BS EN 893:2010

BSI Standards Publication

Mountaineering equipment — Crampons — Safety requirements and test methods

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National foreword

This British Standard is the UK implementation of EN 893:2010. It supersedes BS EN 893:1999, which is withdrawn.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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Compliance with a British Standard cannot confer immunity from legal obligations.

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Date	Text affected

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English Version

Mountaineering equipment - Crampons - Safety requirements and test methods

Equipement d'alpinisme et d'escalade - Crampons - Exigences de sécurité et méthodes d'essai

Bergsteigerausrüstung - Steigeisen - Sicherheitstechnische Anforderungen und Prüfverfahren

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Foreword

This document (EN 893:2010) 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of an identical text or by endorsement, at the latest by May 2011, and conflicting national standards shall be withdrawn at the latest by May 2011.

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 893:1999.

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 89/686/EEC.

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

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Introduction

The text of this European Standard is based on the former UIAA-Standard S (Union Internationale des Associations d'Alpinisme / International mountaineering and climbing federation), which has been developed with international participation.

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

1 Scope

This European Standard specifies safety requirements and test methods for crampons preventing the user from slipping when used in mountaineering on snow and ice including climbing mixed terrain.

2 Normative references

The following referenced documents are indispensable 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 565, *Mountaineering equipment — Tape — Safety requirements and test methods*

EN ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T) (ISO 6508-1:2005)*

ISO 9523, *Touring ski-boots for adults — Interface with touring ski-binding — Requirements and test methods*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply (see also Figure 1).

3.1
crampon
device fitted with spikes, which is intended to cover the sole of a boot, from toe to heel and from one side to the other, so as to provide grip on snow, ice and mixed terrain and which has a system of attachment to the boot

3.2
frame
part or parts of the crampon which bears the spikes

3.3
front spike
forward pointing spike intended for use when climbing steep terrain

3.4
downward spike
spike usually, but not necessarily, pointing vertically downward

3.5
binding
system of attachment to the boot

3.6
clip-on binding
particular binding which uses a lever mechanism for rapid attachment of a crampon to a boot

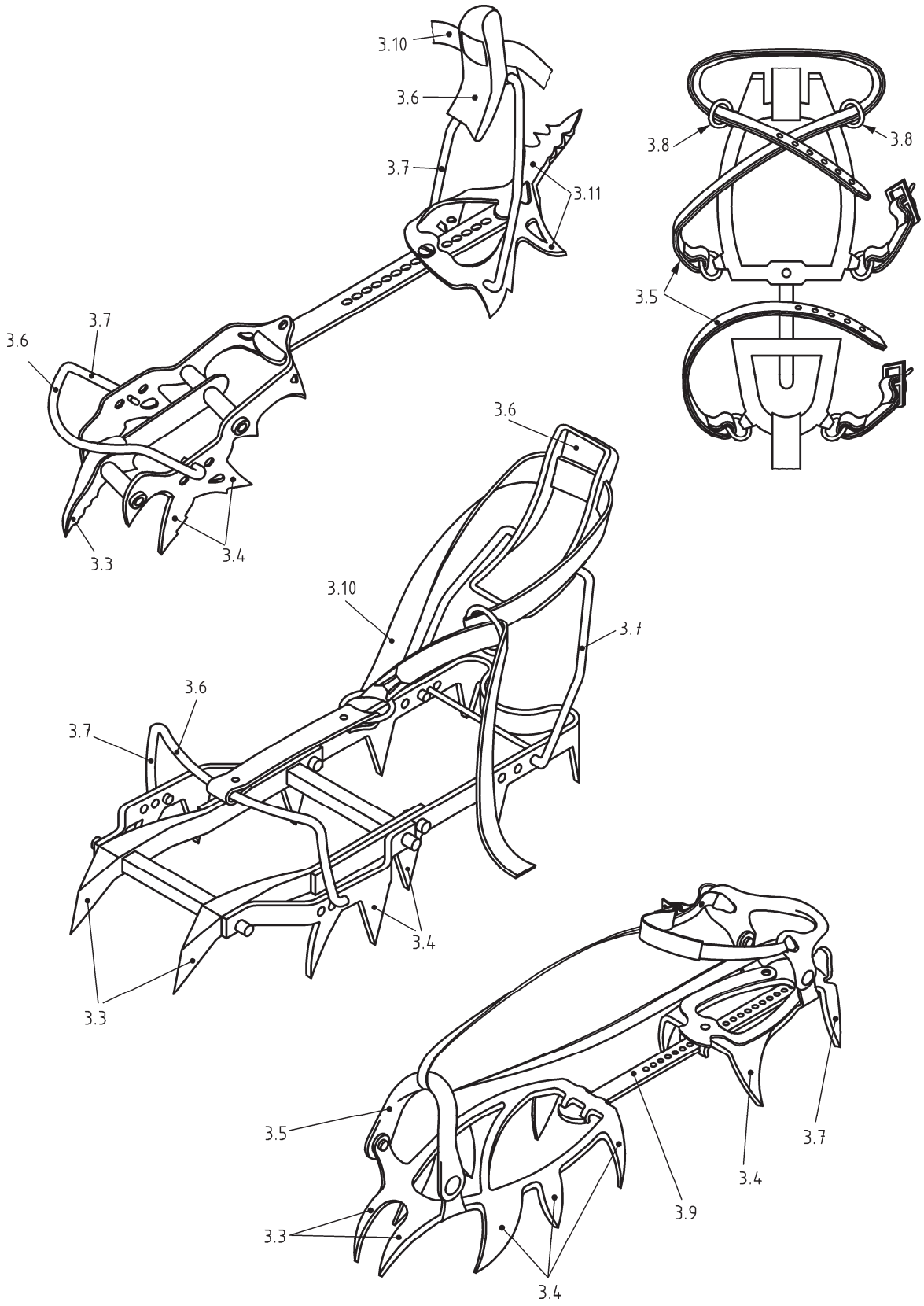
3.7
bail
stirrup-shaped part or parts of a binding used to connect the crampon to the toe and/or to the heel of the boot

3.8
attachment rings or eyes
rings or eyes which are threaded by a part of the binding when fitted in accordance with the manufacturer's instruction

3.9
adjustment system
system for adjusting the crampon to fit the boot

3.10
retaining system
system which prevents the climber from losing the crampon if the binding fails

3.11
spur
other spike than front spikes and downward spikes



NOTE The numbers in this figure refer to the corresponding terms defined in Clause 3.

Figure 1 — Parts of a crampon

4 Safety requirements

4.1 Shape and design

4.1.1 Each crampon shall have a system of attachment to the boot.

4.1.2 Each crampon shall have at least eight spikes, not including spurs.

4.1.3 Each crampon shall have at least six downward spikes, which:

a) shall be at least 20 mm long (see Figure 2) and not necessarily all the same length;

b) when walking normally on flat and smooth ice, shall contact the surface of the ice, but not necessarily at the same time; and

c) shall be shaped such that when loaded with one person's weight whilst walking on smooth ice, the downward spikes will "bite" into the ice such as to prevent slipping.

Dimensions in millimetres

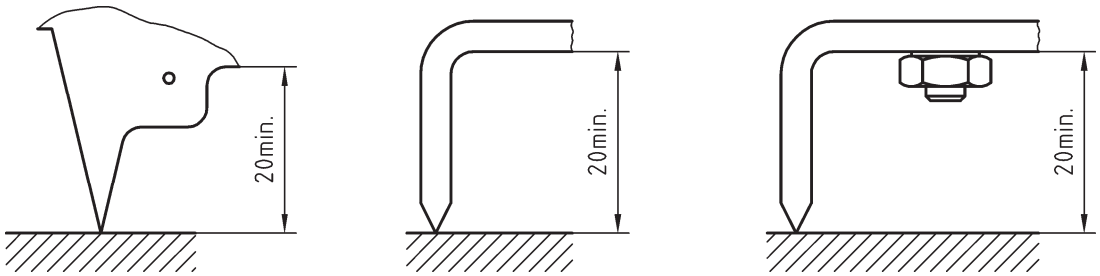


Figure 2 — Length of spikes

4.1.4 All edges with which the user's hands can come into contact shall be free from burrs.

4.1.5 If the crampon has a clip-on binding it shall be fitted with a retaining system.

4.2 Prevention against slippage

When tested according to 5.4.2, the crampons shall not slip on the ice more than 10 mm in each direction.

4.3 Strength

4.3.1 Hardness

Each part of the crampon, which contains a spike or spikes, shall have a hardness of at least 70 HRB.

Testing according to 5.4.1.3.

4.3.2 Bending and breaking strength of spikes

When tested according to 5.4.3, the maximum deformation under load and the permanent deformation after removing the load, measured at the point of application, shall not be more than shown in Table 1. The breaking strength shall be at least as shown in Table 1.

Spurs shall be tested with a load applied in each intended direction.

Table 1 — Strength of spikes

Types of spikes	Applied force N	Deformation under load mm	Permanent deformation mm	Minimum breaking strength N
Downward spikes	900 ± 20	15	7	1 200
Front spikes (if more than one) and spur	1 200 ± 30	15	7	1 500
Single front spike (mono-spike)	1 600 ± 40	15	7	2 000

4.3.3 Transverse strength of bails of clip-on bindings

When tested in the operating position and according to 5.4.4, the bails of clip-on bindings shall not break and shall not come out of the frame of the crampon. Permanent deformation is acceptable.

If the crampon is directly attached or integrated into a boot the transverse strength requirements are not applicable.

4.3.4 Strength of binding parts other than bails

When tested according to 5.4.5, each part shall not break.

4.3.5 Strength of attachment rings and eyes and of the appropriate part of the binding

When tested according to 5.4.7, attachment rings and eyes and the appropriate part of the binding shall not break.

If the crampon is directly attached or integrated into a boot the strength requirements are not applicable.

4.3.6 Longitudinal strength of the frame

When tested according to 5.4.8, the frame including the longitudinal adjustment system shall not break.

5 Test methods

5.1 Test samples

The tests shall be carried out on the following number of test samples:

a) if the left and the right crampon are of identical shape: two test samples (one test sample for the tests in 5.4.3 and one test sample for the tests in 5.4.1 and 5.4.4 to 5.4.8);

b) if the left and the right crampon are of different shapes: two pairs (one pair for the tests in 5.4.3 and one pair for the tests in 5.4.1 and 5.4.4 to 5.4.8).

5.2 Test conditions

5.2.1 All tests shall be carried out at a room temperature of (23 ± 5) °C.

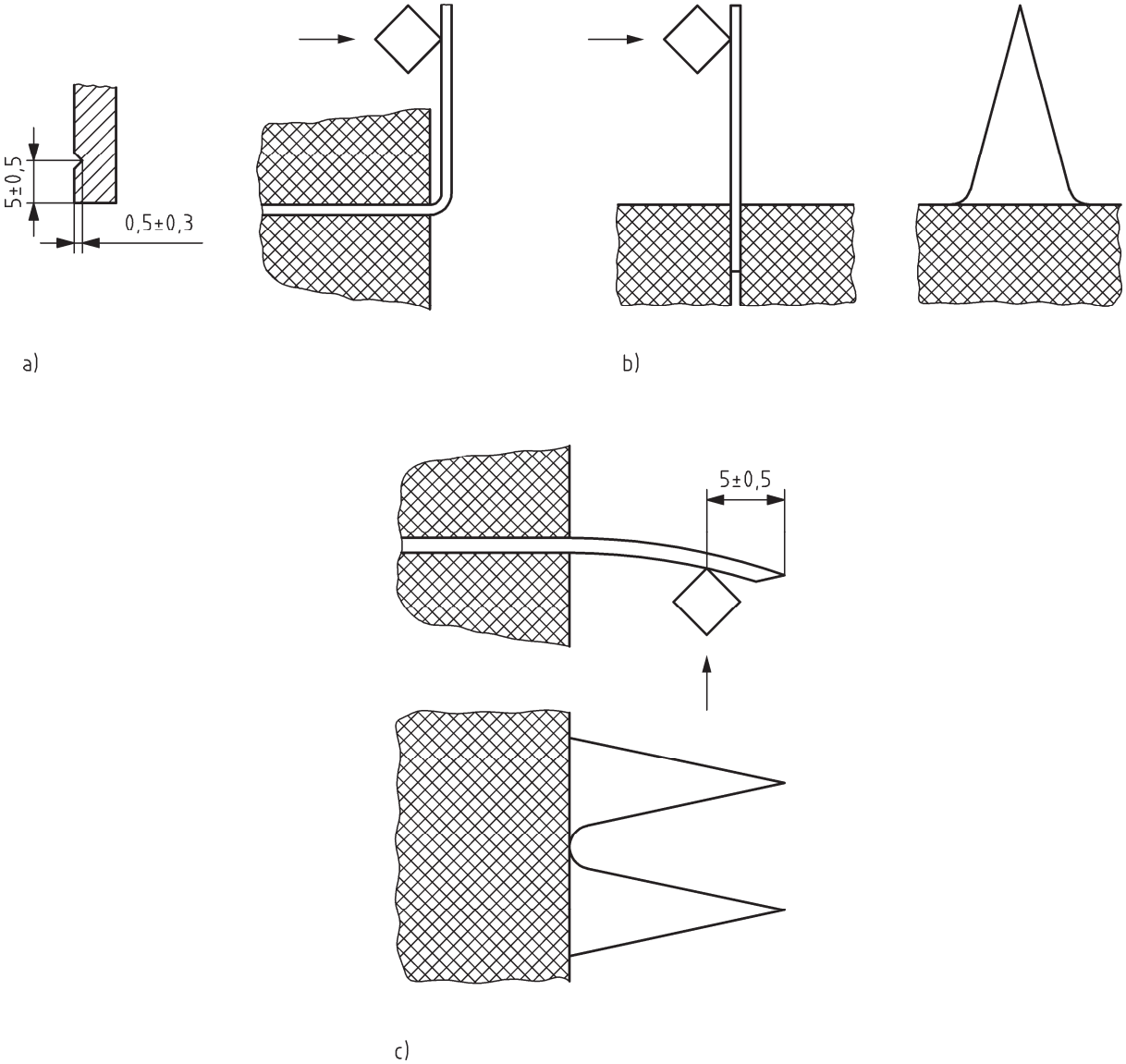
5.2.2 For any strength test involving non-metallic parts the test samples shall be conditioned for 1 h in clean water of domestic supply and then for 4 h at a temperature of (- 30 ± 5) °C. The test samples shall be conditioned in the operating position. The test shall then begin within 3 min from removal from conditioning.

5.3 Apparatus

5.3.1 Load bar for bending test on downward spikes and front spikes.

The spikes shall be provided with a groove, as shown in Figure 3. The load bar for applying a load shall be compatible with the shape of the groove.

Dimensions in millimetres



Key

a) Load direction for down spikes of frame with horizontal structure

b) Load direction for front spikes of frame with vertical structure

c) Load direction on front spike test

Figure 3 — Load bar for bending test

5.4 Test procedure

5.4.1 Shape, design and hardness

5.4.1.1 Check by visual examination and measurement, where appropriate, that the requirements according to 4.1.1, 4.1.2, 4.1.3, a), 4.1.4 and 4.1.5 are met.

5.4.1.2 Check the requirements of 4.1.3, b) by visual examination of a person walking on flat smooth ice, wearing a suitable boot to which the crampon is attached in accordance with the information supplied by the manufacturer. Count the number of downward spikes which contact the ice during the walking motion.

5.4.1.3 Check the requirements of 4.3.1 in accordance with EN ISO 6508-1.

5.4.2 Prevention against slippage

5.4.2.1 Preparation of the ice-block

Fill an ice container, large enough to receive a crampon, with water and store it at temperature of (- 20 ± 2) °C for 12 h. Smooth off any uneven surface of the ice. The crampon shall be also conditioned the same way.

5.4.2.2 Procedure

Carry out the test at room temperature (20 ± 5) °C less than 10 min after leaving the conditioned atmosphere. Clamp the ice container and place the crampon on it.

A test subject (M) of 40 kg < M < 100 kg wearing the boot and crampon shall load the ice.

Apply a force F in the forward direction in accordance with Figure 4. F shall be calculated according to Equation (1):

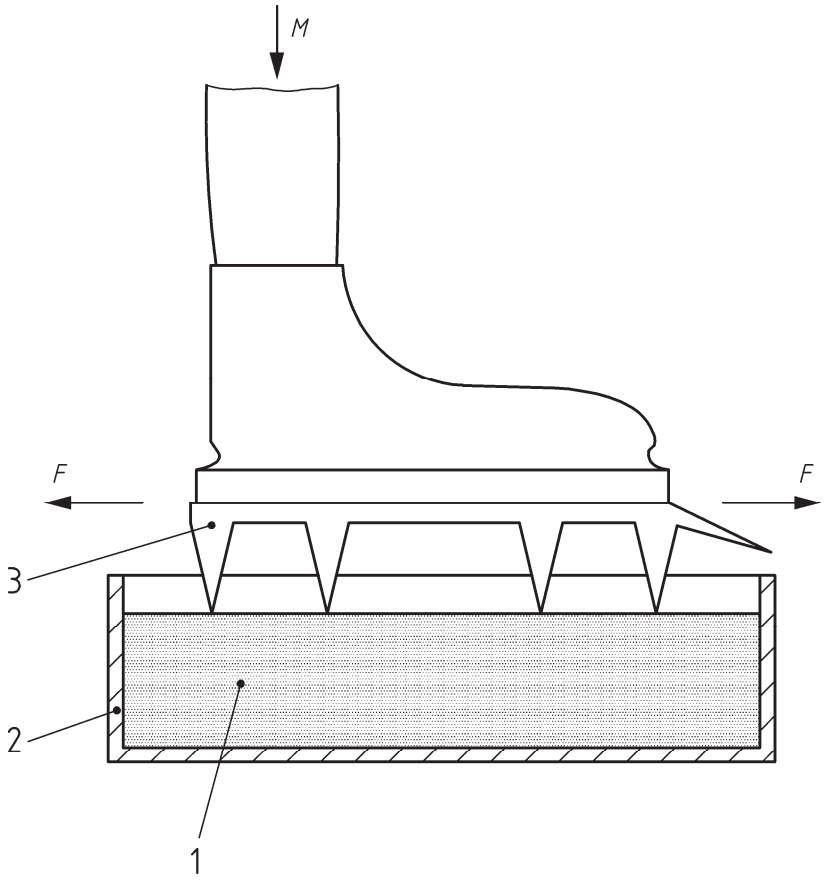
$$F = \frac{3}{8} M \times \mathrm{g} \tag{1}$$

where

M is the test subject, in kilograms;

g is 9,81 m/s^2;

F is the force, in newtons.



Key

1 smooth ice
2 container
3 crampon
M mass
F force

Figure 4 — Slippage test

Measure the slippage of the crampon on the ice when the force F has been applied for 1 min.

Then apply the force F in the backward direction and measure the slippage of the crampon on the ice when the force F has been applied for 1 min.

5.4.3 Bending strength test on spikes

Mount the frame of the test specimen as shown in Figure 3 without deformation of the frame and make the groove in each spike.

If it is not possible to mount the frame without deformation, cut out each spike together with the appropriate part of the frame in a manner which does not affect the strength of the material and make the groove in the spike. Mount the test sample as shown in Figure 3.

Apply a force, as specified in Table 1, to the test sample in accordance with Figure 3 a) or b) or c), as appropriate. Hold the force for (60 ± 5) s and measure the maximum deformation. The rate of loading shall be (200 ± 50) mm/min.

After removing the force, measure the permanent deformation.

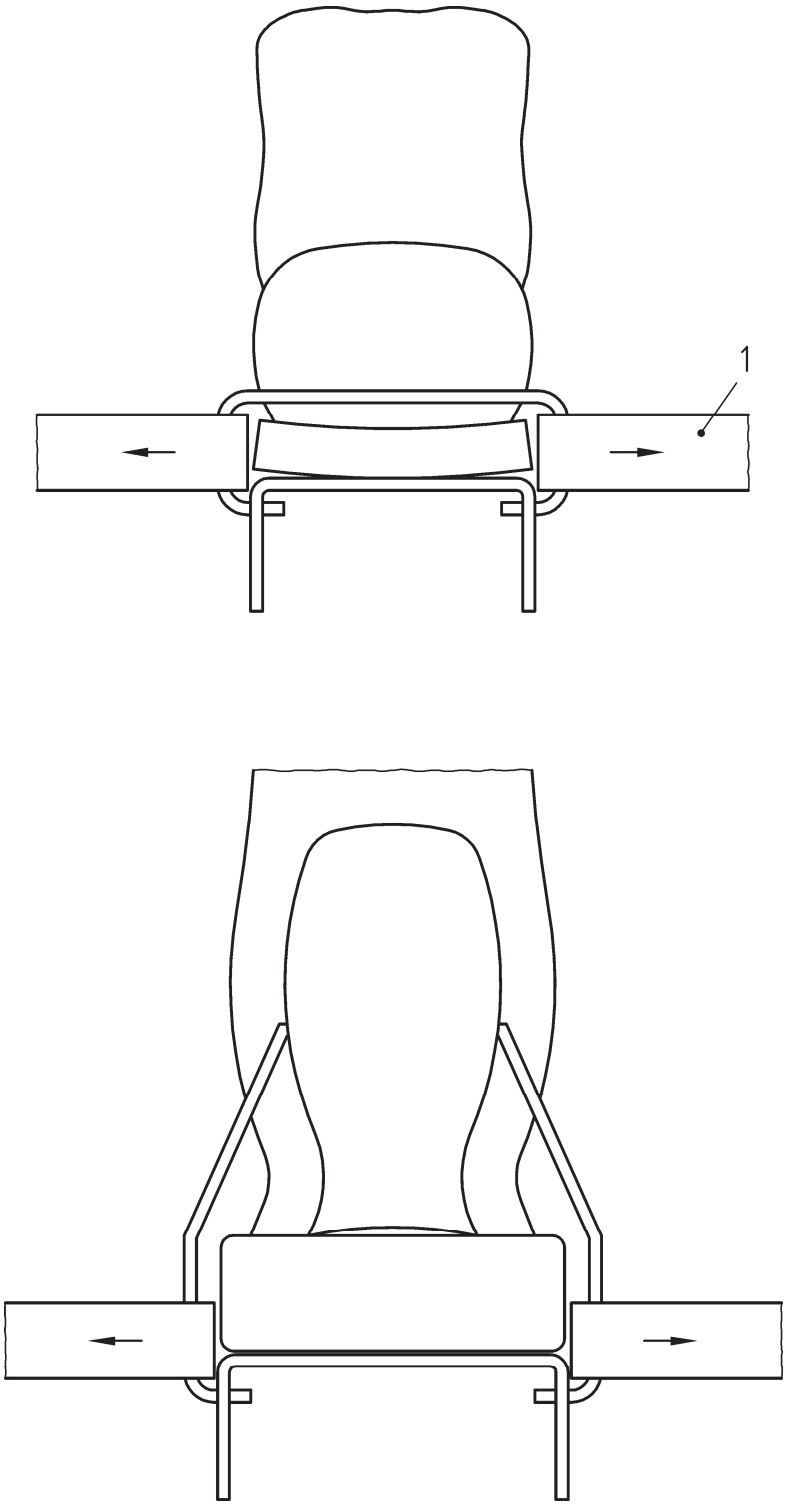
Then load the test sample to the minimum breaking strength as specified in Table 1.

If spikes are adjustable, test the spikes at the maximum extension.

5.4.4 Transverse strength test on bails

Mount the test sample on a ski-boot in accordance with ISO 9523 as instructed in the information supplied by the manufacturer.

Apply a force of (1 000 ± 25) N on the bails with two tape slings in accordance with EN 565 with a width of (15 ± 2) mm as shown in Figure 5, and hold the force for (60 ± 5) s. The rate of loading shall be (200 ± 50) mm/min.



Key

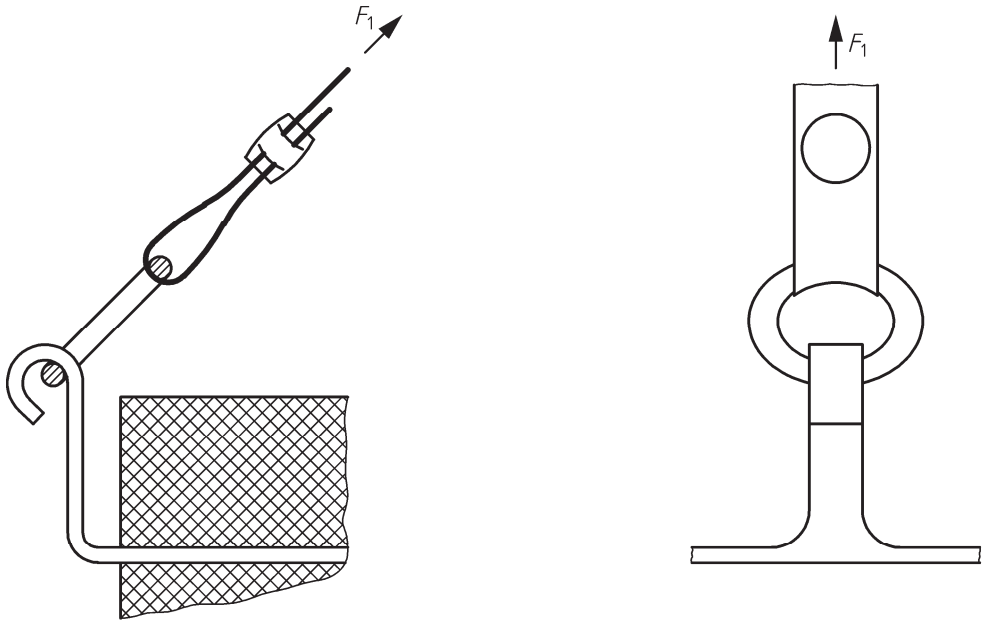
1 tape

Figure 5 — Application of force on the bails

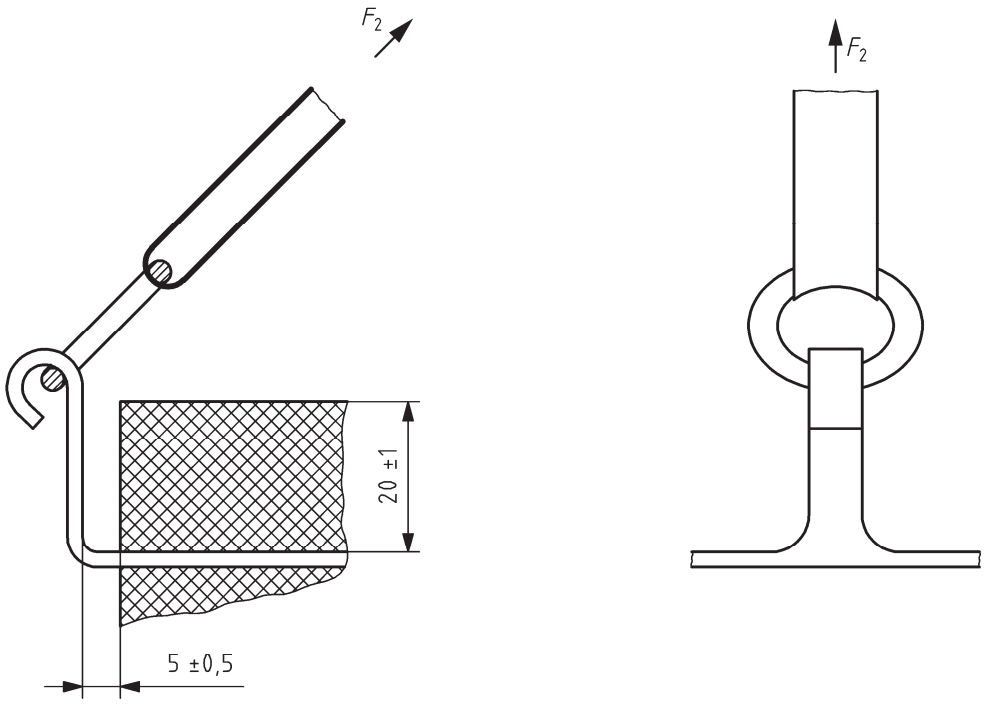
5.4.5 Strength test of binding parts other than bails

Mount the frame of the test sample as shown under a) in Figure 6. If it is not possible to mount the whole frame, cut out the adjustment point together with the appropriate part of the frame and mount this test sample.

Dimensions in millimetres



a)



b)

Key

F_1, F_2 forces

Figure 6 — Mounting of the frame for strength test

Apply a force F_1 = (1 000 ± 25) N on the binding part approximately in the direction in which this part will be loaded during use, and hold the force for (60 ± 5) s. The rate of loading shall be (200 ± 50) mm/min.

5.4.6 Strength test of binding closures

Fasten the crampon binding in accordance with the manufacturer's instruction.

Apply a force of (1 000 ± 25) N to the closure and hold the force for (60 ± 5) s. The rate of loading shall be (200 ± 50) mm/min.

5.4.7 Strength test of attachment rings and eyes and of the appropriate part of the binding

Mount the frame of the test sample as shown under b) in Figure 6. If it is not possible to mount the frame, cut out the attachment point together with the appropriate part of the frame.

The attachment ring or eye shall be threaded with the part of the binding intended for this purpose by the manufacturer and shall be made into a loop (for example, by tying a knot).

Apply a force F_2 = (2 000 ± 50) N to the loop to load the ring or eye approximately in the direction in which it is intended to be loaded during use and hold the force for (60 ± 5) s. The rate of loading shall be (200 ± 50) mm/min.

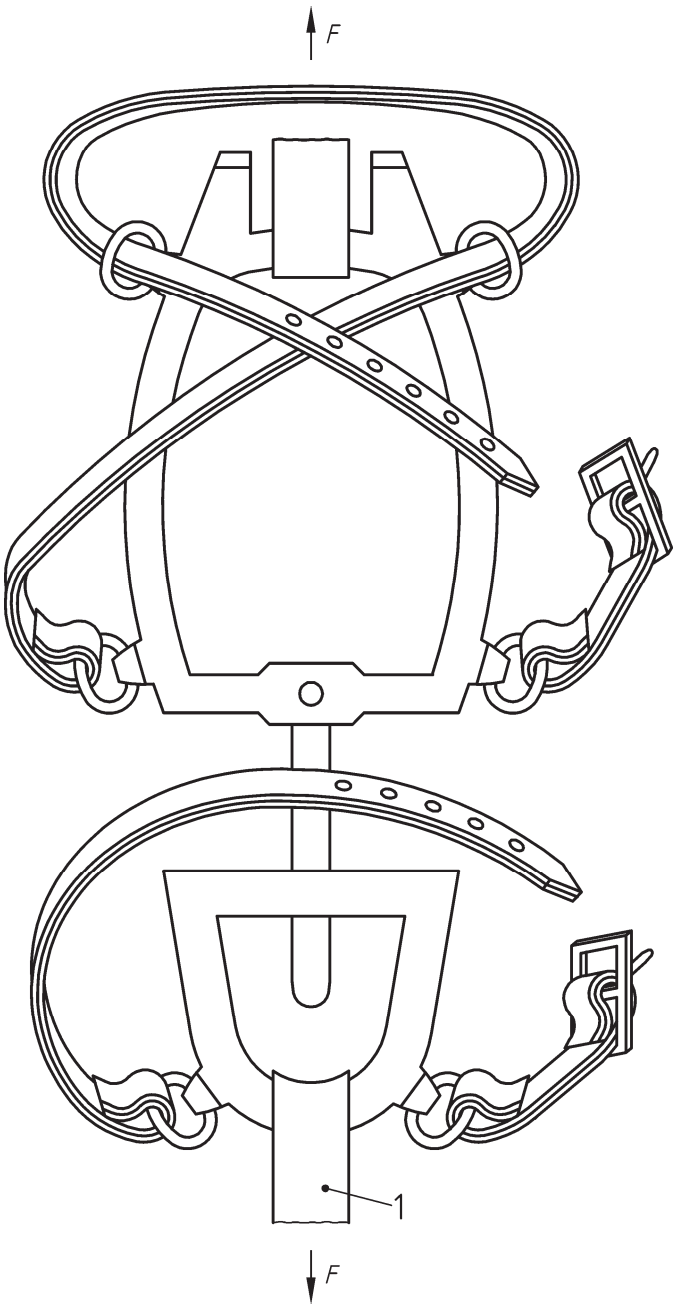
5.4.8 Longitudinal strength test of the frame

Mount the test sample without a boot between two tape slings in accordance with EN 565, each with a width of (15 ± 2) mm, according to Figure 7 in the minimum longitudinal adjustment position. Apply a force F = (3 000 ± 75) N, see 4.3.6, and hold the force for (60 ± 5) s. The rate of loading shall be (200 ± 50) mm/min.

Repeat this test on the same test sample in the maximum longitudinal adjustment position.

If the test specimen has an automatic adjustment to the width of the boot, fix the width by means of a spacer bar to the average width.

In the case of boots with spikes directly integrated into the boot test the crampon with the boot.



Key

1 tape
F force

Figure 7 — Longitudinal strength test of the frame

6 Marking

The crampon shall be marked clearly, indelibly and durably with at least the following items:

a) name of the manufacturer or its authorized representative in the European Union;

b) year of manufacture;

c) pictogram which advises the user to read the information given by the manufacturer:

Figure 8

7 Information supplied by the manufacturer

The crampon shall be supplied with an explanatory leaflet, and written in at least the official language(s) of the state of destination within the European Union containing at least the following items:

a) name and address of the manufacturer or its authorized representative in the European Union;

b) number of this standard: EN 893;

c) use for which the product is intended;

d) type of boot with which the crampons are intended to be used;

e) how to adjust the crampons and attach them to the boots;

f) how to check whether the fit and attachment of the crampons to the boots is satisfactory;

g) how to check the sharpness of the spikes and how to re-sharpen the spikes;

h) meaning of any markings on the product;

i) how to maintain, clean and service the product;

j) lifespan of the product;

k) how to store and transport the product;

l) effect of chemical reagents and temperature on the product.

Annex A
(informative)

Standards on mountaineering equipment

Table A.1 — List of standards on mountaineering equipment

No	Document	Title
1	EN 564	Mountaineering equipment — Accessory cord — Safety requirements and test methods
2	EN 565	Mountaineering equipment — Tape — Safety requirements and test methods
3	EN 566	Mountaineering equipment — Slings — Safety requirements and test methods
4	EN 567	Mountaineering equipment — Rope clamps — Safety requirements and test methods
5	EN 568	Mountaineering equipment — Ice anchors — Safety requirements and test methods
6	EN 569	Mountaineering equipment — Pitons — Safety requirements and test methods
7	EN 892	Mountaineering equipment — Dynamic mountaineering ropes — Safety requirements and test methods
8	EN 893	Mountaineering equipment — Crampons — Safety requirements and test methods
9	EN 958	Mountaineering equipment — Energy absorbing systems for use in klettersteig (via ferrata) climbing — Safety requirements and test methods
10	EN 959	Mountaineering equipment — Rock anchors — Safety requirements and test methods
11	EN 12270	Mountaineering equipment — Chocks — Safety requirements and test methods
12	EN 12275	Mountaineering equipment — Connectors — Safety requirements and test methods
13	EN 12276	Mountaineering equipment — Frictional anchors — Safety requirements and test methods
14	EN 12277	Mountaineering equipment — Harnesses — Safety requirements and test methods
15	EN 12278	Mountaineering equipment — Pulleys — Safety requirements and test methods
16	EN 12492	Mountaineering equipment — Helmets for mountaineers — Safety requirements and test methods
17	EN 13089	Mountaineering equipment — Ice-tools — Safety requirements and test methods
18	prEN 15151-1	Mountaineering equipment — Braking devices — Part 1: Braking devices with assisted locking, safety requirements and test methods
19	prEN 15151-2	Mountaineering equipment — Braking devices — Part 2: Manual braking devices, 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 Mandate M/031 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
4.1.4	1.2.1.2	Satisfactory surface condition of all PPE parts in contact with the user	
4.3	1.3.2	Lightness and design strength	
7	1.4	Information supplied by the manufacturer	
7	2.4	PPE subject to ageing	
6	2.12	PPE bearing one or more identification or recognition marks directly or indirectly relating to health and safety	
4.2	3.1.2.1	Protection against slippage	

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

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