BRITISH STANDARD

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1709:2004

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

The European Standard EN 1709:2004 has the status of a British Standard

ICS 45.100

National foreword

This British Standard is the official English language version of EN 1709:2004.

The UK participation in its preparation was entrusted to Technical Committee MCE/20, Aerial ropeways, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

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English version

Safety requirements for cableway installations designed to carry persons - Precommissioning inspection, maintenance, operational inspection and checks

Prescriptions de sécurité pour les installations à câbles transportant des personnes - Examen probatoire, maintenance, contrôles en exploitatation

Sicherheitsanforderungen für Seilbahnen für den Personenverkehr - Erprobung, Instandhaltung, Betriebskontrollen

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

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

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Foreword

This document (EN 1709:2004) 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 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 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.

1 Scope

This document specifies the safety requirements applicable to the pre-commissioning inspection, maintenance and operational inspections and checks of cableway installations designed to carry persons. This standard is applicable to the various types of installations and takes into account their environment.

It also includes requirements relating to accident prevention and to worker protection.

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

This document does not deal with acceptance tests prior to opening to the public.

The provisions of clause 5 apply to the measures to be taken prior to the initial commissioning and clauses 6 and 7 concern those to be taken during operation.

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.

ENV 1090-1, *Execution of steel structures - Part 1: General rules and rules for buildings.*

prEN 1907:2004, *Safety requirements for cableway installations designed to carry person - 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.*

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 provisions - Part 2: Additional requirements for reversible 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 passenger transportation by rope - Carriers - Part 3: Fatigue testing.*

3 Terms and definitions

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

3.1
pre-commissioning inspection
all of the operations required for confirming the readiness of the installation for acceptance

3.2
inspection
all of the operations intended for ascertaining and assessing the actual condition of an installation and its components

3.3
operational inspection and checks
operations intended for verifying the good working condition of the installation before and during operation

3.4
operating test
operation, of a defined duration, during which the correct working of the installation is tested

3.5
readiness for acceptance
condition of the installation where the functional and technical safety conditions for acceptance have been fulfilled

3.6
readiness for operation
condition of the installation where the functional and technical safety conditions to allow passengers to be transported have been fulfilled

4 General requirements

4.1 Application of this standard

The requirements of this document apply to all installations along with the requirements of EN 1908, 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

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

a) physical construction of the installation not in conformity with the documents presented;

b) defective operation of individual components with each other and in their local environment;

c) defects arising from long-term operation, prolonged stoppages or repeated and long-term operating conditions;

d) use of insufficiently qualified and trained personnel;

e) operation with the installation and its components in a defective condition;

f) absence of measures for maintaining or re-establishing the specified condition of the installation and its components;

g) dangers stemming from the environment;

h) absence or non-compliance with a procedure.

4.2.3 Safety measures

4.2.3.1 General

The following safety measures shall be taken prior to acceptance and during operation in order to eliminate the hazard scenarios listed in 4.2.2.

4.2.3.2 General safety

a) a pre-commissioning inspection of the installation prior to its acceptance, intended to verify the correct operation of each component with the others, and of the installation as a whole within its local environment;

b) maintenance work intended to maintain and re-establish the specified condition of the installation and its components;

c) daily operational inspection and checks intended to verify the correct operating condition of the installation before and during operation.

4.2.3.3 Safety of workers

All work shall be carried out and all activities conducted taking the necessary measures for preventing danger to the safety and health of the workers.

5 Verifications and pre-commissioning inspection

5.1 Submission of the documents for the installation (design, implementation) including verification by calculation

The scope and content of the documents to be submitted are specified in this document and in EN 1908, 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.

The submitted documents shall have been checked previously.

5.2 Submission of verification of the suitability of materials and components

The scope, nature and extent of the verifications to be submitted are specified in EN 1908, 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.

5.3 Pre-commissioning inspection

5.3.1 General

The pre-commissioning inspection shall include:

a) verification of the conformity of the installation with the submitted documents;

b) check of the individual components, their operation with each other and within their local environment;

c) the operating test;

d) the drawing-up of a report on the pre-commissioning inspection.

5.3.2 Verification of conformity of the installation with the submitted documents

The conformity of the completed installation with the submitted documents shall be verified.

5.3.3 Check and operating test of the individual components, their operation with each other and within their local environment

These checks shall be carried out in order to ensure operating safety and shall in particular focus on:

a) the condition of the ropes, their connections and end fixings;

b) the rope guides and the correct operation of their supports and tensioning devices, including the tensioning of the rope;

c) the adequate clearance of the carriers, tow-hangers and ropes in relation to other components and the local environment in the most unfavourable operating conditions;

d) the connection of the carriers or tow-hangers to the moving ropes and their resistance to slippage under all possible operating conditions;

e) the free movement of the carriers or tow-hangers on the line and in the stations;

f) the operation of the electrical installations;

g) the operation of the telecommunications and signalling installations;

h) the operation of the safety and monitoring devices in the event of operational failure conditions;

i) the efficiency of all the brakes and maintenance of adequate friction under the most unfavourable loading conditions during operation; in the case of ski-tows, this check shall be carried out on an unloaded installation;

j) the operation of all drive system types in all the operating modes, including the operation of the control and adjustment devices, taking into account the most unfavourable operating conditions; in the case of ski-tows, this test shall be carried out on an unloaded installation;

k) the operation and tests of the evacuation devices;

l) the condition of the station and line structures and of their foundations.

Before the initial commissioning and after major modifications which affect the safety of workers, the installation shall be inspected in respect of the safety of workers by an independent competent person.

5.3.4 Operating test

The installation after inspection in accordance with 5.3.2 and 5.3.3 shall operate for a period, defined in the following paragraph, during which all drive systems and operating modes shall be used and taking into account all operating conditions. In the case of a ski-tow, this operating test shall be carried out on an unloaded installation.

The minimum time for the operating test at maximum speed shall be:

— for ski-tows: 5 h;

— for fixed grip installations: 25 h with main drive, at least 5 h of which shall be at full load in the case of reversible aerial ropeways and funicular railways;

— for detachable grip installations: 50 h with main drive, at least 5 h of which shall be at full load.

In addition, a loading test is to be carried out with all the other drive modes for at least one complete operating cycle.

In the case of installations with carriers having detachable grips, the operating test is to be carried out with all the carriers.

In the case of installations intended exclusively for uphill transportation, the operating test shall be carried out with the maximum permissible load.

5.3.5 Report on the pre-commissioning inspection

The results of the pre-commissioning inspection shall be recorded in writing in a report which shall include the following, in particular:

a) the report on verification of the conformity of the installation with the submitted documents;

b) the report on the check and the operating tests of the individual components, their operation with each other and within their local environment;

c) the report on the braking tests;

d) the report on the check of the devices for monitoring the correct entry into and exit from the stations of the carriers and tow-hangers;

e) the report on the check of the electrical installation;

f) the report on the reference values for the mechanical and electrical components of the installation;

g) the report on the condition of the ropes and their connections and end fixings;

h) the report on the operating test with details of the running speed, load, number of hours of operation and of all breakdowns having occurred, their cause and rectification;

i) the report on evacuation exercises;

j) the report on the precautionary measures relating to the protection of workers;

k) the names and signatures of the persons responsible for the pre-commissioning inspection and the date of its completion.

These documents shall be identified, dated and signed.

5.4 Delivery of required documents to the operator

The operator shall receive, from the supplier, the civil engineering and assembly plans for the complete installation, the complete operating instructions as well as the maintenance documentation and operational inspections and checks of the installation and operating conditions.

These documents shall be identified, dated and signed.

5.5 Certification of readiness for acceptance

Readiness for acceptance shall be achieved after:

a) the submission of plans and verifications referred to in 5.1 and 5.2;

b) the pre-commissioning inspection in accordance with 5.3;

c) the submission of the documents in accordance with 5.4.

In addition, at the time of acceptance, draft operating regulations and a draft rescue and evacuation plan shall be presented. Proof shall also be given that the necessary measures have been taken to train the personnel with regard to the specific installation in accordance with EN 1909 and EN 12397.

6 Maintenance

6.1 General

The following requirements apply generally and are to be complied with taking into account the standards cited in 5.2.

6.1.1 A maintenance plan shall be drawn up and kept up to date. It shall take into account the required periodic inspections and maintenance operations set out in 6.2 and 6.3.

6.1.2 The maintenance operations shall be set out in check lists which contain the reference values and permissible tolerances, as well as the frequency of replacement for the components.

The specifications and defect acceptance criteria for visual inspections and non-destructive testing shall be indicated.

6.1.3 The report on each maintenance operation shall be confirmed by the signature of the person carrying out the work. Maintenance work carried out on safety components in accordance with the provisions of EN 12929-1, EN 12929-2 and scheduled in the maintenance plan shall be inspected by a second person authorized by the operations manager and the inspection confirmed by that person's signature.

6.1.4 The operator shall have available the necessary tools and test and measurement equipment as well as the necessary weights required for loading the carriers when carrying out braking tests.

6.1.5 The required spare parts shall be available in sufficient quantity, shall be in good condition, shall be located in the immediate vicinity of the installation and shall be stored under adequate conditions.

6.1.6 The necessary lifting equipment, ropes etc., shall be kept in good condition and their permissible load shall be indicated.

6.1.7 The equipment necessary for line maintenance and the protection of workers shall be provided.

6.1.8 The special operations to be carried out on the ropes at regular intervals (for example, the renewal of sockets and the displacement of track ropes or grips), are to be carried out in accordance with EN 12927-6, EN 12927-7 and prEN 13796-1.

6.2 Servicing

Servicing includes cleaning, protection, lubrication, refilling, replacement and adjustment of components.

Servicing shall be carried out in accordance with the servicing schedules provided by the supplier.

The prescribed checks shall be carried out on completion of servicing.

For construction works, the servicing work and scope depend on the results of the inspection.

6.3 Inspection

6.3.1 General

Inspection includes measurement, examination and assessment of the actual condition of the installation. Periodic inspections are to be carried out at monthly, yearly or multiannual intervals.

The inspection instructions provided by the supplier shall be followed. The results of inspections shall be recorded in writing by a person authorized by the operations manager.

Shorter intervals or additional inspections may be prescribed. If deviations from the specified condition are found, the necessary measures shall be taken immediately.

Continual monitoring shall ensure that the originally planned service requirements are fulfilled at any time during the working life of the structural element.

Periodic inspections shall show that the state, the behaviour and the utilisation of the construction works are adequate for the planned conditions. Particular events such as accidents, heavy storms, avalanches and significant earth movements require immediate inspections, where necessary.

6.3.2 First inspection of construction works

Three to six months after putting into operation, all the steel structures shall be subjected to a visual check to see if there is any cracking of the welds and to ensure tightness of rivets and bolts, straightness of members and general integrity of construction works or parts thereof.

6.3.3 Monthly inspections

The monthly inspections shall focus in particular on:

a) carrying-hauling ropes, towing ropes, haul ropes and evacuation ropes in areas where wires are broken or other external damage is noted;

b) track and tension ropes at deviation areas and in any areas where wires are broken or other external damage is noted;

c) rope connections (e.g. splices) and end fixings;

d) the relative positions of the ropes and rails in the attachment and detachment areas;

e) the external condition, position and fastening of the rollers, sheaves and deviation devices as well as rope re-engagement devices and track rope saddles;

f) the devices for monitoring entry into, passage through and exit from the stations;

g) the entry, exit and passage of carriers and tow-hangers in the station;

h) the brakes and brake linings;

i) the electrical and mechanical braking systems by measurement of stopping distances and/or times with empty carriers or tow-hangers and by measurement of the backpressure when braking force is controlled;

j) the manual operation of onboard brakes, with the installation stationary and the consequential operation of the corresponding switches;

k) operating with each drive system;

l) the operation of the overspeed detectors and the runback preventers or monitors;

m) the external condition of the carriers, door fastenings and locks, opening and closing devices, safety bars and tow-hangers;

n) the electrical accumulators;

o) the storage of operating equipment and spare parts;

p) the electrical safety devices(e.g. grip testing device, deceleration monitoring and brake operation).

6.3.4 Inspection in the case of intermittent operation

If operation is intermittent, periodic inspections need not be carried out during the period of stoppage, in accordance with the following principles:

a) if operation is interrupted for a period of more than 1 month, resumption of operation shall be preceded by a monthly inspection in accordance with 6.3.3 with additional inspections in accordance with 6.3.5.4 and 6.3.5.6;

b) if operation is interrupted for a period of more than 6 months, resumption of operation shall be preceded by an annual inspection in accordance with 6.3.5.

6.3.5 Annual inspections

6.3.5.1 General

The installation shall be subjected, at least once a year, to a complete inspection and to a check of their provisions for the protection of workers. In particular, the following inspections and operating tests shall be carried out in addition to the monthly inspections:

6.3.5.2 Construction works

By visual checks, the following inspections shall be carried out:

— activities mentioned in 6.3.2;

— identification of deterioration of structures due to the effects of frost, falling stones, snow creep, settlement or similar actions;

— inspection of concrete structures for cracking and other damage;

— closer inspection of foundations and their surroundings, including the state of anchor bolts;

— inspection of ground anchors.

6.3.5.3 Mechanical devices

a) visual check and operating tests of the various motors and components of the transmissions (main, auxiliary and emergency drive);

b) visual check and operating tests of each individual brake under the various load conditions (including maximum load) and in each of the different modes of triggering mechanism and drive, with the results obtained being recorded. In the case of ski-tows, this inspection shall be carried out on an unloaded installation;

c) in the case of on-board brakes, check of their automatic triggering with the installation stationary, together with measurement of the residual brake force;

d) visual check of the rollers, roller batteries and frames (without disassembly but with the carrying-hauling rope or towing rope raised), the saddles for track ropes and sheaves;

e) visual check of all mechanical station and tensioning devices;

f) visual and operating tests of the devices for carrier recovery for evacuation, together with evacuation exercises.

g) visual check and operating tests of the devices for protection of workers.

6.3.5.4 Ropes

a) visual and/or electromagnetic check of the ropes in accordance with EN 12927-7, EN 12927-8;

b) check of the rope end fixings;

c) visual check of the signalling cables, their supports, connections and fastenings.

6.3.5.5 Electrical devices

a) check of the overall condition and operating tests of all electrical devices and installations;

b) check of the earthing devices and of the excess voltage, excess current and lightning protection devices.

6.3.5.6 Safety, monitoring and signalling devices

a) check and operating tests of the monitoring circuits and of the signalling and telecommunications devices;

b) check and operating tests of the fault indicating devices in the stations and carriers and on the line;

c) test of the insulation resistance of electrically insulated cables;

d) check and operating tests of the anemometers.

6.3.5.7 Carriers and tow-hangers

a) visual check of each carrier or tow-hanger, including suspension, carrier trucks and hanger axles.

   At least 20 % of the grips shall be subjected to visual check in the dismantled condition. These grips shall be selected according to a rotation which shall ensure that the interval between consecutive checks of each grip does not exceed 5 years. The checks and operating tests of the grips shall be in accordance with the supplier's instructions;

b) check and operating tests of the adjustment of grip monitoring devices and of the device for checking the gripping force of detachable grips;

c) at least 10 % of the grips are to be tested for resistance to slipping at the minimum required slipping force, except for grips for ski-tows;

d) measurement of the gripping force of all gravity-operated grips;

e) operating tests of the doors and their closing and locking devices;

f) check of the carrier load measurement device or passenger counting device;

g) check of the triggering of the on-board brakes together with measurement of the residual force and the slip resistance.

6.3.5.8 Miscellaneous

The following visual checks shall be carried out:

a) avalanche protection structures;

b) catch nets;

c) available spare parts;

d) fire protection equipment;

e) first-aid equipment;

f) special tools.

6.3.6 Special multiannual inspections

On the basis of the requirements in the supplier's manuals, special inspections shall be carried out on certain components of the installations:

a) carrier trucks and mechanical brakes on aerial ropeways and funicular railways, including on-board brakes: at least every six years, after disassembly;

b) ropes in accordance with EN 12927-7, EN 12927-8;

c) electrical devices in accordance with EN 13243;

d) construction works of aerial ropeways and ski-tows shall be subjected to the following inspections every five years:

   — those mentioned in 6.3.5.2;

   — monitoring of the deformations of foundations stabilized by ground anchors;

   — measurement of anchor forces, if appropriate;

   — checking the tightness of non-preloaded bolts as well as preloaded bolts according to ENV 1090-1;

e) construction works of funicular railways shall be subjected at least every five years to the following inspections:

   — inspection of line structures such as embankments, retaining structures, draining systems etc.;

   — inspection of tunnels and galleries including general condition and the tightness of their vaults;

   — inspection of bridges, in particular including abutments, piers, bearings and decks; activities listed in 6.3.5.2 shall be carried out if appropriate;

   — inspection of the track including track infrastructure, ballast bed, sleepers and rails and their respective fastenings, correct position of the track, rail joints, work platforms, evacuation facilities, railings etc.

6.3.7 Special inspections

6.3.7.1 General

Within the framework of special inspections, non-destructive tests shall be carried out on safety components which are subject to fatigue loading. The type of inspections to be carried out, the required prescribed values together with tolerances, as well as the permissible defects shall be specified by the supplier, with reference to current European Standards or specifications.

In the context of special inspections of construction works, all structural components subjected to high fatigue stresses shall undergo non-destructive tests. Fatigue stresses are considered high when the nominal stress range, multiplied by the partial factor for the fatigue loading and the correction factor, is higher than 80 % of the fatigue strength taking into account the partial factor for the fatigue strength (see EN 13107).

The intervals shall be as follows (except for grips):

a) first special inspection: at the latest 22 500 operating hours after initial commissioning, but not later than 15 years thereafter;

b) second special inspection: at the latest 15 000 operating hours after the first special inspection, but not later than 10 years thereafter;

c) third and subsequent special inspection: 7 500 operating hours after the previous special inspection, but not later than five years thereafter;

d) for construction works special inspections shall be carried out every 15 years or after 22 500 operating hours.

6.3.7.2 Special requirements for grips

6.3.7.2.1 Principles

Grips are to be visually examined in the dismantled condition at specified intervals and are to be submitted to non-destructive testing at the intervals defined in 6.3.7.2.2 and 6.3.7.2.3.

If damage is found, the test periods are to be shortened in particular cases and the extent of testing is to be increased.

The grips for these special inspections are to be selected in accordance with a rotation procedure such that all grips are inspected in each of the consecutive intervals defined below.

6.3.7.2.2 Visual check in dismantled condition

The grips are to be visually checked in the dismantled condition according to a programme which is to be worked out in detail by the supplier.

This programme shall include at least 50 % of the grips as follows:

a) in the case of detachable grips, after 3 000 operating hours, but not more than 2 years. This interval may be extended to 4 500 operating hours or 3 years in the case of those grips in which the essential supporting and operating parts are externally accessible;

b) in the case of fixed grips, after 4 500 operating hours, but not more than 3 years.

6.3.7.2.3 Non-destructive test

The grips shall be submitted to non-destructive tests according to a programme, which is to be worked out by the supplier.

This programme shall include at least 25 % of the grips as follows:

a) in the case of detachable grips, after 9 000 operating hours, but not more than 6 years;

b) in the case of fixed grips, for the first time after 18 000 operating hours, but not more than 12 years, thereafter every 9 000 operating hours, but not more than every 6 years.

6.4 Repair

Repair includes repair work and the replacement of components. It shall be carried out in accordance with, in particular, the provisions of the standards listed in 5.2.

Repair work shall be recorded in writing and filed. The person carrying out the work shall certify that he has carried it out in accordance with the applicable requirements and shall immediately inform the operation management thereof. Only replacement parts which are at least equivalent in material, shape and function to the original parts shall be used.

For safety components according to EN 12408, the equivalence of the spare parts shall be verified.

For construction works, the scope and extent of repair depend on the results of the inspection. Repair work comprises the rectification of any significant damages caused by ageing as well as wear and tear. It includes for example:

— renewal of corrosion protection;

— adjustment or replacement of bearings;

— exchange or supplementation of ground anchors;

— grouting of concrete fissures.

Before undertaking the repair of any damage, its origin shall be determined and the initial cause shall, whenever possible, be eliminated beforehand; when this cannot be done, appropriate compensatory measures shall be evaluated.

6.5 Renewal of construction works

Renewal of construction works or parts thereof may be indicated after extraordinary events, after extensive wear and tear or whenever a significant increase of the capacity of transportation is intended.

7 Operational inspections and checks

7.1 General

Operational inspections and checks shall be carried out with the installation at rest, during a test run and in operation by personnel with the appropriate training, who shall take into account the operating regulations as well as the operating and maintenance instructions. The requirements of prEN 12397 shall be complied with in particular.

7.2 Daily inspection and test run prior to opening to the public

7.2.1 General

Every day, before the installation is opened to the public, operating inspections and a test run shall be carried out.

7.2.2 Daily inspections

Daily inspections prior to opening to the public shall involve at least the following:

a) operational state of the safety circuits and line safety circuits which directly activate the emergency stop devices, and the devices monitoring the entry and exit of carriers entering and leaving the stations;

b) response of the monitoring circuits to earthing, short-circuit and open circuit;

c) verification that all indicated values are within the permissible range;

d) operation of the electric stop at maximum running speed;

e) operation of the device for changing running speed from the corresponding position;

f) operation of the mechanical braking systems in the drive system;

g) operation of the internal voice communication systems;

h) accessibility of all stop devices;

i) position of ropes on sheaves, rollers and saddles and operation of sheave groove scrapers;

j) position and free movement of tension counterweights or carriages;

k) leaktightness and working pressure of the hydraulic or pneumatic systems and leaktightness of gearboxes;

l) condition and position of support and guide rails in the entry and exit areas of stations (e.g. in the event of accumulation of snow or ice);

m) operation of monitoring systems for detachable grips at station entries and exits;

n) condition of loading and unloading areas and of passenger access and exit ways;

o) condition of carriers and tow-hangers.

7.2.3 Daily test run

7.2.3.1 During the daily test run, the following shall be checked for both up and down lines:

a) the correct operation of the rope supports, alignment and rotation of the rollers;

b) that passage of the carriers and tow-hangers past the supports is possible without hindrance;

c) whether frost or snow or other obstacles on line structures, carriers or tow-hangers endanger the operation;

d) that the correct operation of the anemometer is ensured;

e) the absence of visible anomalies (position, condition) on the ropes;

f) compliance with the necessary safety distances (clearance profile, running height above ground);

g) absence of any visible irregularities or damage on the carriers and tow-hangers scheduled for operation;

h) free access to the planned routes for evacuation of passengers;

i) good condition of the tow track for ski-tows;

j) good condition of the protection devices (such as padding, nets, retaining devices) and barriers;

k) presence and legibility of the required signs;

l) natural events such as rockfalls, avalanches or landslides which could endanger the safety of the installation.

7.2.3.2 During the test run, the following requirements shall be observed:

a) the transport of passengers is forbidden;

b) a radiotelephone link shall be established between the personnel taking part in the test run, except in the case of ski-tows with a visible line;

c) as a general rule, the control position in the drive station shall be manned. If this is not the case, supervision shall be carried out from the other end station and an additional operating cycle shall be carried out with the drive station control position manned;

d) empty carriers shall be stopped outside the entrance to a station if there are frost deposits or snow drifts which could impede entry.

7.3 Checks during operation

Special attention shall be paid to any conditions which do not allow normal operation.

In addition, during operation, checks shall also be carried out on:

a) the indicated values for the electric drive voltages and currents;

b) the other indicating and signalling equipment;

c) the running of the drive mechanism and the sheaves and rollers in the stations;

d) the condition of the loading and unloading areas and of the tow track;

e) the circulation of the carriers or tow-hangers in the stations and their vicinity;

f) the condition of the carriers and tow-hangers.

7.4 Operational inspections and test runs after exceptional events

After exceptional events (e.g. storm, thunderstorm, frost, avalanches, lightning) operational inspections appropriate to the situation and a test run shall be carried out before the installation resumes operation.

8 Maintenance and operational inspection documentation

The results of the operational inspections, of maintenance and of the operations carried out shall be recorded in writing and filed.

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 2000/9/EC relating to cableway installations designed to carry persons

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 2000/9/EC relating to cableway installations designed to carry persons.

Once this standard is cited in the Official Journal of the European Communities under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard given in table ZA confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

Table ZA — Correspondence between this European Standard and Directive 2000/9/EC relating to cableway installations designed to carry persons

Clause(s)/sub-clause(s) of this EN	Essential Requirements (ERs) of Directive 2000/9/EC	Qualifying remarks/Notes
4.2	2.1, 2.2, 2.3	
5	2.3, 2.4, 2.5, 7.1	
6 to 6.4	2.6.1, 2.6.2, 2.6.3, 2.8	
6.1	2.6.4	
6.4	2.6.4	
7	2.6.2, 2.6.3, 7.1.1	
8	7.1	

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

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W4 4AL