation but higher heat absorption.

It shall be noted that:

– Sheathed cables of EN 50264 and EN 50382, as well as textile braided cables of EN 50382 and cables of EN 50306-4 class E, are intended for use where the cable is installed such that it may be subject to mechanical stress and appropriate protection, in general, is not provided.
– Unsheathed cables of EN 50264, EN 50382, EN 50306-2 and sheathed cables of EN 50306-3 and EN 50306-4 class P are intended for use in locations where once installed the cable will be protected so that mechanical stress is unlikely to occur.

4.2.6 Consideration shall be given to protection against aggressive agents other than those for which the cables are designed.

4.2.7 Green-and-yellow coloured cores shall be used for protective earthing purposes only.

4.3 Requirements for installation of cables

4.3.1 Cables shall not be installed in contact with or close to hot surfaces unless the cables are intended for such conditions.

4.3.2 Cables shall be adequately supported. Recommended maximum spacing of supports is given in EN 50343.

In deciding the actual spacing, the weight of the cable between the supports shall be taken into account so that the limiting value of mechanical tension is not exceeded.

The cable shall not be damaged by any mechanical restraint used for its support

4.3.3 Cables which have been in use for long periods may be damaged if they are disturbed. This can arise from the effect of natural ageing on the materials used for cable insulation and sheathing, which ultimately results in deterioration of the physical properties of these materials.

4.3.4 Cables shall not be subject to excessive abrasion, crushing, kinking, and tensile load (see 6.4) particularly at the point of connection to the fixed equipment. Any strain relief or clamping device shall not damage the cable.

4.3.5 An earthing core in multicore cables, if present, shall be of such a length that in case of cable breakage due to tension applied to the cable this core breaks after all other cores.

4.3.6 It should be noted that the use of a class 5 conductor in cables to EN 50264, EN 50306 and EN 50382 does not indicate that the cable is suitable for repeated flexing.

4.4 Electromagnetic compatibility (EMC)

If essential circuits are liable to be subject to electromagnetic interference, screens or shielding shall be provided and connected using an appropriate method. (See also EN 50121-1 and EN 50343).

5 Fire

5.1 General

Attention shall be given to the application for which the rolling stock will be used when assessing requirements of testing for fire.

Rolling stock cables for power, control and associated circuits will, in the event of fire, limit the risk to people and improve the safety on railways in general. These cables are designed with halogen free materials. In the event of a fire, they will have 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.

5.2 Resistance to fire

Where in the event of a fire, the integrity of a circuit is essential for personnel and equipment safety, fire resisting (limited circuit integrity) cable shall be used.