



SLOVENSKI STANDARD
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Safety requirements for cableway installations designed to carry persons - Electrical
 equipment other than for drive systems

Sicherheitsanforderungen für Seilbahnen für den Personenverkehr - Elektrische
 Einrichtungen, ohne Antriebe

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Prescriptions de sécurité pour les installations à câbles transportant des personnes -
 Dispositifs électriques autres que les entraînements

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Ta slovenski standard je istoveten z: EN 13243:2004

ICS:

45.100 U] |^{ æÁ æŌã } æ^ Cableway equipment

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ICS 45.100

English version

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Sicherheitsanforderungen für Seilbahnen für den Personenverkehr - Elektrische Einrichtungen, ohne Antriebe

This European Standard was approved by CEN on 23 August 2004.

CEN 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 CEN 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 CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 13243:2004) has been prepared by Technical Committee CEN/TC 242 "Safety requirements for passenger transportation by rope", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2005, and conflicting national standards shall be withdrawn at the latest by April 2005.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

This document contains a bibliography.

This document forms part of the standards programme approved by the CEN Technical Board on safety requirements for cableway installations designed to carry persons.

- 1) Safety requirements for cableway installations designed to carry persons — Terminology
- 2) Safety requirements for cableway installations designed to carry persons — General requirements
- 3) Safety requirements for cableway installations designed to carry persons — Calculations
- 4) Safety requirements for cableway installations designed to carry persons — Ropes
- 5) Safety requirements for cableway installations designed to carry persons — Tension devices
- 6) Safety requirements for cableway installations designed to carry persons — Drive systems and other mechanical equipment
- 7) Safety requirements for cableway installations designed to carry persons — Carriers
- 8) Safety requirements for cableway installations designed to carry persons — Electrical equipment other than for drive systems
- 9) Safety requirements for cableway installations designed to carry persons — Civil engineering works
- 10) Safety requirements for cableway installations designed to carry persons — Pre-commissioning inspection, maintenance and operational checks
- 11) Safety requirements for cableway installations designed to carry persons — Evacuation and rescue
- 12) Safety requirements for cableway installations designed to carry persons — Operation
- 13) Safety requirements for cableway installations designed to carry persons — Quality assurance

This series of standards forms a complete set with regard to the design, production, installation, maintenance and operation of any cableway installation designed to carry persons.

With regard to ski-tows, the text of this document is based on the work of the International Ropeway Organization (OITAF).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This document specifies safety requirements for electrical devices, apart for those in drive systems, for cableway installations designed to carry persons. This standard is applicable to the various types of installations and takes into account their environment.

Electromagnetic compatibility (EMC) is not covered in this document; cableways and their components should comply with general requirements for EMC.

For electrical devices which are parts of drive systems, the requirements of those sections of EN 13223 listed in its scope as relating to drive systems should be observed.

This standard contains requirements for prevention of accidents and protection of workers.

This standard does not apply to cableways for transportation of goods or to inclined lifts.

2 Normative references

The following referenced documents are indispensable for the application 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.

[SIST EN 13243:2005](https://standards.iteh.ai/catalog/standards/sist/a52370b0-9f18-430c-ae1c-)

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EN 418, *Safety of machinery — Emergency stop equipment, functional aspects — Principles for design.*

EN 954-1, *Safety of machinery — Safety related parts of control systems — Part 1: General principles for design.*

EN 1709, *Safety requirements for cableway installations designed to carry persons — Pre-commissioning inspection, maintenance and operational inspection and checks*

prEN 1907:2004, *Safety requirements for cableway installations designed to carry persons — Terminology.*

EN 1908, *Safety requirements for cableway installations designed to carry persons — Tensioning devices.*

EN 1909, *Safety requirements for cableway installations designed to carry persons — Recovery and evacuation.*

EN 12397, *Safety requirements for cableway installations designed to carry persons — Operation.*

EN 12408, *Safety requirements for cableway installations designed to carry persons — Quality assurance.*

EN 12927-1, *Safety requirements for cableway installations designed to carry persons — Ropes — Part 1: Selection criteria for ropes and their end fixings.*

EN 12927-2, *Safety requirements for cableway installations designed to carry persons — Ropes — Part 2: Safety factors.*

EN 12927-3, *Safety requirements for cableway installations designed to carry persons — Ropes — Part 3: Long splicing of 6-strand hauling, carrying-hauling and towing ropes.*

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EN 12927-4, *Safety requirements for cableway installations designed to carry persons — Ropes — Part 4: End fixings.*

EN 12927-5, *Safety requirements for cableway installations designed to carry persons — Ropes — Part 5: Storage, transportation, installation and tensioning.*

EN 12927-6, *Safety requirements for cableway installations designed to carry persons — Ropes — Part 6: Discard criteria.*

EN 12927-7, *Safety requirements for cableway installations designed to carry persons — Ropes — Part 7: Inspection, repair and maintenance.*

EN 12927-8, *Safety requirements for cableway installations designed to carry persons — Ropes — Part 8: Magnetic rope testing (MRT).*

EN 12929-1, *Safety requirements for cableway installations designed to carry persons — General requirements — Part 1: Requirements for all installations.*

EN 12929-2, *Safety requirements for cableway installations designed to carry persons — General requirements — Part 2: Requirements for bicable aerial ropeways without carrier truck brake.*

EN 12930, *Safety requirements for cableway installations designed to carry persons — Calculations.*

EN 13107, *Safety requirements for cableway installations designed to carry persons — Civil engineering works.*

EN 13223, *Safety requirements for cableway installations designed to carry persons — Drive systems and other mechanical equipment.*

prEN 13796-1, *Safety requirements for cableway installations designed to carry persons — Carriers — Part 1: Grips, carrier trucks, on-board brakes, cabins, chairs, carriages, maintenance carriers, tow-hangers.*

prEN 13796-2, *Safety requirements for cableway installations designed to carry persons — Carriers — Part 2: Slipping resistance tests for grips.*

prEN 13796-3, *Safety requirements for cableway installations designed to carry persons — Carriers — Part 3: Fatigue testing.*

EN 50110-1, *Operation of electrical installations.*

EN 50110-2, *Operation of electrical installations (national annexes).*

EN 50272-2, *Safety requirements for secondary batteries and battery installations - Part 2: Stationary batteries.*

EN 60204-1, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:1997).*

EN ISO 12100-2, *Safety of machinery — Basic concepts, general principles for design - Part 2: Technical principles (ISO 12100-2:2003).*

EN ISO 13849-2, *Safety of machinery — Safety-related parts of control systems - Part 2: Validation (ISO 13849-2:2003).*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 1907:2004 and the following apply.

3.1 Basic principles, general

3.1.1

safety function

all the procedures that recognize the occurrence of certain conditions or operations that together make up a hazardous situation. These procedures initiate processes that reduce the risks involved particularly by stopping the installation. A safety function starts with an assessment of the conditions and physical parameters in the cableway and ends with initiation of the process or completion of the procedure initiated.

3.1.2

electrical safety device

all the components used to implement all the operations of a safety function. Electrical safety devices may be of Type A or Type B (see 4.2.2.1).

3.1.3

remote monitoring installation, signalling installation

installation used to transmit commands and information between the cableway stations or between stations and carriers.

3.1.4

suspension of safety functions

process whereby safety functions are put out of operation by deliberate switching.

3.1.5

fault exclusion

exclusion of a theoretically possible fault as a result of special measures.

3.1.6

fault tolerance time

time period during which a process can be impaired by erroneous control signals without a dangerous state occurring.

3.2 Electrical circuits

3.2.1

break circuit

circuit that normally carries current continuously. The desired function is initiated by interrupting the current flow.

3.2.2

make circuit

circuit in which no current normally flows. The desired function is initiated by generating current flow.

3.2.3

safety circuits

electrical circuits on which safety functions and emergency stopping devices act directly, or which monitor and compare physical parameters relevant to safety (e.g. set point value/actual value monitoring, deceleration monitoring). They bring the cableway to a stop or prevent unwanted start-up.

3.2.4

line safety circuits

safety circuits operated directly by the safety functions and emergency stopping devices on the line. They are also used for monitoring various ropes and cables for failure, contact with each other and earthing.

3.2.5

control circuits

circuits used for operational open-loop control, closed-loop control and for protecting the main circuits

3.2.6

main circuits

circuits that supply the actual drive devices and the auxiliary drives with electrical power

3.3 Electrical equipment

3.3.1

emergency stop device

manually or automatically operated switchgear acting on a safety circuit or line safety circuit and initiating the stopping of the cableway

NOTE According to this definition, switches on line support structures, profile gauge switches and tension weight switches, for example, are also emergency stop devices, as are also maintenance switches and emergency stop buttons

3.3.1.1

maintenance switch; safety switch

manually operated and lockable emergency stopping device which initiates stopping of the cableway and prevents restart by means of a brake acting on the drive sheave

3.3.1.2

emergency stop button

manually operated emergency stop device which does not return automatically to its initial position after operation and can be reset manually

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3.4 Control and operation

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3.4.1

service run

run in which no passengers are carried

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NOTE The transport of personnel and materials is permissible.

3.4.2

test run

a service run during which tests are carried out

3.4.3

control point

point from which the cableway can be controlled and stopped

NOTE The type and extent of operating and indicating devices at the control point vary depending on the type of cableway and the position of the control point.

3.4.4

control console

the control console is located in the control room in the drive station. From it, the cableway can be controlled and brought to rest and all the modes of control can be monitored

3.4.5

ready for operation

an installation is ready for operation when no safety function or emergency stopping device is blocking start-up

3.4.6

ready signal

control signal from the control points to the control console indicating readiness for the cableway to start up

3.5 Electric cables

3.5.1

derailment detector line

cable on which the line support structure switches act

3.5.2

telephone line

cable used for the internal telephone system for connecting the stations and intermediate stopping points

3.5.3

line cable

cable that transmits command and information signals (cable position, loudspeakers, wind warning etc.) between the line and the stations

4 General requirements

4.1 Application of this standard

4.1.1 The requirements of this document apply to all installations together with those of EN 1709, EN 1908, EN 1909, EN 12927-1, EN 12927-2, EN 12927-3, EN 12927-4, EN 12927-5, EN 12927-6, EN 12927-7, EN 12927-8, EN 12929-1, EN 12929-2, EN 12930, EN 12397, EN 12408, EN 13223, EN 13107, prEN 13796-1, prEN 13796-2, prEN 13796-3.

4.1.2 EN 60204-1 applies where this document does not contain different requirements, except for the sections on control functions, safety interlocks, control functions in the case of faults, electronic components and technical documentation.

4.2 Safety principles

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4.2.1 Hazard scenarios

The safety principles set out in EN 12929-1 apply. In addition, the following hazard scenarios and safety measures apply within the scope of this document.

4.2.1.1 The following events may lead to hazardous situations which may be avoided or limited by the requirements of this document:

- a) accidental contact of a person with a live metallic component;
- b) failure of an electrical safety function;
- c) voltage drop or total loss of voltage;
- d) occurrence of a short-circuit, earth fault or open circuit;
- e) failure of electrical or electronic components;
- f) foreseeable external influences, in particular, environmental conditions and electromagnetic fields.

4.2.1.2 For each individual safety function, the hazard to persons is to be defined by means of a risk analysis (see also Annex A). A distinction is made between the following 3 hazard categories:

- a) **Hazard category 1:** failure of an electrical device that cannot lead to an accident (no personal hazard);

- b) **Hazard category 2:** failure of an electrical device that could lead to a slight accident (reversible injuries to persons);
- c) **Hazard category 3:** failure of an electrical device that could lead to a serious accident (irreversible injuries, death of persons).

4.2.1.3 The safety functions are allocated to 4 graded requirement classes (see 4.2.2.4) taking into account the respective hazard category and the probability of occurrence of the hazardous situation. The requirement class of a safety function is determined as shown in the diagram in Annex A. Examples of this allocation are given in informative Annex C.

NOTE Additions may be made to these examples of allocation in informative Annex C during the next few years.

4.2.2 Safety measures

The safety measures to be taken to eliminate the hazard scenarios listed under 4.2.1 are the following:

4.2.2.1 Division of the components used

4.2.2.1.1 An electrical safety device is of type A if:

- a) the failure behaviour of all components is well defined; and if
- b) the behaviour of the assembly under fault conditions can be completely determined; and if
- c) reliable failure rate data from actual experience exist for components or the assembly.

4.2.2.1.2 An electrical safety device is of type B if it cannot be classified as being of type A.

4.2.2.2 It shall be ensured that, in the event of a danger to persons, the cableway is automatically put into a safe state according to the hazardous situation.

4.2.2.3 Measures to be taken concerning software or hardware to try to prevent accidental or systematic faults from occurring shall be executed corresponding to the applicable requirement classes. In principle, it may be assumed that maintenance will be carried out in accordance with the specifications

4.2.2.4 Type A safety devices shall meet the following requirements, depending on the applicable requirement class:

- a) **requirement class 1:** electrical devices shall be designed, selected, assembled and installed in accordance with the state of the art so that they can at least adequately withstand the expected operating stresses and external influences;
- b) **requirement class 2:** the requirements of requirement class 1 shall be met and well-tried components and well-tried safety principles shall be used. The safety functions of the electrical safety devices of requirement class 2 shall be tested at suitable intervals (automatic or manual tests). The occurrence of a fault may lead to the loss of the safety function between the test intervals;
- c) **requirement class 3:** the requirements of requirement class 2 shall be met. Electrical safety devices of requirement class 3 shall be designed so that a single fault in one of these devices does not lead to the loss of the safety functions. The occurrence of a second fault may lead to the loss of the safety functions between the test intervals (automatic or manual tests);
- d) **requirement class 4:** the requirements of requirement class 3 shall be met. Electrical safety devices of requirements class 4 shall be designed so that a single fault in one of these devices does not lead to the loss of the safety functions and:
 - 1) the single fault, while always possible, is identified at or before the next call for the safety function or else results in putting the cableway into a safe state; or