SLOVENSKI STANDARD

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Osebna varovalna oprema za zaščito pred padci z višine - Naprave za spuščanje

Personal protective equipment against falls from a height - Descender devices

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Descriptors: Personal protective equipment, accident prevention, protection against fall, rescue equipment, ropes, wire rope, classifications, mechanical strength, tests, marking, instructions

English version

Personal protective equipment against falls from a height - Descender devices

Equipement de protection individuelle contre les chutes de hauteur - Descenseurs

Persönliche Schutzausrüstung gegen Absturz - Abseilgeräte

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart,36 B-1050 Brussels

Contents list

Foreword

This European Standard was prepared by the Technical Committee CEN/TC 160 "Protection against falls from a height including working belts", of which the secretariat is held by DIN.

This European Standard has been prepared under a mandate given to CEN by the Commission of the European Communities and the European Free Trade Association, and supports essential requirements of the EC Directive(s).

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of an identical text or by endorsement, at the latest by June 1993, and conflicting national standards shall be withdrawn at the latest by June 1993.

The Standard was approved and in accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom.

1 Scope

This standard specifies requirements, test methods, marking and instructions for use for descender devices to be used in conjunction with personal protective equipment against falls from a height.

2 Normative references

This European Standard incorporates by dated or undated reference provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 364:1992	Personal protective equipment against falls from a height - Test methods
EN 365	Personal protective equipment against falls from a height - General requirements for instructions for use and for marking
prEN 892-1	Mountaineering equipment - Ropes - Safety requirements, testing, marking

3 Definition and classes

3.1 Definition

For the purposes of this standard the following definition applies.

Descender devices

Rescue devices by means of which a person can, at a limited velocity, descend from a higher to a lower position either on his own or assisted by a second person.

3.2 Classes

Descender devices shall be classified as follows:

class A: descent energy $W \geq 7{,}5 \cdot 10^6$ J,
class B: descent energy $W \geq 1{,}5 \cdot 10^6$ J,
class C: descent energy $W \geq 0{,}5 \cdot 10^6$ J,
class D: descent energy $W \geq 0{,}02 \cdot 10^6$ J, for only one descent with a descent height of up to 20 m (for descender devices to be permitted for descent heights exceeding 20 m the descent energy shall be increased accordingly).

Note 1: In practical operation descender devices are subjected to different loads. A descender device for descending e. g. 100 passengers from a ropeway cabin at a height of 100 m has to meet more severe requirements than a descender used by a crane driver to descend himself from a height of 20 m.

Note 2: Descender devices class D are primarily designed for private use.

Note 3: Descent energy $W = m \times g \times h \times n$

W = descent energy, in joule
m = test mass, in kilogram
g = gravity 9,81 m/s²
h = descent height, in metres
n = number of descents

4 Requirements

4.1 Ropes, straps

Ropes shall consist of synthetic fibres or steel wires.

4.1.2 Wire ropes

Wire ropes shall be made from galvanized steel wire; they shall be stress and torsion relieved. They shall be made from one piece.
The nominal tensile strength of the steel wire rope should be 1770 N/mm² and shall not exceed 1960 N/mm². The base for calculating the construction shall be in any case 1770 N/mm².
Ropes shall be of a type capable of visual inspection or else subject to manufacturers guidance for appropriate examination and non-destructive test which will guarantee the rope is satisfactory for use.
The rope terminations of wire ropes shall be made with thimbles and by splices or with thimbles and by pressed ferrules.

4.1.3 Synthetic fibre ropes

Synthetic fibre ropes shall be designed in a core-case plait and made from polyamide or a material of the same quality.

The displacement of the case shall not exceed 15 mm over a rope length of 2 m.

The elongation in use shall not exceed 8 %.

Ropes of different design may be used for descender devices class D.

4.1.4 Straps

If for the descent straps are used instead of ropes they shall be made of a material equal in quality to ropes made from synthetic fibres.

4.1.5 Terminations

Terminations shall exclusively be made by the manufacturer or by a person authorized by the manufacturer. Terminations shall be designed in a way that they can only be opened by means of a tool. They shall be marked by the manufacturer.

Terminations of synthetic fibre ropes shall be made with knots or with pressed ferrules. The rope including terminations shall resist a static strength of 12 kN (class D 5 kN) for a period of 3 min. The test shall be carried out according to 5.5.

4.2 Holding load of hand operated descender devices

The maximum load necessary for holding the mass fixed at the end of the rope leaving the device shall be 120 N.

4.3 Static strength

In a test of the static strength according to 5.5 no part of the device shall show any signs of breaking or tearing.

4.4 Descent energy

With descents being carried out in succession descender devices shall resist the descent energy determined for their class in the following without any impairment of the safety:

Descender devices class A: $W \geq 7{,}5 \cdot 10^6 J$
Descender devices class B: $W \geq 1{,}5 \cdot 10^6 J$
Descender devices class C: $W \geq 0{,}5 \cdot 10^6 J$
Descender devices class D: $W \geq 0{,}02 \cdot 10^6 J$ (for descender devices to be permitted for descent heights exceeding 20 m the descent energy shall be increased accordingly).

After the test of the descent energy according to 5.6 and the functional test according to 5.7 the descender device and the rope or strap shall not show any changes affecting its safety.

4.5 Temperature rise of the descender device

In the test of the descent energy according to 5.6 the temperature due to friction shall not rise to a point affecting the function of the descender device. None of the parts of the device touched during the descent shall develop a temperature higher than 48 °C.

4.6 Descent velocity

In the tests according to 5.6 and 5.7 it shall be possible to keep the descent velocity of the devices classes A, B and C between 0,5 m/s and 2 m/s. For the devices of class D it must be possible to maintain a descent velocity of a maximum of 2 m/s.

In the case of hand operated devices the velocity must not exceed 2 m/s after the control device was released. During the descent the descent velocity shall be almost constant.

4.7 Special requirements for devices class D

Descender devices class D shall be designed in a way that they cannot be used more than once.

5 Test methods

5.1 Design test

The design test is to show whether the device complies with the drawings and whether the calculation includes the proof of sufficient strength taking into account the forces given in 5.5.

For proving the sufficient strength of components made from steel material a double safety with regard to the yield point shall be assumed. In case other materials are used there shall be an analogous proof concerning breaking or tensile strength.

5.2 Determination of case displacement

The case displacement shall be determined according to prEN 892-1.

5.3 Determination of the elongation in use

The elongation in use shall be determined with two rope samples which shall not have been used before.

The elongation in use shall be determined with the rope sample in a suspended position being loaded as follows:

First a force created by a mass of (80 ± 0,1) kg shall be rapidly applied to the rope sample. The mass shall be suspended freely at the rope sample. The load shall be maintained for (10 ± 0,5) min. Then the force shall be reduced to zero and the rope sample shall remain unloaded in that position for (10 ± 0,5) min.

After that the rope sample shall be loaded with a mass of (5 ± 0,1) kg, and it shall be marked by two reference lines in a distance of about 1 m. Then the distance l_0 between these marks shall be measured to the nearest ± 1 mm.

Once more the rope sample shall be loaded rapidly with a mass of (80 ± 0,1) kg. After (60 ± 5) s the distance l_1 between the two marks shall be measured.

The elongation in use ε_G shall be calculated in per cent.

The values to be given are the individual values from two measurements on different rope samples rounded to the nearest 0,1 %.

The elongation in use may also be determined by means of a test machine.

5.4 Test of the holding load of hand operated descender devices

A mass of 80 kg shall be applied to the end of the rope leaving the device.

5.5 Static strength

5.5.1 Test equipment

The test equipment for testing the static strength shall correspond to 4.1 of EN 364:1992.

5.5.2 Test method

In a test machine a load of 12 kN (class D: 5 kN) is applied to the descender device including the rope with the termination according to 4.1.5, this test load shall be maintained for 3 min.

One test shall be carried out before and one after the testing of the descent energy.

Examples for the test arrangement for the test of static strength:

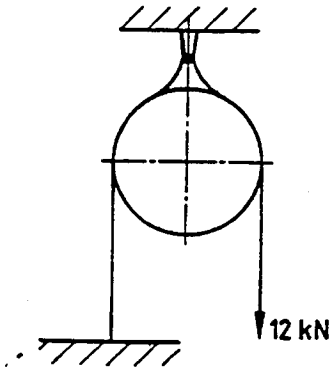

Figure 1: Device attached to the anchorage point

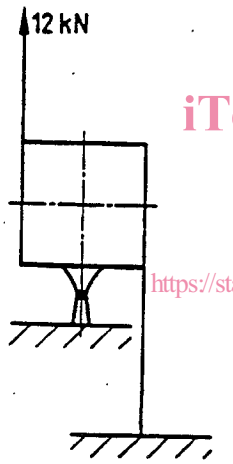

Figure 2: Mobile device

5.6 Test of the descent energy

In agreement with the test house the applicant determines a place appropriate for testing the descent energy and the functioning of the type.

For testing the descent energy the descents corresponding to the descent in case of rescue shall be carried out under the following conditions:

The test loads shall be 75 kg for the device classes A, B and C and 100 kg for the device class D. For devices classes A and B the descent heights shall be 100 m, for class C 20 m and for class D the descent height shall correspond to the descent height permitted.

According to that the following numbers of descents shall be necessary:
class A: 100, class B: 20, class C: 34, class D: 1.

The individual descents shall be carried out one directly after another.