



SLOVENSKI STANDARD
SIST EN 13796-3:2017+A1:2023

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Varnostne zahteve za žičniške naprave za prevoz oseb - Vozila - 3. del: Preskusi utrujenosti (vključuje dopolnilo A1)

Safety requirements for cableway installations designed to carry persons - Carriers - Part 3: Fatigue testing

Sicherheitsanforderungen an Seilbahnen für den Personenverkehr - Fahrzeuge - Teil 3: Ermüdungsversuche

Prescriptions de sécurité pour les installations à câbles transportant des personnes - Véhicules - Partie 3 : Essais de fatigue

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English Version

Safety requirements for cableway installations designed to carry persons - Carriers - Part 3: Fatigue tests

Prescriptions de sécurité pour les installations à câbles
transportant des personnes - Véhicules - Partie 3 :
Essais de fatigue

Sicherheitsanforderungen an Seilbahnen für die
Personenbeförderung - Fahrzeuge - Teil 3:
Ermüdungsversuche

This European Standard was approved by CEN on 1 December 2014 and includes Amendment 1 approved by CEN on 15 August 2022.

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

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European foreword

This document (EN 13796-3:2017+A1:2022) has been prepared by Technical Committee CEN/TC 242, "Safety requirements for cableway installations designed to carry persons", 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of an identical text or by endorsement, by May 2023 at the latest, and all conflicting national standards shall be withdrawn no later than May 2023.

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

This document includes Amendment 1, approved by the CEN on 15 August 2022.

This document replaces A1 EN 13796-3:2017 A1.

The start and end of the text added or modified by the amendment are indicated in the text with A1 and " respectively.

EN 13796 comprises the following parts under the general title *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;*
- *Part 2: Slipping resistance tests for grips;*
- *Part 3: Fatigue testing.*

This document forms part of the standards programme approved by the CEN Technical Board (CEN/BT) on safety requirements for cableway installations designed to carry persons. This programme comprises the following standards:

- EN 1907, *Safety requirements for cableway installations designed to carry persons — Terminology;*
- 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 12927 (all parts), *Safety requirements for cableway installations designed to carry persons — Ropes;*
- EN 1908, *Safety requirements for cableway installations designed to carry persons — Tensioning devices;*
- EN 13223, *Safety requirements for cableway installations designed to carry persons — Drive systems and other mechanical equipment;*

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- EN 13796 (all parts), *Safety requirements for cableway installations designed to carry persons — Carriers*;
- EN 13243, *Safety requirements for cableway installations designed to carry persons — Electrical equipment other than for drive systems*;
- EN 13107, *Safety requirements for cableway installations designed to carry persons — Civil engineering works*;
- EN 1709, *Safety requirements for cableway installations designed to carry persons — Pre-commissioning inspection and instructions for maintenance and operational inspection and checks*;
- 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*.

Together, these standards govern the design, manufacturing, production, maintenance and operation of all cableway installations designed to carry persons.

This document has been prepared as part of a standardisation request made to CEN by the European Commission and the European Free Trade Association, and supports the essential requirements of the (EU) Directive(s)/Regulation(s).

[A1] For the relationship with EU Directive(s) or Regulation(s), see informative Annex ZA, which forms an integral part of this document.

The user should address any feedback or questions regarding this document to their country's national standards organisation. A comprehensive list of these organisations can be found on the CEN and CENELEC web pages. **[A1]**

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

1 Scope

This European Standard specifies the safety requirements applicable to carriers for cableway installations for passenger transportation. It is applicable to the various types of installations and takes into account their environment.

This European standard sets out the requirements for fatigue tests for carriers of unidirectional monicable aerial ropeways with a capacity of no more than 16 persons according to [\[A1\] EN 13796-1:2017](#).

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

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable to its application. For dated references, only the cited edition applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

[\[A1\] EN 1907:2017](#), *Safety requirements for cableway installations designed to carry persons — Terminology*

[\[A1\] EN 13796-1:2017](#), *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*

[\[A1\] EN ISO/IEC 17025:2017](#), *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2017)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in [\[A1\] EN 1907:2017](#) and [\[A1\] EN 13796-1:2017](#) apply.

4 Symbols and abbreviations

$\Delta\varepsilon$	range of elongation	[$\mu\text{m}/\text{m}$]
ε_m	average elongation	[$\mu\text{m}/\text{m}$]
ε_u	lower limit of elongation	[$\mu\text{m}/\text{m}$]
$\varepsilon_{\text{stat}}$	elongation due to static loading ($G + Q$)	[$\mu\text{m}/\text{m}$]
ΔF	range of load	[kN]
F_m	average load	[kN]
F_u	smaller load	[kN]
G	self-weight of carrier	[kN]
N	number of cycles	[-]
Q	useful load	[kN]

5 General information

The risk factors and corresponding safety measures to be taken into consideration in this document are listed in **[A1]** EN 13796-1:2017".

It is recommended that testing be carried out by a qualified testing laboratory in accordance with the provisions set out in **[A1]** EN ISO/IEC 17025:2017".

NOTE The testing laboratory does not need approval or authorisation from third parties for this process.

Once they have undergone fatigue testing, the test pieces shall not be used again for transport in an installation.

6 Parts to be tested

The test is carried out either on the fully equipped carrier or on its load-bearing structure alone. Elements having an effect on the fatigue behaviour of the structure shall remain in place for the test or be taken into account adequately in the definition of the masses or forces. For ski racks, an equivalent mass of 5 kg per set of equipment shall be allowed for as specified in **[A1]** EN 13796-1:2017".

To simplify the test, the carrier may be subdivided into sub-assemblies. The following are regarded as sub-assemblies:

- grip;
- suspensions;
- intermediate structures;
- cabins or chairs;
- seats.

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[SIST EN 13796-3:2017+A1:2023](https://standards.iteh.ai/catalog/standards/sist/fe2457e7-689d-4dd1-99ed-f55efd0996e2/sist-en-13796-3-2017a1-2023)

<https://standards.iteh.ai/catalog/standards/sist/fe2457e7-689d-4dd1-99ed-f55efd0996e2/sist-en-13796-3-2017a1-2023>

If the test is carried out on sub-assemblies, care shall be taken to ensure that they are loaded in the same way as in the carrier as a complete unit.

The geometry and materials of the test piece shall be identical to the series-manufactured components. Their methods of manufacture shall be equivalent. In particular, when the test piece is galvanised, the component shall also be galvanised.

[A1] The test piece shall be clearly identified by a mark."

7 **[A1]** Descriptive information prior to the test"

!The test piece to be tested is described in a manual that contains the following information and documents, enabling laboratories to understand the function of the carrier and design suitable test requirements:

- general description of the carrier or sub-assembly;
- production drawings of the carrier or sub-assembly;
- descriptions and explanations required to understand the above-mentioned drawings and the mode of operation of the carrier or sub-assembly;
- field of use of the carrier or sub-assembly;
- list of manufacturing inspections in accordance with EN 13796-1:2017 and their results."

8 Examination prior to test

A1) A visual examination shall be carried out prior to the test in order to verify that the carrier or sub-assemblies comply with the above-mentioned descriptive information."

9 Test requirements

The test consists of subjecting the carrier or sub-assemblies to the number of cycles and the effects of actions defined in Clause 10.

The test may be carried out either as a function of the intensity of the action (load) or as a function of the elongation it causes.

The excitation shall be sinusoidal in form.

On the test bench, adequate account shall be taken of the degrees of freedom the test piece has in actual operation. In particular, the grips shall be subjected to $N/2$ cycles in the horizontal position and to $N/2$ cycles inclined at 45° to the horizontal.

If the test so requires, shock-absorbing elements may be replaced with rigid elements as long as:

- safety components are not involved;
- during the test, this does not cause any reduction in the effect of actions on the test piece or parts of it.

The values of the parameters specified in Clause 10 must be recorded at least every 500,000 cycles.

When the test is carried out as a function of elongation, the measuring point selected shall not be located in an area of stress concentration.

10 Test parameters

10.1 Test parameters for unidirectional aerial ropeways with fixed grips

The carriers or sub-assemblies of unidirectional aerial ropeways with fixed grips shall be subjected to $N = 5 \times 10^6$ identical cycles as defined in Figure 1 and Table 1 below.

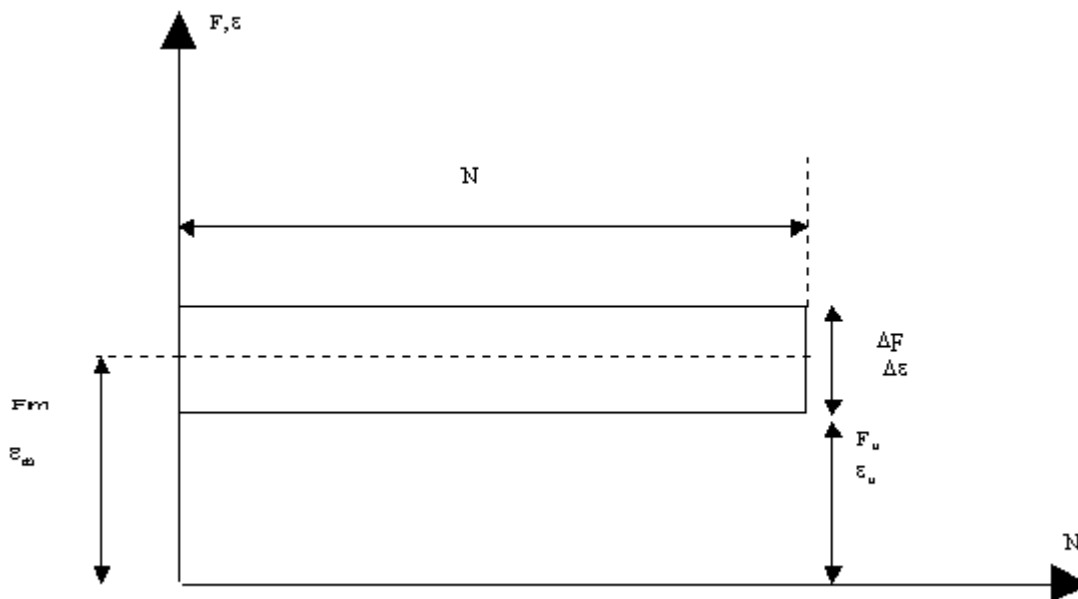


Figure 1 – Test parameters for unidirectional aerial ropeways with fixed grips

Table 1 – Test parameters for unidirectional aerial ropeways with fixed grips

Parameters	Grips, suspensions, intermediate structures, cabins or chairs, seats	
F_m, ε_m	$F_m \geq (G + Q)$	$\varepsilon_m \geq \varepsilon_{stat}$
F_u, ε_u	$F_u > 0$	$\varepsilon_u > 0$
$\Delta F, \Delta \varepsilon$	$2(G + Q)$	$2 \varepsilon_{stat}$
N	5×10^6	5×10^6

10.2 Test parameters for unidirectional aerial ropeways with detachable grips

The carriers or sub-assemblies of unidirectional aerial ropeways with detachable grips shall be subjected to a total of $N = 5 \times 10^6$ cycles. These N cycles are distributed according to the two levels defined in Figure 2 and Table 2 below.