BS EN 12277:2015

BSI Standards Publication

Mountaineering equipment — Harnesses — Safety requirements and test methods

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National foreword

This British Standard is the UK implementation of EN 12277:2015. It supersedes BS EN 12277:2007 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee SW/136/5, Sports, Playground and other Recreational Equipment - Mountaineering Equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

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

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Mountaineering equipment - Harnesses - Safety requirements and test methods

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This European Standard was approved by CEN on 26 September 2015.

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European foreword

This document (EN 12277:2015) 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of an identical text or by endorsement, at the latest by May 2016, and conflicting national standards shall be withdrawn at the latest by May 2016.

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 12277:2007.

In comparison with the previous edition, the following major changes were made:

a) Amendment of the belt test;

b) New definitions added and amendment of some definitions;

c) Amendment of safety requirements;

d) Amendment of test methods;

e) Amendment of marking and requirements for information supplied by the supplier.

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, see informative Annex ZA, which is an integral part of this document.

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.

Introduction

The text of this European Standard is based on the former UIAA-Standard E "harnesses" (Union Internationale des Associations d'Alpinisme), which has been prepared with international participation.

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

1 Scope

This European Standard specifies safety requirements and test methods for harnesses for use in mountaineering including climbing. It is applicable to full body harnesses, small body harnesses, sit harnesses and chest harnesses.

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 892, *Mountaineering equipment — Dynamic mountaineering ropes — Safety requirements and test methods*

3 Terms and definitions

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

3.1
harness
assembly of narrow textile fabric(s) (hereafter referred to as tape), adjusting device(s) and/or other elements which fit around the body to support it in a hanging position after a fall

3.1.1
full body harness (type A)
harness which fits at least around the upper part of the body and the thighs

Note 1 to entry: This type of harness will support an unconscious person in a head up position.

3.1.2
small body harness (type B)
full body harness according to type A intended for people up to 40 kg

Note 1 to entry: This type of harness is particularly suitable for people with an undeveloped or ill defined waistline.

3.1.3
sit harness (type C)
harness in the form of a waist belt and connecting sub-pelvic support suitably arranged to support a conscious body in a sitting position

3.1.4
chest harness (type D)
harness which fits around the upper part of the body around the chest and under the armpits

Note 1 to entry: A type D harness should only be used in combination with a type C harness.

3.2
load transmitting part
part of the harness which transmit load in the tests in accordance with 5.2.3, 5.2.4, 5.2.5 or 5.2.6 as appropriate

3.3
adjusting device
device which allows adjustment to be made to the harness(es) to the needs of the wearer

3.4
rope attachment point
part of the harness intended for the attachment of the rope

Note 1 to entry: Harnesses can have several attachment points.

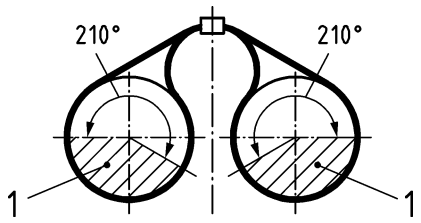
3.5
belt
part of the harness which is around the waist

4 Safety requirements

4.1 General

4.1.1 Load transmitting part

The following parts of the harness in contact with the dummy during the test are not defined as load transmitting parts to the body: shoulder straps, the part of the thighs excluded in Figure 1 and accessory parts.



Key
1 load transmitting part to the body

Figure 1 — Parts transmitting load to the body in leg loops of a harness

4.1.2 Dimensions of tapes

For ergonomic reasons the tape assembly shall comply with the following dimensions:

a) load transmitting parts to the body in contact with the dummy during the tests in accordance with 5.2.3.2, 5.2.4.2, 5.2.5.2 or 5.2.6.2 as appropriate:

   1) harnesses of type B and D: 28 mm minimum;

   2) all other types of harnesses: 43 mm minimum;

b) shoulder straps:

   1) harnesses of type B: 23 mm minimum;

   2) all other types of harnesses: 28 mm minimum;

c) all other parts: no requirements specified.

4.1.3 Threads

Where stitching is used to provide safety and strength (e.g. in joints) the visible area of stitching shall contrast with the tape in colour or surface appearance.

4.1.4 Components

Any component that can come into contact with the user or with any textile part shall be free from burrs and sharp edges.

4.1.5 Textile part

Any textile part which can come into contact with the user shall be free from burrs.

4.2 Strength

4.2.1 When tested in accordance with 5.2.3, 5.2.4, 5.2.5.2, 5.2.5.3 or 5.2.6, no load transmitting part to the body shall break completely. In addition, the dummy (or the cylinder) shall not be released from the harness and no load bearing buckles or adjusting devices shall slip more than 20 mm.

4.2.2 Any loop or combination of loops which are specified in the instructions for use for abseiling shall pass the tests in accordance with 5.2.3.2, 5.2.4.2 or 5.2.5.2, as appropriate.

4.2.3 If there are multiple rope attachment points (for different sizes) the tests in accordance with 5.2.3, 5.2.4, 5.2.5 or 5.2.6 shall be repeated as appropriate for each size as specified in the information to be supplied. Second and subsequent samples may be necessary.

4.2.4 If a harness of type B is adjustable, the range of adjustments shall be within the maximum and minimum ranges claimed on the label (in accordance with Clause 6). This shall be checked, after each of the adjustments, in accordance with 5.2.1.

4.2.5 If the type A or type B harness can be divided into a type C and a type D harness, each component which has a rope attachment point shall meet the requirements of this European Standard.

5 Test methods

5.1 Conditioning and test conditions

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. Then start testing these samples at a temperature of (23 ± 5) °C within 10 min.

5.2 Procedure

5.2.1 General

Verify the requirements according to 4.1.1, 4.1.3 and 4.1.4 by visual and tactile examination.

Verify the requirements according to 4.1.2 by measuring with the harness on the dummy loaded in accordance with 5.2.3.2, 5.2.4.2, 5.2.5.2 or 5.2.6.2. For the width in 4.1.2 the measurements shall be made in three locations per dimension.

5.2.2 Threads

Check by visual examination that the requirements specified in 4.1.3 are met.

5.2.3 Type A harnesses

5.2.3.1 Put the harness on a rigid test dummy according to Figure 4 and attach it with a single rope, according to EN 892, to the test machine in accordance with the instructions for use.

5.2.3.2 In the head up position of the dummy load the harness gradually up to (800 ± 10) N in the head up position of the dummy. Under this load, the rope attachment points should be placed approximately symmetrically about the plane of symmetry of the dummy, then mark the tape at the outer edge of any load bearing buckle or adjusting device and apply a force increasing gradually to ($15\ ^{+0,3}_{0}$) kN over a period of (2 ± 0,25) min. Hold this force for (1 ± 0,25) min and then release the tension completely over (1 ± 0,10) min. Reapply the force immediately and increase gradually to ($15\ ^{+0,3}_{0}$) kN over a period of (2 ± 0,25) min and hold the force for (3 ± 0,25) min before release. After release mark the tape at the outer edge of any load bearing buckle or adjusting device. Undo the load bearing buckle or adjusting device and measure the distance between the two marks.

5.2.3.3 In the head down position of the dummy (see Figure 4), use the same harness as in 5.2.3.2 then mark the tape at the outer edge of any load bearing buckle or adjusting device and apply a force increasing gradually to ($10\ ^{+0,3}_{0}$) kN over a period of (2 ± 0,25) min. Hold this force for (1 ± 0,25) min and then release the tension completely over (1 ± 0,10) min. Reapply the force immediately and increase gradually to ($10\ ^{+0,3}_{0}$) kN as before and hold the force for (3 ± 0,25) min before release. After release mark the tape at the outer edge of any load bearing buckle or adjusting device. Undo the load bearing buckle or adjusting device and measure the distance between the two marks.

5.2.4 Type B harnesses

5.2.4.1 Put the harness on a rigid test dummy according to Figure 5 and attach it with a single rope, according to EN 892, to the test machine in accordance with the instructions for use.

5.2.4.2 In the head up position of the dummy load the harness gradually up to (500 ± 10) N in the head up position of the dummy. Under this load, the rope attachment points should be placed approximately symmetrically about the plane of symmetry of the dummy, then mark the tape at the outer edge of any load bearing buckle or adjusting device and apply a force increasing gradually to ($10\ ^{+0,3}_{0}$) kN over a period of (2 ± 0,25) min. Hold this force for (1 ± 0,25) min and then release the tension completely over (1 ± 0,10) min. Reapply the force immediately and increase gradually to ($10\ ^{+0,3}_{0}$) kN over a period of (2 ± 0,25) min as before and hold the force for (3 ± 0,25) min before release. After release, mark the tape at the outer edge of any load bearing buckle or adjusting device. Undo the load bearing buckle or adjusting device and measure the distance between the two marks.

5.2.4.3 In the head down position of the dummy, mark the tape at the outer edge of any load bearing buckle or adjusting device and apply a force increasing gradually to ($7\ ^{+0,2}_{0}$) kN over a period of (2 ± 0,25) min. Hold this force for (1 ± 0,25) min and then release the tension completely over a maximum of 1 min. Reapply the force immediately and increase gradually to ($7\ ^{+0,2}_{0}$) kN as before and hold the force for (3 ± 0,25) min before release. After release, mark the tape at the outer edge of any load bearing buckle or adjusting device. Undo the load bearing buckle or adjusting device and measure the distance between the two marks.

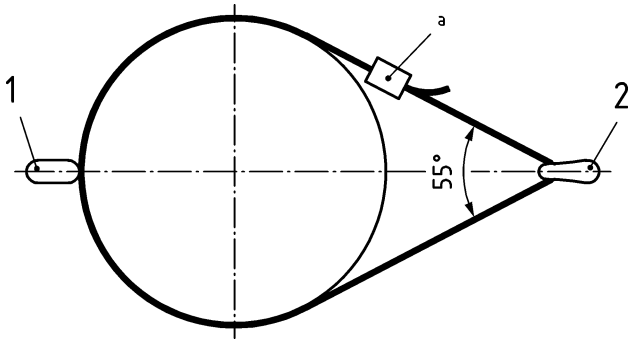
5.2.5 Type C harnesses

5.2.5.1 Put the harness on a rigid test dummy according to Figure 4 and attach it with a single rope, according to EN 892, to the test machine in accordance with the instructions for use.

5.2.5.2 In the head up position of the dummy load the harness gradually up to (800 ± 10) N in the head up position of the dummy. Under this load, the rope attachment points should be placed approximately symmetrically about the plane of symmetry of the dummy. Then mark the tape at the outer edge of any load bearing buckle or adjusting device and apply a force increasing gradually to $(15\ ^{+0,3}_{0})$ kN over a period of (2 ± 0,25) min. Hold this force for (1 ± 0,25) min and then release the tension completely over (1 ± 0,10) min. Reapply the force immediately and increase gradually to $(15\ ^{+0,3}_{0})$ kN over a period of (2 ± 0,25) min and hold the force for (3 ± 0,25) min before release. After release, mark the tape at the outer edge of any load bearing buckle or adjusting device. Undo the load bearing buckle or adjusting device and measure the distance between the two marks.

5.2.5.3 Affix the belt of the harness to the cylinder as shown in Figure 2 and attach the attachment point of the harness with a pin of diameter (12 ± 0,1) mm to the test machine. Apply a force increasing gradually to (300 ± 10) N over a period of (30 ± 10) s. Control the angle of the belt to be (55 ± 5)° by adjusting the length of the belt. Position the belt on the cylinder so that the attachment point of the harness and the fixation element of the cylinder are aligned within the direction of the applied force. If the belt has an adjusting device for the length, make a mark at the outer edge of any load bearing buckle or adjusting device.

Apply a force increasing gradually to $(10\ ^{+0,1}_{0})$ kN over a period of (2 ± 0,25) min. Hold this force for (1 ± 0,25) min and release the tension completely over a period of 60 s. Reapply the force immediately and increase the force gradually to $(10\ ^{+0,1}_{0})$ kN over a period of (3 ± 0,25) min. Hold this force for (3 ± 0,25) min before releasing the force completely. After releasing the tension completely, if relevant, make a mark at the outer edges of any load bearing buckle or adjusting device. Undo the load bearing buckle or adjusting device and measure the distance between the two marks.



Key

a) The load bearing buckle or adjusting device shall not touch the cylinder.

1 fixation element of the cylinder

2 harness attachment point

Diameter of the cylinder: (250 ± 10) mm. Diameter of (160 ± 10) mm if the load bearing buckle or adjusting device touches the cylinder of 250 mm.

Figure 2 — Arrangement for belt testing

5.2.6 Type D harnesses

5.2.6.1 Put the harness on a rigid test dummy according to Figure 4 and attach it with a single rope, according to EN 892, to the test machine in accordance with the instructions for use.

5.2.6.2 In the head up position of the dummy load the harness gradually up to (800 ± 10) N in the head up position of the dummy. Under this load, the rope attachment points should be placed approximately symmetrically about the plane of symmetry of the dummy. Then, mark the tape at the outer edge of any load bearing buckle or adjusting device and apply a force increasing gradually to $(10\ ^{+0,3}_{0})$ kN over a period of (2 ± 0,25) min. Hold this force for (1 ± 0,25) min and then release the tension completely (1 ± 0,10) min. Reapply the force immediately and increase gradually to $(10\ ^{+0,3}_{0})$ kN over a period of (2 ± 0,25) min as before and hold the force for (3 ± 0,25) min before release. After release, mark the tape at the outer edge of any load bearing buckle or adjusting device. Undo the load bearing buckle or adjusting device and measure the distance between the two marks.

6 Marking

Harnesses shall carry a label which will be marked with at least the following items:

a) name of the manufacturer or his/ her representative;

NOTE For a definition of manufacturer and authorized representative, see Regulation 765/2008 [1].

b) number of this European Standard, i.e. EN 12277 and type of the harness in accordance with 3.1 model designation (if several models are marketed by the manufacturer);

c) size, if applicable;

d) drawing showing how to fasten and secure load transmitting buckles or adjusting devices;

e) maximum weight and size ranges, only for type B harnesses;

f) drawing to indicate that they shall not be used alone, only for type D harnesses;

g) year of manufacture;

h) graphical symbol (see Figure 3), which advises the user to read the information given by the manufacturer.

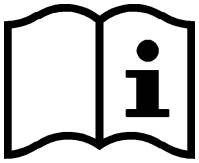


Figure 3 — Operator's manual (according to ISO 7000, Symbol No. 1641)

7 Information supplied by the manufacturer

The harness shall be supplied with an explanatory leaflet containing at least the following items:

a) advice that the product should only be used by trained and/or otherwise competent persons or the user should be under the direct supervision of a trained and/or otherwise competent person;

b) advice that, before using the harness, the user should carry out a suspension test in a safe place to ensure that the harness is the correct size, has sufficient adjustment and is of an acceptable comfort level for the intended use;

c) instruction for the proper way to put on the harness;

d) explanation of sizing details and how to obtain the optimum fit;

e) identification of rope attachment points and how to tie into them;

f) advice on the importance of regularly checking any buckles or adjusting devices during use;

g) advice on how attachment should be made to any connecting component or sub-system (e.g. for anchoring, belaying, ascending, abseiling or in a rescue situation);

h) instruction for the choice of other suitable components for use in the system;

i) advice on the importance of checking the whole harness regularly for any damage during use and the necessity to withdraw it from use if any damage or defect is found;

j) maximum weight and size ranges for type B harnesses;

k) advice on the risk of injury when using a type D harness without a type C harness;

l) advice on the effects of chemical reagents with which the product might come into contact;

m) instruction for the cleaning and/or disinfection of the product without adverse effects;

n) lifespan of the product or how to assess it;

o) instruction for the protection of the product during transportation;

p) advice on the meaning of any markings on the product;

q) instructions for drying: after any wetting, without affecting its performance and subsequent correct storage;

r) advice on the effects of damp and icy conditions;

s) advice on the effects of storage and of ageing;

t) information, that the use of the harness is intended for mountaineering, including climbing.

Dimensions in millimetres

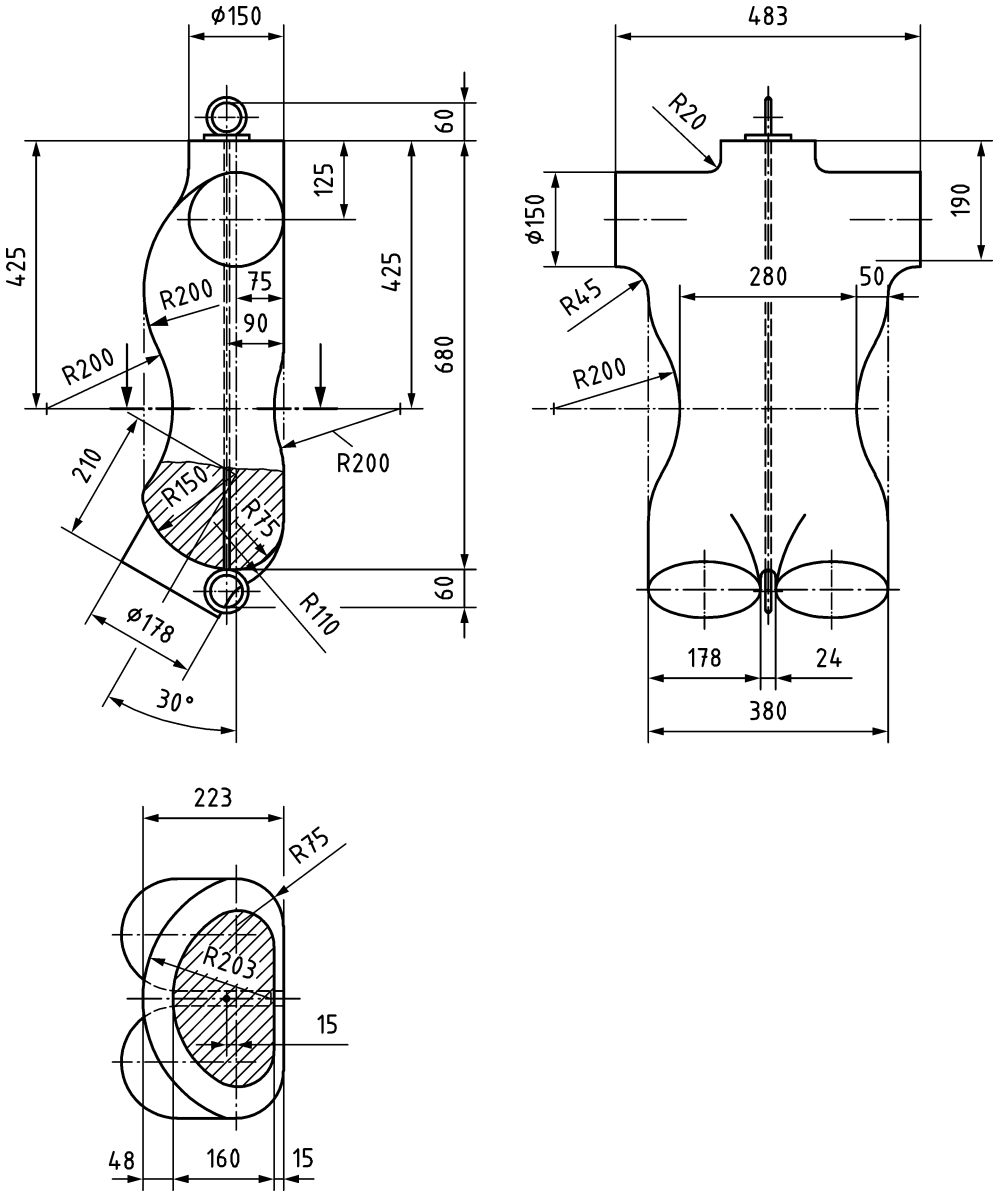
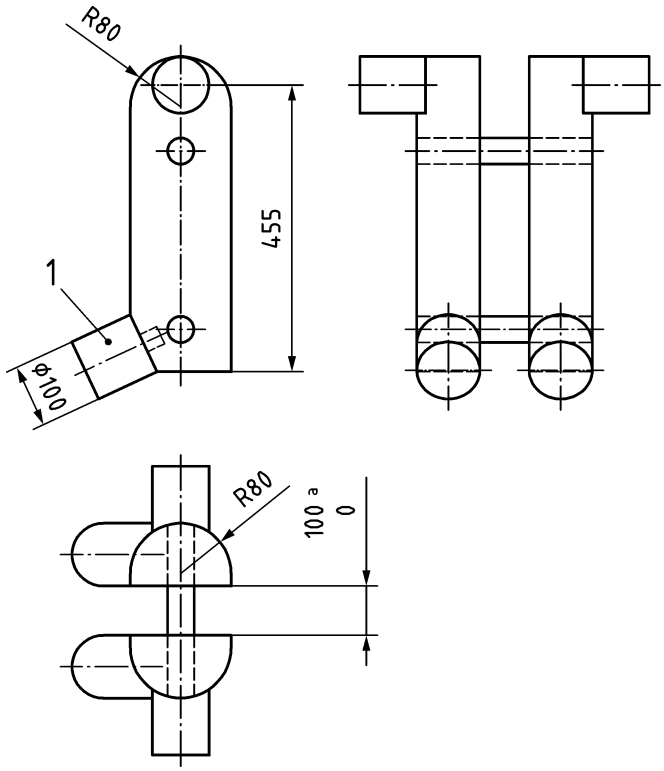


Figure 4 — Outline of test dummy

Dimensions in millimetres



Key

a adjustable from 0 mm to 100 mm

1 may be removable

Figure 5 — Outline of test dummy for type B harnesses testing

Annex A
(informative)

Standards on mountaineering equipment

Table A.1 — List of standards on mountaineering equipment

No	Document	Title
1	EN 892	Mountaineering equipment — Dynamic mountaineering ropes — Safety requirements and test methods
2	EN 12275	Mountaineering equipment — Connectors — Safety requirements and test methods
3	EN 13089	Mountaineering equipment — Ice-tools — Safety requirements and test methods
4	EN 12277	Mountaineering equipment — Harnesses — Safety requirements and test methods
5	EN 12492	Mountaineering equipment — Helmets for mountaineers — Safety requirements and test methods
6	EN 564	Mountaineering equipment — Accessory cord — Safety requirements and test methods
7	EN 565	Mountaineering equipment — Tape — Safety requirements and test methods
8	EN 566	Mountaineering equipment — Slings — Safety requirements and test methods
9	EN 12276	Mountaineering equipment — Frictional anchors — Safety requirements and test methods
10	EN 12270	Mountaineering equipment — Chocks — Safety requirements and test methods
11	EN 567	Mountaineering equipment — Rope clamps — Safety requirements and test methods
12	EN 958	Mountaineering equipment — Energy absorbing systems for use in klettersteig (via ferrata) climbing — Safety requirements and test methods
13	EN 959	Mountaineering equipment — Rock anchors — Safety requirements and test methods
14	EN 568	Mountaineering equipment — Ice anchors — Safety requirements and test methods
15	EN 569	Mountaineering equipment — Pitons — Safety requirements and test methods
16	EN 893	Mountaineering equipment — Crampons — Safety requirements and test methods
17	EN 15151-1	Mountaineering equipment — Braking devices — Part 1: Braking devices with manually assisted locking, safety requirements and test methods
18	EN 15151-2	Mountaineering equipment — Braking devices — Part 2: Manual braking devices, safety requirements and test methods
19	EN 12278	Mountaineering equipment — Pulleys — Safety requirements and test methods

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 89/686/EEC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 89/686/EEC on the approximation of the laws of the Member States relating to personal protective equipment.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Directive 89/686/EEC

Clause(s)/subclause(s) of this EN	Essential Requirements (ERs) of Directive 89/686/EEC	Qualifying remarks/ Notes
4.1.2	1.1.1 Ergonomics	
4.1.4	1.2.1.2 Satisfactory surface condition of all PPE parts in contact with the user	
4.1.2 4.1.3, 4.2	1.3.2 Lightness and design strength	
Clause 6, Clause 7	1.4 Information supplied by the manufacturer	
Clause 7	2.4 PPE subject to ageing	In Clause 7 only the first paragraph of ER 2.4 is addressed.
4.2	3.1.2.2 Prevention against falling from heights	Harnesses according to this standard are only one part of the safety chain and should be used in conjunction with other compatible equipment.

WARNING: Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Bibliography

[1] Regulation 765/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) No 339/93