SLOVENSKI STANDARD
SIST EN 958:2017

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Nadomešča:
SIST EN 958:2007+A1:2011

Gorniška oprema - Sistemi za absorpcijo energije pri zahtevnem varovanem planinstvu (via ferrata) - Varnostne zahteve in preskusne metode

Mountaineering equipment - Energy absorbing systems for use in klettersteig (via ferrata) climbing - Safety requirements and test methods

Bergsteigerausrüstung - Fangstoßdämpfer für die Verwendung auf Klettersteigen (Via Ferrata) - Sicherheitstechnische Anforderungen und Prüfverfahren

Équipement d'alpinisme et d'escalade - Systèmes absorbeurs d'énergie utilisés en Via Ferrata - Exigences de sécurité et méthodes d'essai

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ICS:

97.220.40	Oprema za športe na prostem in vodne športe	Outdoor and water sports equipment

SIST EN 958:2017 **en,fr,de**

EUROPEAN STANDARD
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EN 958

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Supersedes EN 958:2006+A1:2010

English Version

Mountaineering equipment - Energy absorbing systems for use in klettersteig (via ferrata) climbing - Safety requirements and test methods

Équipement d'alpinisme et d'escalade - Absorbeurs d'énergie utilisés en Via Ferrata - Exigences de sécurité et méthodes d'essai

Bergsteigerausrüstung - Fangstoßdämpfer für die Verwendung auf Klettersteigen (Via Ferrata) - Sicherheitstechnische Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 16 January 2017.

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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 958:2017) has been prepared by Technical Committee CEN/TC 136 “Sports, playground and other recreational facilities and equipment”, the secretariat of which is held by DIN.

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 September 2017, and conflicting national standards shall be withdrawn at the latest by September 2017.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 958:2006+A1:2010.

In comparison to the previous edition EN 958:2006+A1:2010, the following technical changes have been made:

a) in the scope, energy absorbing systems (EAS) according to this document have been limited to users weighing not less than 40 kg (total weight without equipment) and no more than 120 kg (total weight including the equipment);

b) additional design requirements for the arm and overall lengths;

c) in 4.2, the maximum braking length was changed to 2200 mm;

d) in Clauses 6 and 7, the requirements of 40 kg and 120 kg was added;

e) in 4.3.3 a fatigue test was added.

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(s).

For relationship with EU Directive 89/686/EEC, see informative Annex ZA, which is an integral part of this document.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies safety requirements and test methods for energy absorbing systems (EAS) for use in climbing on a Via Ferrata, for users weighing not less than 40 kg (total weight without equipment) and no more than 120 kg (total weight including the equipment).

NOTE This European Standard is one of a package of standards for mountaineering equipment, see Annex A.

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 565, *Mountaineering equipment - Tape - Safety requirements and test methods*

EN 1891, *Personal protective equipment for the prevention of falls from a height - Low stretch kernmantel ropes*

EN 12275, *Mountaineering equipment - Connectors - Safety requirements and test methods*

EN ISO 2307, *Fibre ropes - Determination of certain physical and mechanical properties (ISO 2307)*

ISO 6487, *Road vehicles — Measurement techniques in impact tests — Instrumentation*

ISO 7000, *Graphical symbols for use on equipment — Registered symbols*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
Via Ferrata
route consisting of a fixed climbing installation including a safety line where the user is not always supervised

Note 1 to entry: The mere presence of a wire cable/rope on a mountain route does not constitute a Via Ferrata (e.g. Hörnli Ridge on Matterhorn).

3.2
safety line
flexible or rigid, horizontal, vertical or sloping, continuous or discontinuous installation, used as protection against fall from a height and possible progression aid

3.3
energy absorbing system (EAS)
device connecting the climber to the safety line, using an energy absorber to limit the impact forces on the climber and the fixed installation

Note 1 to entry: See Figure 1.

3.4
energy absorber
part of the EAS which limits the impact force during a climber's fall

Note 1 to entry: See Figure 1.

3.5
braking length
increase in the distance between the connection to the safety line and the connection to the harness after the climber's fall

3.6
initial arrangement
original configuration of an un-activated energy absorber

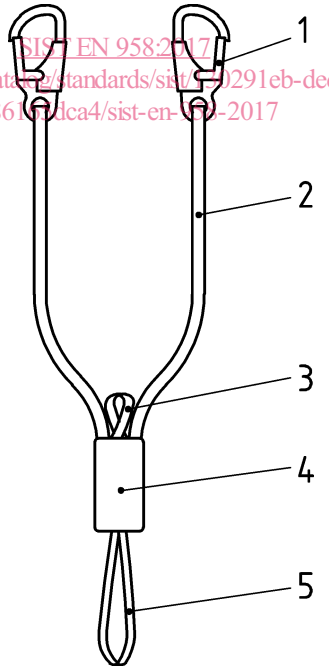
3.7
arm
part of the EAS between the energy absorber and the connecting device to the safety line of the Via Ferrata; an arm may be elasticated or non-elasticated

Note 1 to entry: See Figure 1.

3.8
elasticated arms
arms with a static elongation of the arm material, as measured in 5.2.4.5, greater than 5 %

3.9
rest attachment point
specific attachment point intended to attach the user to the safety line or to the anchor points of the Via Ferrata to take a rest

Note 1 to entry: See Figure 1.



Key

1	connecting device (to Via Ferrata)	4	energy absorber
2	arm	5	harness attachment point (to climber)
3	rest attachment point		

Figure 1 — Example of an energy absorbing system

4 Safety requirements

4.1 Design

4.1.1 Construction

4.1.1.1 General

All load bearing connections shall be designed so that they cannot be altered or disassembled by the user, with the exception of removable connecting devices. EAS shall not have any sharp or rough edges that may cut, abrade or cause injury to the user.

4.1.1.2 Distance between the two arm extremities

When measured in accordance with 5.1.2, the distance between the two extremities of the arms (without connecting devices) shall be ≥ 1 000 mm, unless there is only a single arm.

4.1.1.3 Overall length of EAS

When measured in accordance with 5.1.3, the length of the energy absorbing system without connecting devices shall be ≤ 1 500 mm

4.1.2 Connecting device

If the connecting device is a connector according to EN 12275, it shall be a type K connector.

If an EAS is not fitted with a connector of type K according to EN 12275, refer to the information supplied by the manufacturer of the EAS (see Clause 7).

4.1.3 Connection to the safety line

There shall be at least two arms intended for attachment to the safety line, unless designed for a continuous system which does not permit disconnection of the EAS from the safety line (except at entry and exit points), where just one arm could be used.

4.1.4 Initial arrangement

The initial arrangement of the energy absorber shall be designed in such a way that it can easily be checked by visual examination by the user.

4.1.5 Rest attachment point

The rest attachment point shall activate the energy absorber in case of fall.

4.2 Operation of the EAS

4.2.1 General

Table 1 summarizes the dynamic performance requirements of the EAS, which are described in detail in 4.2.3 to 4.2.4.

Table 1 — Summary of dynamic test requirements of the EAS

Symbol	Test 1	Test 2	Test 3	Test 4
M	40 kg	120 kg	120 kg	120 kg
EAS wet or dry	Dry	Dry	Dry	Wet
Arm (s)	The two arms connected	The two arms connected	If symmetrical test one arm. If asymmetrical test each arm.	Most constraining (configuration with the maximum braking length)
F_{max}	3,5 kN	6 kN	6 kN	8 kN
L_{max}	< 2 200 mm	< 2 200 mm	< 2 200 mm	< 2 200 mm

M: rigid steel mass equal to the maximum user weights (with equipment) and minimum user weights (without equipment).

F_{max}: max. allowable impact force during dynamic test.

L_{max}: max. braking length.

4.2.2 Force to initiate operation

When tested in accordance with 5.2.4.2, the static force to initiate operation of the EAS shall be greater than 1,3 kN (see Table 2).

4.2.3 Dynamic performance

The requirements of the dynamic tests 1, 2 and 3 shall be fulfilled (see Table 1).

a) When tested in accordance with 5.2.4.3 with a rigid steel mass of 40 kg the maximum impact force shall not exceed 3,5 kN and the maximum braking length shall not exceed 2 200 mm.

b) When tested in accordance with 5.2.4.3 with a rigid steel mass of 120 kg the maximum impact force shall not exceed 6 kN and the maximum braking length shall not exceed 2 200 mm.

4.2.4 Dynamic strength of the EAS under wet conditions

After conditioning the selected sample according to 5.2.4.4, when tested in accordance with 5.2.4.3, using a rigid steel mass of 120 kg, the maximum impact force shall not exceed 8 kN, and the maximum braking length shall not exceed 2 200 mm.

4.3 Static strength of the energy absorbing system

4.3.1 General

Table 2 summarizes the static strength requirements of the EAS, which are described in detail in 4.3.2 to 4.3.5.

Table 2 — Summary of static test requirements of the EAS

Symbol	Minimum static strength kN
F_{init}	1,3
F_{stat}	12
$F_{stat\text{-}elast\ arm}$	12
$F_{stat\ non\text{-}elast\ arm}$	15
$F_{rest\ ap}$	12

F_{init}: minimum static strength to initiate operation

F_{stat}: minimum static strength of whole system after dynamic tests

$F_{stat\text{-}elast\ arm}$: minimum static strength after fatigue test of elasticated arm

$F_{stat\ non\text{-}elast\ arm}$: minimum static strength of non-elastic arm

$F_{rest\ ap}$: minimum static strength of rest attachment point

4.3.2 Static strength of the whole system

When tested in accordance with 5.3.1 after being subjected to the dynamic test in accordance with 5.2.4.3, the EAS shall withstand a static force greater than 12 kN (see Table 2).

4.3.3 Breaking strength of the components of elasticated arms

The decrease of breaking strength after the fatigue test in accordance with 5.3.2.2 compared to the breaking strength when new shall not exceed 30 % and the breaking strength shall be more than 12 kN (see Table 2).

All elasticated arms shall be checked unless the manufacturer states that the elasticated arms are manufactured from the same material, and have identical strengths, performance, design and construction.

4.3.4 Breaking strength of the textile components of non-elasticated arms and harness attachment point

Every textile component of non-elasticated arms and harness attachment point shall withstand a static force greater than 15 kN without breakage when tested in accordance with 5.3.3 (see Table 2).

4.3.5 Energy absorber initiation force

When tested in accordance with 5.2.4.2 the initiation force shall be greater than 1,3 kN (see Table 2).

4.3.6 Breaking strength of the rest attachment point

If an EAS is fitted with a rest attachment point, when tested in accordance with 5.3.4, the breaking strength of the rest attachment point shall be greater than 12 kN (see Table 2).

5 Test methods

5.1 Design

5.1.1 General

Check by visual examinations that the requirements specified in 4.1.1 to 4.1.5 (4.1.4 and 4.1.5 based on the technical documentation supplied by the manufacturer) are met.

5.1.2 Measurement of the distance between the two arm extremities

With the longest arm configuration, suspend the two arm extremities between a fixed point via a pin of diameter (12 ± 0,1) mm, if not supplied with connecting device, to a mass of (5 ± 0,1) kg via a pin of (12 ± 2,0) mm diameter, if not supplied with connecting device, and maintain this load for (60 ± 5) s.

Measure the distance between the ends of the loaded arm extremities.

5.1.3 Measurement of the overall length of the EAS

Attach the longest arm extremity to a fixed point via a pin of diameter (12 ± 0,1) mm, if not supplied with connecting device. Attach the harness attachment point of the EAS in accordance with the information supplied by the manufacturer, via a pin of diameter (12 ± 2,0) mm to a rigid steel mass of (8 ± 0,1) kg and maintain this load for (60 ± 5) s.

Measure the distance between the end of the loaded arm extremity and the lowest part of the harness attachment point.

5.2 Operation tests

5.2.1 General

A test sample shall be subjected to the test according to 5.2.4.2. Additional test samples shall be subjected to the tests according to 5.2.4.3. The test sample subjected to 5.2.4.3 test at 120 kg shall then be tested according to 5.3.1. An additional test sample shall be subjected to the wet test according to 5.2.4.4.

5.2.2 Conditioning and test conditions for energy absorbing systems with textile components

Dry the test samples for at least 24 h in an atmosphere of (50 ± 5) °C and less than 20 % relative humidity. Then condition these test samples in an atmosphere of (23 ± 2) °C and (50 ± 2) % relative humidity for at least 72 h. Test each sample at a temperature of (23 ± 5) °C within 10 min of removal from atmosphere.

5.2.3 Apparatus

For the dynamic test in accordance with 5.2.4.3, the force measuring device and its associated recording equipment shall meet the following requirements in accordance with ISO 6487:

a) The apparatus for measuring and recording the arresting impact force shall correspond with ISO 6487, channel frequency class (CFC) 30;

b) The force transducer, in its operating position attached to the fixed point, shall not have a resonance frequency below 100 Hz;

c) The channel amplitude class (CAC) shall be at least 20 kN;

d) The error of the measurement of the arresting impact force (static calibration) shall be less than 1 %;