



NSAI
Standards

Irish Standard
I.S. EN 13107:2015&AC:2016

Safety requirements for cableway installations designed to carry persons - Civil engineering works

© CEN 2016 No copying without NSAI permission except as permitted by copyright law.

I.S. EN 13107:2015&AC:2016

Incorporating amendments/corrigenda/National Annexes issued since publication:

EN 13107:2015/AC:2016

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:

EN 13107:2015

Published:

2015-06-24

This document was published under the authority of the NSAI and comes into effect on:

2016-07-24

ICS number:

45.100

NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

National Foreword

I.S. EN 13107:2015&AC:2016 is the adopted Irish version of the European Document EN 13107:2015, Safety requirements for cableway installations designed to carry persons - Civil engineering works

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

Compliance with this document does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

This is a free 14 page sample. Access the full version online.

This page is intentionally left blank

EUROPEAN STANDARD

EN 13107:2015/AC

NORME EUROPÉENNE

July 2016
Juillet 2016
Juli 2016

EUROPÄISCHE NORM

ICS 45.100

English version
Version Française
Deutsche Fassung

Safety requirements for cableway installations designed to carry persons -
Civil engineering works

Prescriptions de sécurité pour les
installations à câbles transportant des
personnes - Ouvrages de génie civil

Sicherheitsanforderungen an Seilbahnen für
den Personenverkehr - Bauwerke

This corrigendum becomes effective on 6 July 2016 for incorporation in the three official language versions of the EN.

Ce corrigendum prendra effet le 6 juillet 2016 pour incorporation dans les trois versions linguistiques officielles de la EN.

Die Berichtigung tritt am 6. Juli 2016 zur Einarbeitung in die drei offiziellen Sprachfassungen der EN in Kraft.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

© 2016 CEN All rights of exploitation in any form and by any means reserved worldwide for CEN national Members.
Tous droits d'exploitation sous quelque forme et de quelque manière que ce soit réservés dans le monde entier
aux membres nationaux du CEN.
Alle Rechte der Verwertung, gleich in welcher Form und in welchem Verfahren, sind weltweit den nationalen
Mitgliedern von CEN vorbehalten.

Ref. No.: EN 13107:2015/AC:2016 D/E/F

1 Modification to Formula (1) in 7.2.3.7

Replace Formula (1) with the following:

"

$$F_w = c_s c_d \cdot c_f \cdot q_p(z_e) \cdot A_{\text{ref}} \quad (1)$$

"

EUROPEAN STANDARD

EN 13107

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2015

ICS 45.100

Supersedes EN 13107:2004

English Version

Safety requirements for cableway installations designed to carry persons - Civil engineering works

Prescriptions de sécurité pour les installations à câbles transportant des personnes - Ouvrages de génie civil

Sicherheitsanforderungen an Seilbahnen für den Personenverkehr - Bauwerke

This European Standard was approved by CEN on 3 December 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.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

	Page
Foreword.....	5
1 Scope	8
2 Normative references	8
3 Terms and definitions	9
4 Units and symbols	9
5 General requirements.....	10
5.1 Application of this standard	10
5.2 Safety principles	10
5.3 Safety analysis	10
5.3.1 Reliability differentiation	10
5.3.2 Design situations	10
5.3.3 Design working life	10
5.3.4 Durability	10
6 Combinations of actions and safety measures	11
6.1 Combinations of actions	11
6.2 Safety measures	11
7 Actions and environmental influences.....	11
7.1 General.....	11
7.1.1 Principal classifications.....	11
7.1.2 Characteristic and representative values of actions	12
7.1.3 Environmental influences	12
7.2 Actions for aerial ropeways.....	12
7.2.1 General.....	12
7.2.2 Permanent actions.....	13
7.2.3 Variable actions	13
7.2.4 Accidental actions	17
7.2.5 Other actions and effects.....	19
7.3 Actions for funicular railways	19
7.3.1 General.....	19
7.3.2 Permanent actions.....	19
7.3.3 Variable actions	20
7.3.4 Accidental actions	22
7.3.5 Other actions and effects.....	24
7.4 Actions for ski-tows.....	24
7.4.1 General.....	24
7.4.2 Permanent actions.....	24
7.4.3 Variable actions	25
7.4.4 Accidental actions	27
7.4.5 Other actions and effects.....	29
8 Limit states	29
8.1 General.....	29
8.2 Limit state design	30
9 Verifications	30
9.1 General.....	30
9.2 Design values of actions.....	30
9.3 Verification of ultimate limit state	31
9.3.1 General.....	31

9.3.2	Verification of static equilibrium and strength (ground, components).....	31
9.3.3	Combination of actions	32
9.3.4	Partial factors	33
9.4	Verification of serviceability limit state	34
9.4.1	General	34
9.4.2	Verification of serviceability limit states	34
9.4.3	Combination of actions	34
9.4.4	Deformations	35
9.4.5	Rotations.....	35
9.4.6	Vibrations of work platforms	36
9.5	Verification of fatigue	37
9.5.1	General	37
9.5.2	Fatigue loading.....	38
9.5.3	Fatigue loads for continuous circulation	38
9.5.4	Fatigue loads for monocable group ropeways and group aerial ropeways	39
9.5.5	Fatigue loads for double cableway installations	39
9.5.6	Fatigue loads for funicular railways.....	40
9.5.7	Fatigue resistance.....	40
9.5.8	Verification.....	40
9.6	Fire design verifications.....	41
10	Type of construction.....	42
10.1	Concrete structures	42
10.1.1	General	42
10.1.2	Foundations.....	42
10.1.3	Bridges of funicular railways and ski-tows.....	42
10.1.4	Structures subjected to fatigue	42
10.2	Steel structures	42
10.2.1	General	42
10.2.2	Steel grade and quality.....	43
10.2.3	Bridges of funicular railways and ski-tows.....	43
10.2.4	Structures subjected to fatigue	43
10.3	Composite steel and concrete structures	43
10.4	Timber structures.....	43
10.5	Geotechnical construction works	44
10.6	Seismic design	44
10.7	Aluminium structures	44
10.7.1	Buildings.....	44
10.7.2	Structures subjected to fatigue	44
11	Components	44
11.1	Foundations – General	44
11.2	Spread foundations	44
11.2.1	Verification of ultimate limit state for spread foundations.....	44
11.2.2	Verification of the serviceability limit state for spread foundations	46
11.3	Deep foundations – anchors and piling.....	46
11.4	Railings, balustrades, and barriers	47
11.4.1	General	47
11.4.2	Railings in public areas.....	47
11.4.3	Railings in work areas	47
11.5	Connection between steel line support structure and foundation	48
11.6	Line structures of funicular railways	48
11.6.1	Track.....	48
11.6.2	Track infrastructure	48
11.6.3	Track superstructure	48
11.6.4	Bridges.....	49
11.6.5	Tunnels and galleries	49
11.7	Bridges for ski-tows.....	49
12	Protection of workers	49
12.1	General	49

12.2	Work platforms.....	49
12.3	Access to work platforms	50
12.4	Gangways for return stations.....	50
12.5	Rope lifting devices and roller batteries	50
12.6	Running rails for carriers.....	51
12.7	Provisions for load handling devices.....	51
12.8	Handling devices for drive elements	51
12.9	Anchor points for tensioning ropes.....	51
Annex A (normative) Documentation		52
A.1	General.....	52
A.2	General data	52
A.3	Technical documents	52
A.3.1	General.....	52
A.3.2	Utilization plan (requirements specification).....	52
A.3.3	Project principles / Specifications / Technical Report.....	53
A.4	Verifications and calculations	53
A.4.1	Verifications	53
A.4.2	Calculations.....	53
A.4.3	Plans	54
A.5	Records.....	54
Annex B (informative) Extracts from the EN 1990:2002		55
B.1	General.....	55
B.2	Terms and definitions	55
B.3	Safety principles (essential requirements)	57
B.4	Safety analysis.....	57
B.4.1	Reliability differentiation [EN 1990:2002, 2.2]	57
B.4.2	Durability [EN 1990:2002, 2.4].....	58
B.4.3	Design situations [EN 1990:2002, 3.2]	59
B.5	Safety measures	59
B.5.1	Assumptions [EN 1990:2002, 1.3]	59
B.5.2	Further safety measures	59
B.5.3	Quality management [EN 1990:2002, 2.5].....	60
B.6	Fundamentals for limit state design	60
B.6.1	General [EN 1990:2002, 3.1].....	60
B.6.2	Ultimate limit states [EN 1990:2002, 3.3]	60
B.6.3	Serviceability limit states [EN 1990:2002, 3.4]	61
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2000/9/EC relative to cableway installations designed to carry persons		62
Bibliography.....		65

Foreword

This document (EN 13107:2015) 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 be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2015, and conflicting national standards shall be withdrawn at the latest by December 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 supersedes EN 13107:2004.

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

With respect to EN 13107:2004, the following significant amendments have been made:

- Since the present standard was enacted, the Eurocodes 0 to 9 have come into force, which is why they have lost the status of a pre-standard "ENV". The Eurocodes are binding in regard to the design and sizing for the entire construction, but also for the area of cableway installations. Many adjustments in this revision phase justify themselves because the updates in relation to these standards resulted in numerous editorial, conceptual, as well as substantive changes.
- Due to various inaccuracies in the translation from English (2004: Original document), some textual changes had to be made in the German and French versions.
- In the German version, a "muss-Formulierung" ["must formulation"] was used consistently at Germany's request for the requirements with mandatory character. In the French version, "doit" is used for this.
- The German spelling rules were taken into account where necessary with "ß" instead of "ss".
- In 5.3.3, the working life of some structural parts has been adjusted to current knowledge.
- In 7.2.3.2, the variable actions of the rope forces in determining the amount of hydraulic braced systems may relate to the nominal base clamping force and not to the upper limit.
- Clause 7 defines, under the payloads, the horizontal action on railing in public areas and in the working platforms, the snow load that is to be considered, as well as the accidental action on attachment points.
- In Clause 7, it has been pointed out that environmental influences are to be established through expert opinion or – if available – national regulations may / shall be used. The environmental impacts have been added to the parameters; in particular the relevant return period has been determined according to whether the action represents a variable or accidental action.
- In Clause 7 "Actions and environmental influences," there were some reallocations of accidental to variable actions (e.g. simultaneous incursion of the operational and safety brake, frequently occurring avalanche impacts, etc.).

EN 13107:2015 (E)

- In 7.2 the size of the nosing force has been defined, instead of referring to the carrier standard EN 13796-1. The nosing force is caused by irregularities in the track and shall therefore be determined by EN 13107. Moreover, it has primary effects on the concept and the execution of the track as well as the engineering structures.
- In 9.4.4.2, the permitted value of the support deformation was increased for combined support / compression towers. Moreover, it no longer deals with the threshold values, but with the indicative values for the specified support deformations.
- Subclause 9.5 “Verification of fatigue” has been completely rewritten and updated in accordance with the state of the art.
- In 10.2, some specific rules for manufacturing processes as well as steel grades and quality were adjusted or deleted to comply with Eurocode 3 which was enacted, since the relevant standard is precise and detailed in this regard.
- Subclauses 11.1 to 11.3, were revised based on the current EN 1997-1 and adapted to the needs of the area of cableway installations.
- 11.4 has been re-added to the standard for the public sector because it provides relevant reference to EN 13107 in EN 12929-1.
- 11.6 has been restructured and redrafted. Reference is made to the standard CEN/TC 256/DC 1 for the concept and execution of the track superstructure.
- Subclause 11.8 “Miscellaneous” has been removed altogether. It mainly dealt with the requirements for fire protection, which have been newly recorded in Section 7 (“Fire” with respect to the three aforementioned cableway installation systems).
- In Clause 7, and in Subclause 9.6, references to fire risks that are typical for cableway installations as well as to CEN/TR 14819-1 and CEN/TR 14819-2 have been made. Reference is also made to the national regulations.
- In Clause 12, 12.1 as well as Figure 2 “Safety distances with vehicles” has been deleted. Similar requirements are contained in EN 12929-1. At this point, a “General” subclause with general principles for employee protection has been added.
- Annex A has been editorially revised and adapted to the new terms and definitions.
- Annex B has been adapted to the new terminology in EN 1990 and three new terms and definitions have been added (rope shoe, track rope saddle, friction coefficient). For texts that are quoted from EN 1990 almost word for word, DE applications concerning a “must formulation” had not been implemented.
- Annex C (Deviation A) has been deleted.
- Annex ZA has been updated.

This European Standard is part of a series of standards concerning safety requirements for cableway installations designed for passenger transport. This series consists of the following standards:

- EN 1907, relating to *Terminology*
- EN 12929 (all parts), relating to *General requirements*
- EN 12930, relating to *Calculations*
- EN 12927 (all parts), relating to *Cables*

- EN 1908, relating to *Tensioning devices*
- EN 13223, relating to *Drive systems and other mechanical equipment*
- EN 13796 (all parts), relating to *Carriers*
- EN 13243, relating to *Electrical equipment other than for drive systems*
- EN 13107, relating to *Civil engineering works*
- EN 1709, relating to *Pre-commissioning inspection, maintenance, operational inspection and checks*
- EN 1909, relating to *Recovery and evacuation*
- EN 12397, relating to *Operation*
- EN 12408, relating to *Quality control*

Together these form a series of standards applicable to the design, manufacturer, installation, maintenance and operation of cableway installations designed for passenger transport.

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

1 Scope

This European Standard specifies the safety requirements applicable to civil engineering works for cableway installations designed to carry persons. In doing so, the various types of cableway installations and their environment are taken into consideration.

It includes requirements relating to the prevention of accidents and the protection of workers, notwithstanding the application of national regulations.

National regulations regarding building or construction or that are designed to protect particular groups of people remain unaffected.

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

This European Standard is applicable to:

- new cableway installations designed to carry persons;
- alterations to existing cableway installations, as far as the safety of civil engineering works or parts of them is involved and no contrary specifications apply.

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 795, *Personal fall protection equipment – Anchor devices*

EN 1090-1, *Execution of steel structures and aluminium structures – Part 1: Requirements for conformity assessment of structural components*

EN 1090-2, *Execution of steel structures and aluminium structures – Part 2: Technical requirements for steel structures*

EN 1536, *Execution of special geotechnical work – Bored piles*

EN 1537, *Execution of special geotechnical works - Ground anchors*

EN 1709, *Safety requirements for cableway installations designed to carry persons — Pre-commissioning 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 1990:2002, *Eurocode: Basis of structural design*

EN 1991 (all parts) *Eurocode 1 - Actions on structures*

EN 1992 (all parts), *Eurocode 2: Design and Construction of reinforced concrete structures*

EN 1993 (all parts), *Eurocode 3 - Design and Construction of reinforced concrete structures*

This is a free preview. Purchase the entire publication at the link below:

**I.S. EN 13107 : 2015 : INC : COR 1 : 2016 : EN :
COMBINED PDF**

- ⤵ Looking for additional Standards? Visit SAI Global Infostore
- ⤵ Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation

Need to speak with a Customer Service Representative - Contact Us