



**SLOVENSKI STANDARD**  
**SIST EN 1908:2005**  
**01-januar-2005**

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Safety requirements of cableway installations designed to carry persons - Tensioning devices

Sicherheitsanforderungen für Seilbahnen für den Personenverkehr - Spanneinrichtungen

Prescriptions de sécurité pour les installations a câbles transportant des personnes - Dispositifs de mise en tension

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**ICS:**

45.100 U] i^{ æ Á æ ã } æ^ Cableway equipment

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ICS 45.100

English version

## Safety requirements of cableway installations designed to carry persons - Tensioning devices

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

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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

Management Centre: rue de Stassart, 36 B-1050 Brussels

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## Foreword

This document (EN 1908:2004) 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of an identical text or by endorsement, at the latest by April 2005, and conflicting national standards shall be withdrawn at the latest by April 2005.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 Directives.

For 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. This programme comprises the following standards:

- 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 devices.
- 7) Safety requirements for cableway installations designed to carry persons – Carriers.
- 8) Safety requirements for cableway installations designed to carry persons – Electrical installations apart from 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 inspection and 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.

Together these form a series of standards regarding design, production, maintenance and operation of all installations for cableway installations 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).

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.

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## 1 Scope

This document specifies the safety requirements applicable for the tensioning devices for cableway installations designed to carry persons. This standard is applicable to the various types of installations and takes into account their environment.

This document applies to the design, manufacture, installation, maintenance and operation of rope tensioning devices and anchorages for cableway installations designed to carry persons.

It includes requirements relative to the prevention of accidents and the protection of workers.

It does not apply either to installations intended for the transport 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.

EN 982, *Safety of machinery — Safety requirements for fluid power systems and their components — Hydraulics.*

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 passenger transportation by rope — Terminology.*

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.*

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

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: Calculation, 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 applicable to all installations.*

EN 12929-2, *Safety requirements for cableway installations designed to carry persons — General requirements - Part 2: Additional requirements for jig back bicable 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 13243, *Safety requirements for cableway installations designed to carry persons — Electrical equipment other than for drive systems.*

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.*

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### 3 Terms and definitions

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

#### 3.1

##### **tensioning device**

all of the components which are used for maintaining the tension of a rope within pre-established permissible limits

#### 3.2

##### **travel**

the distance available for the moving part of a tensioning device to absorb variations in the length and sag of a rope under tension

#### 3.3

##### **nominal tension**

the theoretical static force applied to the rope through the tensioning device by counterweights, or the mean value of the pre-established limits in the case of another tensioning device

#### 3.4

##### **tension sheave**

sheave for deflecting a tension rope

#### 3.5

##### **fixed anchorage tensioning device**

rope tensioning device whose tension cannot be adjusted during operation

**3.6  
roller chain**

component used to deflect a track rope in which the rope rests on interlinked guide components forming a chain

**4 General requirements**

**4.1 Application of this standard**

The requirements of this document apply to all installations along with those of EN 1709, EN 1909, EN 12397, EN 12408, 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 13107, EN 13223, EN 13243, prEN 13796-1, prEN 13796-2 and prEN 13796-3.

**4.2 Safety principles**

**4.2.1 General**

The safety principles set out in EN 12929-1 apply.

In addition, the following hazard scenarios and safety requirements relative to the scope of this document are to be taken into consideration.

**4.2.2 Hazard scenarios**

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

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- a) exceeding permissible limits for tension and variation in length of a rope;
  - b) exceeding permissible pressure limits in a hydraulic tensioning device;
  - c) jamming or catching which impedes the free movement of a rope;
  - d) jamming, wedging or incorrect position of the moving parts of a tensioning device;
  - e) deterioration or failure of the components of a tensioning device due to wear, corrosion or fatigue;
  - f) failure of components in a tensioning device as a result of incorrect dimensioning;
  - g) hazards which a tensioning device can present for persons in access and work areas;
  - h) improper behaviour of persons (passengers, operating personnel, third parties)

**4.2.3 Safety measures**

The safety measures to be taken to eliminate the hazard scenarios listed under 4.2.2 are the following:

- ensure that rope tensions are maintained within permissible limits;
- prevent or avert the failure of safety-related mechanical and hydraulic components and systems for measuring forces and pressures;
- prevent and detect the malfunction of a tensioning device;

- protect persons against the risk of falling or of contact with moving parts of a tensioning device;
- prevent non-permissible load conditions in the case of tensioning device failures.

## 5 General requirements for tensioning devices

### 5.1 Purpose of tensioning devices

The function of a tensioning device is to maintain the tension in a rope within pre-established permissible limits.

### 5.2 Travel (of tensioning devices)

#### 5.2.1 Dimensioning

**5.2.1.1** The travel of a tensioning device shall accommodate at least the sum of the following, unless specific justification can be made for a different approach:

- a) the variation in length of the ropes to be tensioned under a temperature difference of 60 °C, unless the climatic conditions at the site of the installation require a greater temperature difference to be considered;
- b) a permanent rope elongation of 0,5 ‰ in the case of carrying ropes and 1,5 ‰ for carrying-hauling ropes and haul ropes. This travel shall be at least the minimum length required for the renewal of a splice or the installation of new rope end fixings;
- c) the effect of the differences in sag for all specified operational loading conditions;
- d) the elastic variation in length of the ropes for all specified operational loading conditions. For carrying-hauling and haul ropes, calculations are to be made with elastic modulus of 80 kN/mm<sup>2</sup> (new rope) and 120 kN/mm<sup>2</sup> (worn rope).

**5.2.1.2** If the position of a counterweight or a hydraulic tensioning device is adjustable, the travel of the counterweight or jack may be calculated assuming a temperature difference of 30 °C, and the length required for renewing a splice or for installing new end fixings need not be taken into account.

The adjustment device shall be able to accommodate at least the travel required by 5.2.1.1 a) to d).

For other adjustable tensioning devices, this provision may be applied by analogy.

#### 5.2.2 Free movement

Free movement of a tensioning device shall be assured in all permissible operating conditions, in particular with regard to the effects of bad weather.

#### 5.2.3 Limits

**5.2.3.1** Travel shall be limited by means of mechanical stops.

**5.2.3.2** Under all conditions of normal operation, tensioning devices shall not reach the mechanical stops.

**5.2.3.3** The extreme operating positions of the moving part of a tensioning device shall be monitored.

The triggering of a travel limit switch shall initiate the stopping of the installation.

It shall only be possible to reset travel limit switches in situ and manually.