BS EN 12930:2015

BSI Standards Publication

Safety requirements for cableway installations designed to carry persons — Calculations

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National foreword

This British Standard is the UK implementation of EN 12930:2015. It supersedes BS EN 12930:2004 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MCE/20, Aerial ropeways.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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English Version

Safety requirements for cableway installations designed to carry persons - Calculations

Prescriptions de sécurité pour les installations à câbles destinées au transport de personne - Calculs

Sicherheitsanforderungen an Seilbahnen für den Personenverkehr - Berechnungen

This European Standard was approved by CEN on 8 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.

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 CEN-CENELEC Management Centre has the same status as the official versions.

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Foreword

This document (EN 12930:2015) has been prepared by Technical Committee CEN/TC 242 “Safety requirements for cableway systems for passenger transportation”, 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the publication of an identical text or by recognition up to July 2015, and any opposing National Standards shall be withdrawn by July 2015.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 12930:2004.

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 the EU Directive 2000/9/EC.

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

The following main changes have been made to EN 12930:2004:

— In Clause 3 the term and definition “curvature ratio” has been replaced with the term “diameter ratio” and is defined in EN 1907.

— In Clause 3 the term and definition “safety component” has been removed, as the term and definition is defined in EN 1907 and/or in the Directive 2009/9/EC.

— In 5.2.2, 6.2 b) and 7.4.1 a) for the combinations of actions, the reference to their compatibility has been included.

— In 6.2 the requirement on calculation methods with regard to precision has been added.

— In 6.5 the wind force and the dynamic pressure are shown in simplified form and the possible deviation as a result of cableway-specific circumstances has been added.

— In 6.5 the usually assumed minimum dynamic pressure out of operation has been specified as 1,20 kN/m².

— In 6.5 consistency with EN 12929-1 has been achieved with regard to the reduction coefficient.

— In 6.5.5.3 the requirements for the ice load dependent on the nominal rope diameter have been changed, whereby provisions of international and national Standards (ISO 12494, EN 50341) have been taken into account.

— In 7.1.1 the non-essential details concerning the precision of the calculation of rope angles have been removed and the information concerning the step size for the calculation of longitudinal profile has been simplified with concentrated loads.

— In 7.1.4 due to the technical development of calculation programmes, the use of simplified calculation methods has been restricted.

— In 7.1.5 consistency with EN 1908 has been achieved.

— In 7.1.6 requirements to avoid rope spans which are too long and a too heavy concentration of carriers has been explained in more detail. The requirements for uni-directional aerial ropeways which are also operated with individual carriers have been compared with the requirements for group ropeways and cableways with carrier groups.

— In 7.2.3 the assumed friction coefficients for the line and rope calculations have been added.

— In 7.2.4 the reduction factor for the wind force in the “out of operation” load case has been added to the requirements.

— In 7.3 consistency with series EN 12927 has been achieved.

— In 7.4.1 b) the technically unfounded restriction on track ropes with fixed ends has been removed.

— 7.4.4 has been revised in order to clarify the previous requirements.

— In 7.5.2 the restriction of the smallest permissible tension safety factor whilst taking into consideration the wind and ice out of operation and in the case of cord tension as a result of differing groove diameters of multi-grooved drive sheaves has been added.

— In 7.5.2 c) and 7.6.2 c) the maximum tension safety factor on the long splicing has been restricted.

— In 7.5.4 the requirements concerning the verification of safe support of moving ropes in the case of suspended haul rope supports have been added.

— In 7.6.1 b) the partially incomplete specifications with regard to load positions for the approximation methods have been removed.

— In 7.6.2 the restriction of the smallest permissible tension safety factor whilst taking into consideration the wind and ice out of operation has been added.

— In 7.7.4 the technically unfounded requirement of the smallest bearing force for compression line support structures in the area of the loading area of ski-tows has been removed.

— The former 7.9.2 regarding the limit profile of the ropes of evacuation railways has been moved to EN 12929-1 to the remaining specifications with regard to the limit profile.

— In 7.9.2 a) the smallest permissible tension safety factor for endless evacuation ropes has been amended.

— The identification of the smallest nominal diameter of endless evacuation ropes has been moved to the new 7.9.3.

— The former 7.10.1 regarding the limit profile of the conductor, restraint and marker ropes has been moved to EN 12929-1 to the remaining specifications with regard to the limit profile.

— In 8.2.1 the list of the permissible friction values on the drive sheaves in the case of a complete loss of pressure in the hydraulic tensioning devices has been added.

— In 10.9.3 and 10.9.4 the actions as a result of a derailment on the towing ropes has been restricted.

— In 10.9.5 the actions as a result of a complete deropement have been specified in more detail and simplified.

— 10.9.6 has been removed as an accidental action, as if with detachable cableways which have a garaging possibility, the empty carriers on the rope are subjected to a wind “out of operation”, no further standardised specifications have been made.

— In Annex A the A-deviation for Germany has been removed.

— Annex ZA has been updated.

This European Standard forms part of a series of European Standards concerning safety requirements for cableway installations designed to carry persons. This series of Standards comprises the following parts:

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 inspection and checks*

EN 1909 – *Recovery and evacuation*

EN 12397 – *Operation*

EN 12408 – *Quality assurance*

Together these form a series of Standards regarding design, manufacture, erection, maintenance and operation of all 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 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.

1 Scope

This European Standard specifies the general safety requirements applicable to the calculations 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 contains:

— general requirements for calculations and their presentation;

— general requirements relating to the actions that shall be taken into account in the calculation of components as a basis for the requirements of the standards EN 13223, EN 13107, EN 12927 (all parts) and EN 1908;

— requirements relating to verification of ropes by calculation;

— requirements relating to the determination of the drive power;

— requirements for the actions of the ropes and carriers on the support structures and for the deformations of these support structures.

It does not apply to installations for the transportation of goods nor to lifts.

2 Normative references

The following documents, 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 referenced 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 1990, *Eurocode: Basis of structural design*

EN 1991-1-1, Eurocode 1: *Actions on structures — Part 1-1: General actions — Densities, self-weight and imposed loads for buildings*

EN 1991-1-4, Eurocode 1: *Actions on structures — Part 1-4: General actions — Wind actions*

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