



**SLOVENSKI STANDARD**  
**oSIST prEN 13243:2013**  
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**Varnostne zahteve za žičniške naprave za prevoz oseb - Elektro oprema (razen za pogonske sisteme)**

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

Sicherheitsanforderungen für Seilbahnen für den Personenverkehr - Spanneinrichtungen

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

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45.100            Oprema za žičnice            Cableway equipment

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

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

Sicherheitsanforderungen für Seilbahnen für den Personenverkehr - Spanneinrichtungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 242.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## iTeh STANDARD PREVIEW (standards.iteh.ai)

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## Foreword

This document (prEN 13243:2013) 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 document is currently submitted for CEN enquiry.

This document is intended to replace EN 13243:2004.

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 Directives.

For the relationship with EU Directives, see informative Annex ZA, which is an integral part of this document.

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 — Tensioning 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 — Precommissioning inspection, maintenance and operational checks
- 11) Safety requirements for cableway installations designed to carry persons — Recovery and evacuation
- 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, erection, maintenance and operation of any cableway installation designed to carry persons.

In respect of ski-tows, the drafting of this document has been guided by the works of the International Organisation for Transportation by Rope (OITAF).

## 1 Scope

This document specifies safety requirements for electrical devices including application software, apart for those in drive systems, for cableway installations designed to carry persons. This document is applicable to the various types of cableway installations and takes into account their environment. It does not apply to complex electronics and embedded software.

For complex electronics and embedded software, reference is made to the relevant publications e.g. IEC 61508.

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 part of drive systems, the requirements of those sections listed in the scope of EN 13223 as relating to drive systems should be observed.

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

It does not apply to cableway installations for the transportation of goods by rope or to inclined lifts.

## 2 Normative references

The following references, 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 reference document (including any amendments) applies.

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

EN 1907:2005, *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 control*

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*

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*

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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: Additional requirements for reversible bi-cable aerial ropeways without carrier truck brakes*

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*

EN 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*

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

EN 13796-3, *Safety requirements for cableway installations designed to carry persons — Carriers — Part 3: Fatigue tests*

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*

EN 62305-1, *Protection against lightning — Part 1: General principles*

EN 62305-2, *Protection against lightning — Part 2: Risk management*

EN 62305-3, *Protection against lightning — Part 3: Physical damage to structures and life hazard*

EN 62305-4, *Protection against lightning — Part 4: Electrical and electronic systems within structures*

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

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

EN ISO 13850, *Safety of machinery — Emergency stop — Principles for design*



### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1907:2005 and the following apply.

#### 3.1 Basic principles, general

##### 3.1.1

##### **safety function**

all the procedures that identify 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 (input unit) in the cableway and ends with the initiation of the process (output unit) or completion of the procedure initiated.

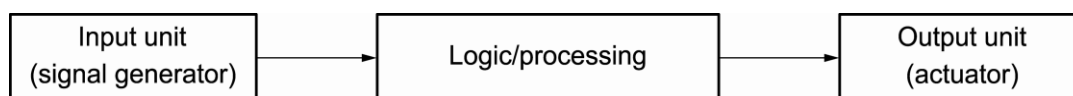


Figure 1 - Schematic representation of a safety function

##### 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 4.2.3.1)

##### 3.1.3

##### **remote monitoring installation; signaling 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 or state whereby safety functions or parts of 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

##### **normally open circuit**

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

**prEN 13243:2013 (E)****3.2.3****safety circuits**

electrical circuits on which safety functions and emergency stop 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 an unwanted start-up

**3.2.4****line safety circuits**

safety circuits operated directly by the safety functions and emergency stop 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 control, regulation and to protect the main circuits

**3.2.6****main circuits**

circuits that supply the drive devices and 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 maintenance switches and emergency stop buttons.

**3.3.1.1****maintenance switch; safety switch**

manually operated and lockable emergency stop device which initiates stopping 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 locks in position after operation and can be reset manually

**3.4 Control and operation****3.4.1****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.

**3.4.2****control console**

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

**3.4.3****ready for operation**

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

**3.4.4****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 cableway 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, EN 13796-1, EN 13796-2, EN 13796-3.

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

**4.1.3** Process for establishing the requirements for the electrical devices.

**4.1.3.1 General** <https://standards.iteh.ai/catalog/standards/sist/e0423bc9-c5b8-41e9-97e8-a20bc101ff25/sist-en-13243-2013>

The safety analysis of the installation shall provide requirements for eliminating the hazard or for reducing the risk that is associated with the hazard, by means of safety functions.

The necessary safety level of the safety function and its specification shall be established by the persons responsible for the subsystem from which the hazard for the overall system has originated.

**NOTE** The required level of safety should be established in requirement classes 1 to 4, in accordance with Annex A.

**4.1.3.2** Contribution towards reducing the risk by means of the control, monitoring and safety devices (e.g. electrical subsystem).

The verification process for proving that the required level of safety has been reached with regard to the hardware and software is described in Clauses 4.2 and 4.3.

#### **4.1.3.3 Validation**

The validation of the safety function shall be carried out the first time on a complete installation by the subsystem which specified the safety function.

**4.1.3.4** Schematic representation of the process for reducing the risk (e.g. electrical subsystem).

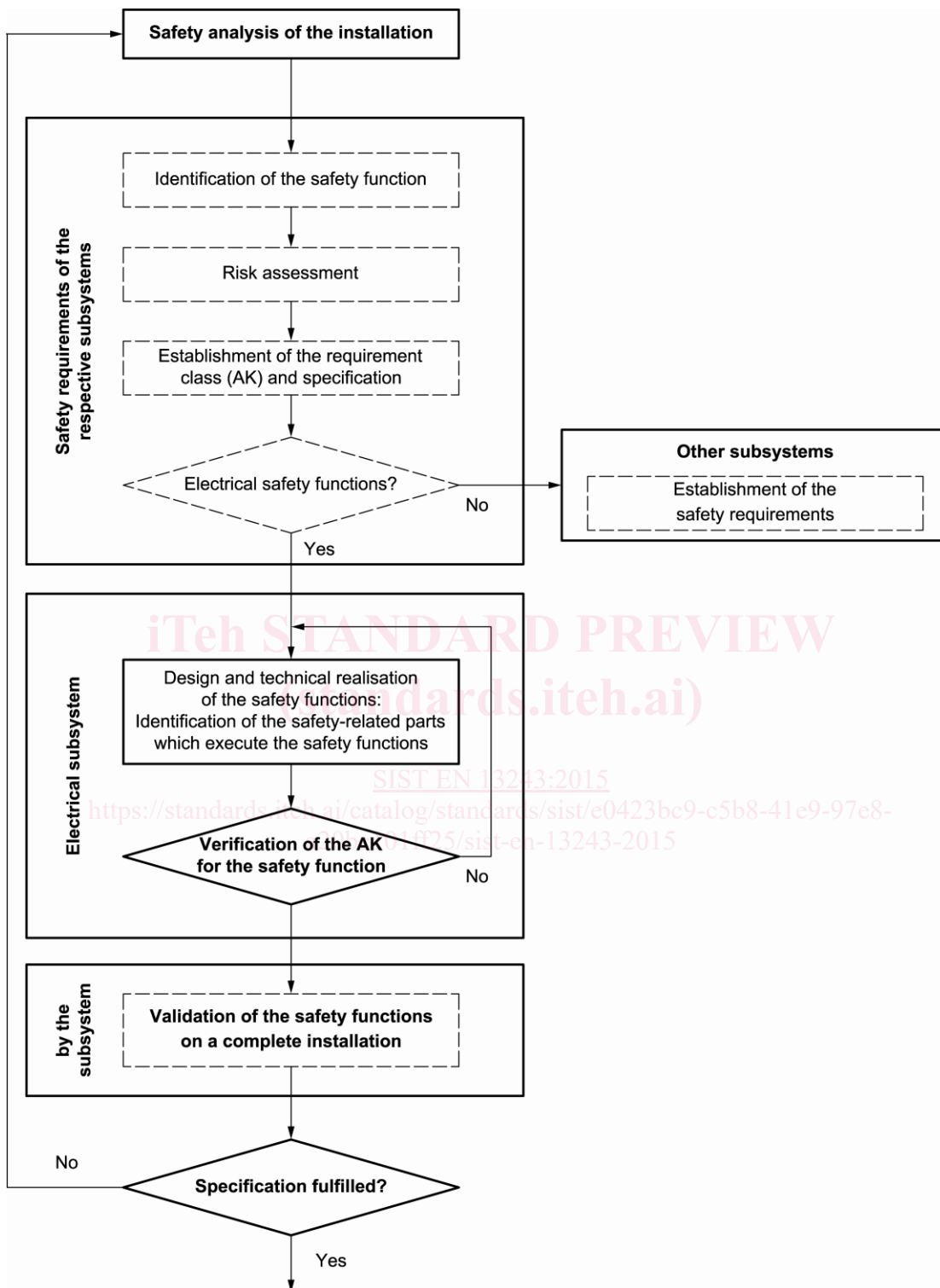


Figure 2 – Overview of the process for reducing the risk

## 4.2 Safety principles

### 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 can be avoided or limited by the safety requirements of this document:

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

### 4.2.2 Establishing the requirement classes

**4.2.2.1** For each individual safety function, the hazard to persons shall 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:** hazardous situation which cannot cause a personal hazard;
- b) **Hazard category 2:** hazardous situation which can cause slight (usually reversible) injury to persons;
- c) **Hazard category 3:** hazardous situation which can cause serious (usually irreversible) injury or death to persons.

**4.2.2.2** The safety functions are allocated to 4 graded requirement classes (see 4.2.3.4) taking into account the respective hazard category and the probability of avoiding this hazard. The requirement class of a safety function is determined as shown in the diagram in Annex A.

### 4.2.3 Safety measures

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

**4.2.3.1** division of the components used.

**4.2.3.1.1** An electrical safety device is of type A if:

- a) the failure behaviour of all components is sufficiently 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 (proven components). Complex electronic components and assemblies of type B cannot be considered as equivalent.

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

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