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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 den
Personenverkehr - Fahrzeuge - Teil 3: Ermüdungsversuche

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 242.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This European Standard (prEN 13796-3:2012) 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 document is currently submitted to CEN Enquiry.

This document will supersede EN 13796-3:2005.

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 the EU Directive(s).

For the relationship with the EU Directive, see Informative Annex ZA, which is an integral part of this document.

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 tests

This European Standard 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 of 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 equipment
- 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

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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, manufacture, construction, maintenance and operation of all cableway installations designed to carry persons.

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<https://standards.iteh.ai/catalog/standards/sist/c7f16428-4d0a-45a6-8178-59711bf5a16c/sist-en-13796-3-2017>

1 Scope

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

This Part 3 sets out the requirements to be met for fatigue tests for carriers of unidirectional monocable aerial ropeways of capacity not greater than 16 persons according to 6.3.3.1 of Part 1 of this standard.

This standard does not apply to installations for the transportation of goods or to inclined lifts.

2 Normative references

The following documents, whether in part or in full, are indispensable normative references 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 1907:2005, *Safety requirements for cableway installations designed to carry persons – Terminology*

EN 13796-1:2005, *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*

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1907:2005 and EN 13796-1:2005 apply.

4 Symbols and abbreviations

$\Delta\varepsilon$	Range of elongation	($\mu\text{m}/\text{m}$)
ε_m	Mean 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	Mean load	(kN)
F_u	Minimum load	(kN)
G	Self-weight of carrier	(kN)
N	Number of cycles	(-)
Q	Useful load	(kN)

5 General

The danger factors and corresponding safety measures relating to this part of the standard are given in EN 13796-1.

The tests shall be carried out by a certified laboratory according to EN ISO/IEC 17025.

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 load-bearing 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 EN 13796-1.

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

- grip;
- suspension;
- intermediate structure;
- cabin or chair;
- seat.

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, the test piece shall be galvanized if it is planned for the component to be so.

7 Information to be supplied by the manufacturer

The manufacturer shall supply the test laboratory with the following information and documents:

- general description of the carrier or sub-assembly;
- diagrams, sketches and manufacturing drawings of the carrier or sub-assembly;
- descriptions and explanations necessary for understanding the above-mentioned sketches and drawings and the method of operation of the carrier or sub-assembly;
- scope of use of the carrier
- declaration of conformity by the manufacturer certifying that the carriers and sub-assemblies supplied for the test meet the requirements of the operating manual specified in EN 13796-1;
- inspection procedures specified in 11.1 (cracks, deformations, etc.)

The test pieces shall be identified by a mark.

8 Examination prior to test

The test laboratory shall verify by means of a visual examination that the carrier or the sub-assemblies comply with the documentation supplied by the manufacturer.

The procedure and the result of the examination shall be included in the test report.

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 shall 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.

