



# SLOVENSKI STANDARD

## SIST EN 13243:2015

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Nadomešča:

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**Varnostne zahteve za žičniške naprave za prevoz oseb - Električna 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  
(standards.itteh.ai)

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

**Ta slovenski standard je istoveten z: EN 13243:2015**

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**ICS:**

45.100

Oprema za žičnice

Cableway equipment

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EUROPEAN STANDARD

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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 an Seilbahnen für den Personenverkehr - Elektrische Einrichtungen, ohne Antriebe

This European Standard was approved by CEN on 18 November 2014.

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 CEN-CENELEC Management Centre or to any CEN member.

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**EN 13243:2015 (E)****Foreword**

This document (EN 13243:2015) 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 maintain the status of a National Standard, either with the publication of an identical text or by recognition up to July 2015, and any opposing National Standards shall be withdrawn by July 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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 Directive 2000/9/EC.

For the relationship with EU Directive 2000/9/EC, see informative Annex ZA, which is an integral part of this document.

With respect to EN 13243:2004, the following significant amendments have been made:

- In section 1, additions have been added with respect to worker protection and the transported persons.
- In section 1, the reference to relevant publications, e.g. EN 61508 (all parts) has been added for complex electronics and embedded software.
- In section 3, terms and definitions have been removed because the reference to EN 1907 is sufficient.
- In 4.1.3, the process to determine the requirements for electrical equipment has been added by means of a schematic representation of the process for risk reduction.
- In 4.2.2, the risk categories have been revised with regard to the current principles.
- The content and structure of 4.2.3 have been adjusted to the new reference system of the EN ISO 13849 1 standard due to the withdrawal of EN 954 1 by the end of 2011. The requirements of the requirement classes have been revised accordingly.
- In 4.2.3.14, Table 1 has been added on the basis of EN ISO 13849 1.
- In 4.2.3.15, Table 2 has been added on the basis of EN ISO 13849 1.
- In 4.3, the requirements for safety-related application software have been added with the presentation of the development process of the software (V diagram).
- In 6.4, reference has been made to the reference standard EN ISO 13850, with respect to the requirements of emergency stop devices.
- In 8.2.2, the requirement for test devices has been defined more precisely.
- In Annex A, the definitions of the risk categories have been updated and parameters P1 and P2 have been added with respect to the possibility of avoiding hazardous situations.
- In Annex B, the assignment of performance levels as specified in EN ISO 13849 1 and the safety integrity level (SIL) as specified in EN 61508 (all parts) to requirement classes is shown in a table.

- In the old Annex C, the examples for assigning the requirement classes have been removed.
- In Annex C, the table for indicating devices has been updated.
- In the old Annex D, Deviation A of Italy has been removed.
- In Annex D, the table with examples of the level of fault detection (FG) has been added.
- Old Annex ZA has been updated.
- The bibliography has been updated.

This document forms part of the standards programme approved by the CEN/TC 242 . This programme includes the following standards:

- EN 1907 — *Terminology*;
- EN 12929 (all parts)— *General requirements*;
- EN 12930 — *Calculations*;
- EN 12927 (all parts) — *Ropes*;
- EN 1908 — *Tensioning devices*;
- EN 13223 — *Drive systems and other mechanical equipment*;
- EN 13796 (all parts) — *Carriers*;
- EN 13243 — *Electrical equipment other than for drive systems*;
- EN 13107 — *Civil engineering works*;
- EN 1709 — *Precommissioning inspection, maintenance and operational checks*;
- EN 1909 — *Recovery and evacuation*
- EN 12397 — *Operation*;
- EN 12408 — *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 standard has been guided by the works of the International Organisation for Transportation by Rope (OITAF).

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Belgium, Bulgaria, Denmark, Germany, the former Yugoslav Republic of Macedonia, Estonia, Finland, France, Greece, Ireland, Iceland, Italy, Croatia, Latvia, Lithuania, Luxemburg, Malta, the Netherlands, Norway, Austria, Poland, Portugal, Romania, Sweden, Switzerland, Slovakia, Slovenia, Spain, Czech Republic, Turkey, Hungary, United Kingdom and Cyprus.

**EN 13243:2015 (E)****1 Scope**

This European standard specifies safety requirements for electrical devices (including application software, apart from those in drive systems) on cableway installations designed to carry persons. This standard 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. EN 61508 (all parts).

Electromagnetic compatibility (EMC) is not covered in this standard; 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 without prejudice to the application of national regulations. National regulations of a legal nature in regards to building or regulations or that are designed to protect particular groups of people, remain unaffected.

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

**2 Normative references**

The following references, in whole or in part, are normatively referenced in this standard 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, *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 (all parts), *Safety requirements for cableway installations designed to carry persons — Ropes*

EN 12929 (all parts), *Safety requirements for cableway installations designed to carry persons — General requirements* 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 (all parts), *Safety requirements for cableway installations designed to carry persons — Carriers* EN 50110 (all parts), *Operation of electrical installations* 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)*



EN 62305 (all parts), *Protection against lightning (IEC 62305, all parts)*

EN ISO 12100, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100)*

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

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

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1907 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.

Note 1 to entry: 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.

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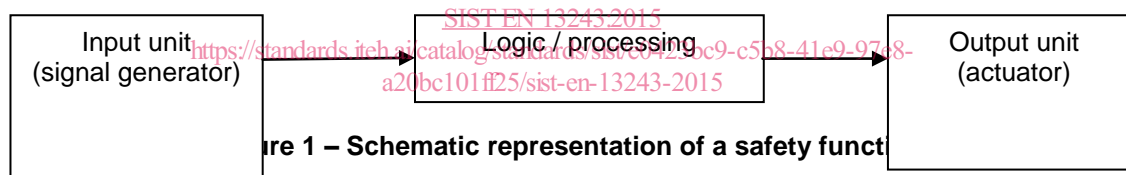


Figure 1 – Schematic representation of a safety function

##### 3.1.2

##### **electrical safety device**

all the components used to implement all the operations of a safety function.

Note 1 to entry: Electrical safety devices may be of Type A or Type B (see 4.2.3.1)

##### 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 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

**EN 13243:2015 (E)****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

Note 1 to entry: The desired function is initiated by interrupting the current flow.

**3.2.2****normally open circuit**

circuit in which no current normally flows.

Note 1 to entry: The desired function is initiated by generating the current flow.

**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)

Note 1 to entry: 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

Note 1 to entry: 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 Electric cables****3.3.1****derailment detector line**

cable on which the line support structure switches act

**3.3.2****telephone line**

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

**3.3.3****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 standard apply to all cableway installations together with those of EN 1709, EN 1908, EN 1909, EN 12927 (all parts), EN 12929 (all parts), EN 12930, EN 12397, EN 12408, EN 13223, EN 13107 and EN 13796 (all parts).

**4.1.2** EN 60204-1 shall be applied where this standard does not contain different requirements. EN 60204-1 shall not be applied to the sections 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:**

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 manufacturer or its authorized representative 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 Subclauses 4.2 and 4.3.

##### **4.1.3.3 Validation:** <https://standards.iteh.ai/catalog/standards/sist/e0423bc9-c5b8-41e9-97e8-a20bc101f25/sist-en-13243-2015>

The validation of the safety function shall be carried out the first time on a complete installation by the manufacturer or its authorized representative that specified the safety function.

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

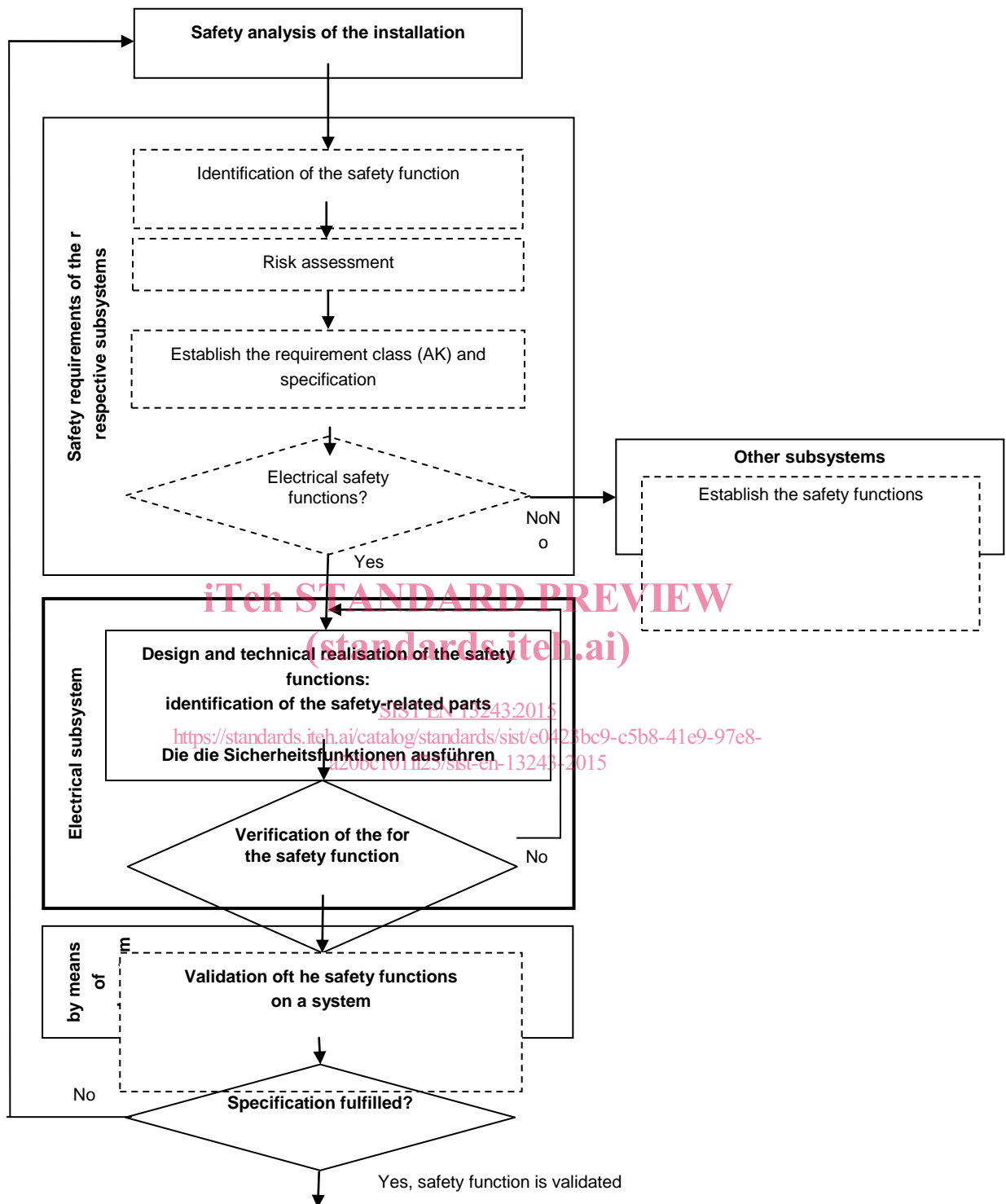


Figure 2 – Overview of the process for reducing the risk

## 4.2 Safety principles

### 4.2.1 Hazard scenarios

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

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

- 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 shall be 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 shall be allocated to 4 graded requirement classes (in accordance with 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 shall be 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.