

Mountaineering equipment — Crampons — Safety requirements and test methods

The European Standard EN 893:1999 has the status of a
British Standard

ICS 97.220.40

National foreword

This British Standard is the English language version of EN 893:1999.

The UK participation in its preparation was entrusted by Technical Committee SW/136, Sports, playground and other recreational equipment, to Subcommittee SW/136/5, Mountaineering equipment, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 15 and a back cover.

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This British Standard, having been prepared under the direction of the Consumer Products and Services Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 November 1999

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ISBN 0 580 35156 4

Amendments issued since publication

Amd. No.	Date	Comments

EUROPEAN STANDARD

EN 893

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 1999

ICS 97.220.40

English version

Mountaineering equipment – Crampons – Safety requirements and test methods

Équipement d'alpinisme et d'escalade – Crampons –
Exigences de sécurité et méthodes d'essai

Bergsteigerausrüstung – Steigeisen – Sicherheitstechnische
Anforderungen und Prüfverfahren

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. EN 893:1999 E

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 136 "Sports, playground and other recreational 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of an identical text or by endorsement, at the latest by March 2000, and conflicting national standards shall be withdrawn at the latest by March 2000.

The text is based on UIAA-Standard S (Union Internationale des Associations d'Alpinisme), which has been prepared with international participation.

This standard is one of a series of standards for mountaineering equipment, see annex A.

This European Standard supports essential requirements of EU Directive.

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

Annexes A and ZA of this European Standard are for information only.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This standard specifies safety requirements and test methods for crampons for use in mountaineering on snow and ice including climbing mixed terrain.

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 565

Mountaineering equipment – Tape – Safety requirements and test methods

EN 10109-1

Metallic materials – Hardness test – Part 1: Rockwell test (scales A, B, C, D, E, F, G, H, K) and Rockwell superficial test (scales 15N, 30N, 45N, 15T, 30T and 45T)

ISO 9523

Touring ski-boots for adults – Interface with ski-binding

3 Definitions

For the purposes of this standard, the following definitions apply (see 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 spikes: Forward pointing spikes intended for use when climbing steep terrain.

3.4 downward spikes: Spikes other than front spikes 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.

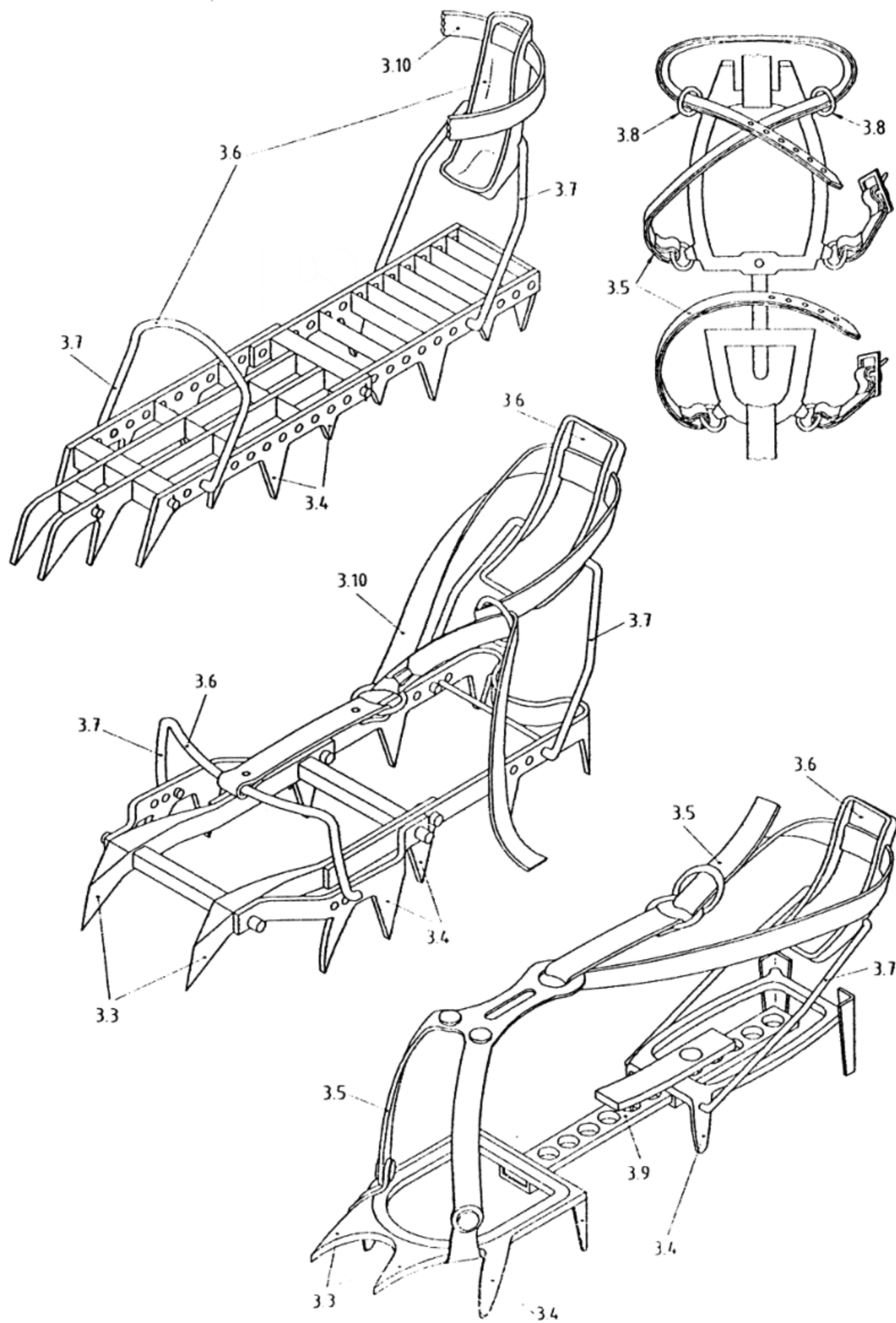


Figure 1: Parts of a crampon

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 8 spikes.

4.1.3 Each crampon shall have at least 6 downward spikes, which

a) shall be at least 20 mm long (see figure 2), and

b) when walking normally on flat and smooth ice, shall touch the surface of the ice.

Dimensions in millimetres

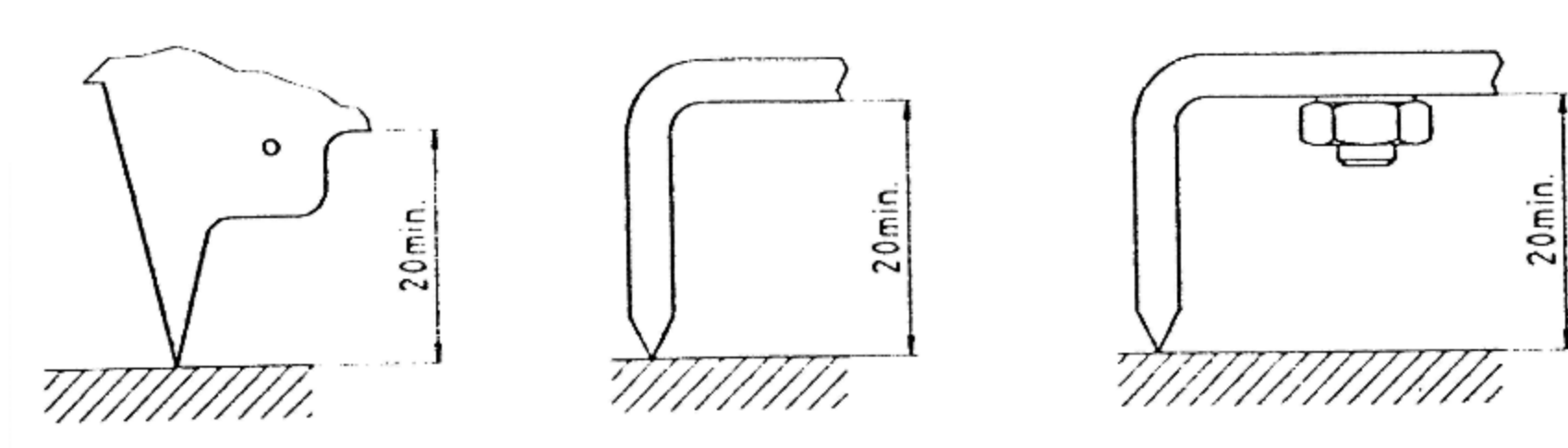


Figure 2: Length of spikes

4.1.4 All edges with which the users 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 Strength

4.2.1 Hardness

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

Testing in accordance with 5.4.1.3.

4.2.2 Bending and breaking strength of spikes

When tested in accordance with 5.4.2, 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.

Table 1: Strength of spikes

Types of spikes	Applied load 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)	1 200 ± 30	15	7	1 500
Single front spike (mono-spike)	1 600 ± 40	15	7	2 000

4.2.3 Transverse strength of bails of clip-on bindings

When tested in the operating position and in accordance with 5.4.3, the bails of clip-on bindings shall not break and shall not come out of the frame of the crampon. Permanent deformation is acceptable.

4.2.4 Strength of binding parts other than bails

When tested in accordance with 5.4.4, each part shall not break.

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

When tested in accordance with 5.4.6, attachment rings and eyes and the appropriate part of the binding shall not break.

4.2.6 Longitudinal strength of the frame

When tested in accordance with 5.4.7, 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: 2 test samples (one test sample for the tests in 5.4.2 and one test sample for the tests in 5.4.1 and 5.4.3 to 5.4.7).
- b) If the left and the right crampon are of different shapes: 2 pairs (one pair for the tests in 5.4.2 and one pair for the tests in 5.4.1 and 5.4.3 to 5.4.7).

5.2 Test conditions

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

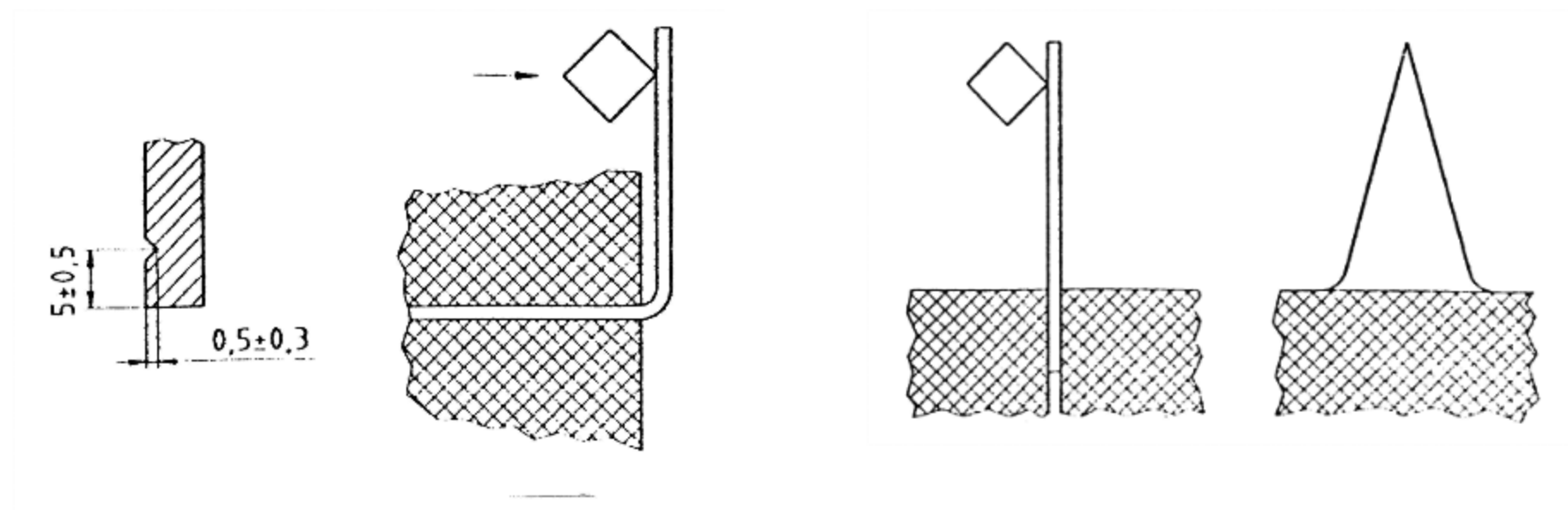
5.2.2 For any strength test involving non-metallic parts the test samples shall be conditioned for 1 h in clean water of domestic supply and then for 4 h at a temperature of (- 30 ± 5) °C. The test samples shall be conditioned in the operating position. The test shall then begin within three minutes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

5.3 Apparatus

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

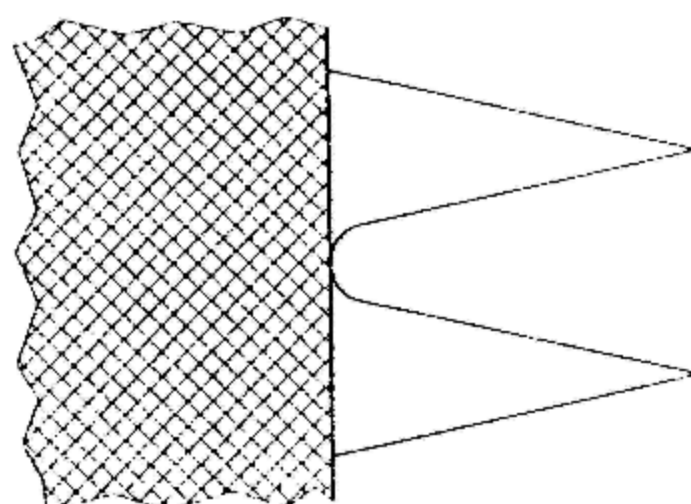
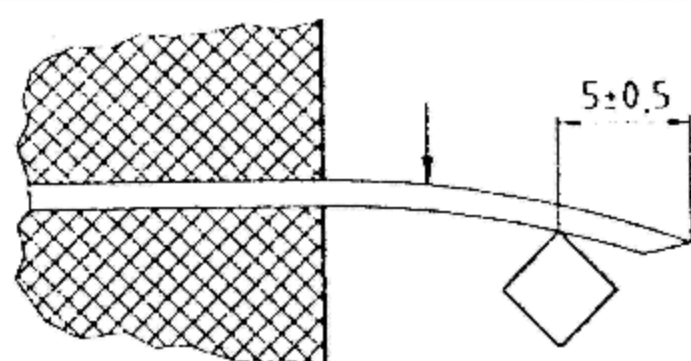
The load bar shall be prism-shaped, and the spikes shall be provided with a groove, as shown in figure 3.

Dimensions in millimetres



a) Frame with horizontal structure

b) Frame with vertical structure



c) 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 whilst the crampon is attached to a boot and, if necessary, whilst walking on flat smooth ice. The spikes which touch the surface are downward spikes.

5.4.1.3 Check the requirements of 4.2.1 in accordance with EN 10109-1.

5.4.2 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. Hold the force for (60 ± 5) s and measure the maximum deformation.

After removing the force, measure the permanent deformation.

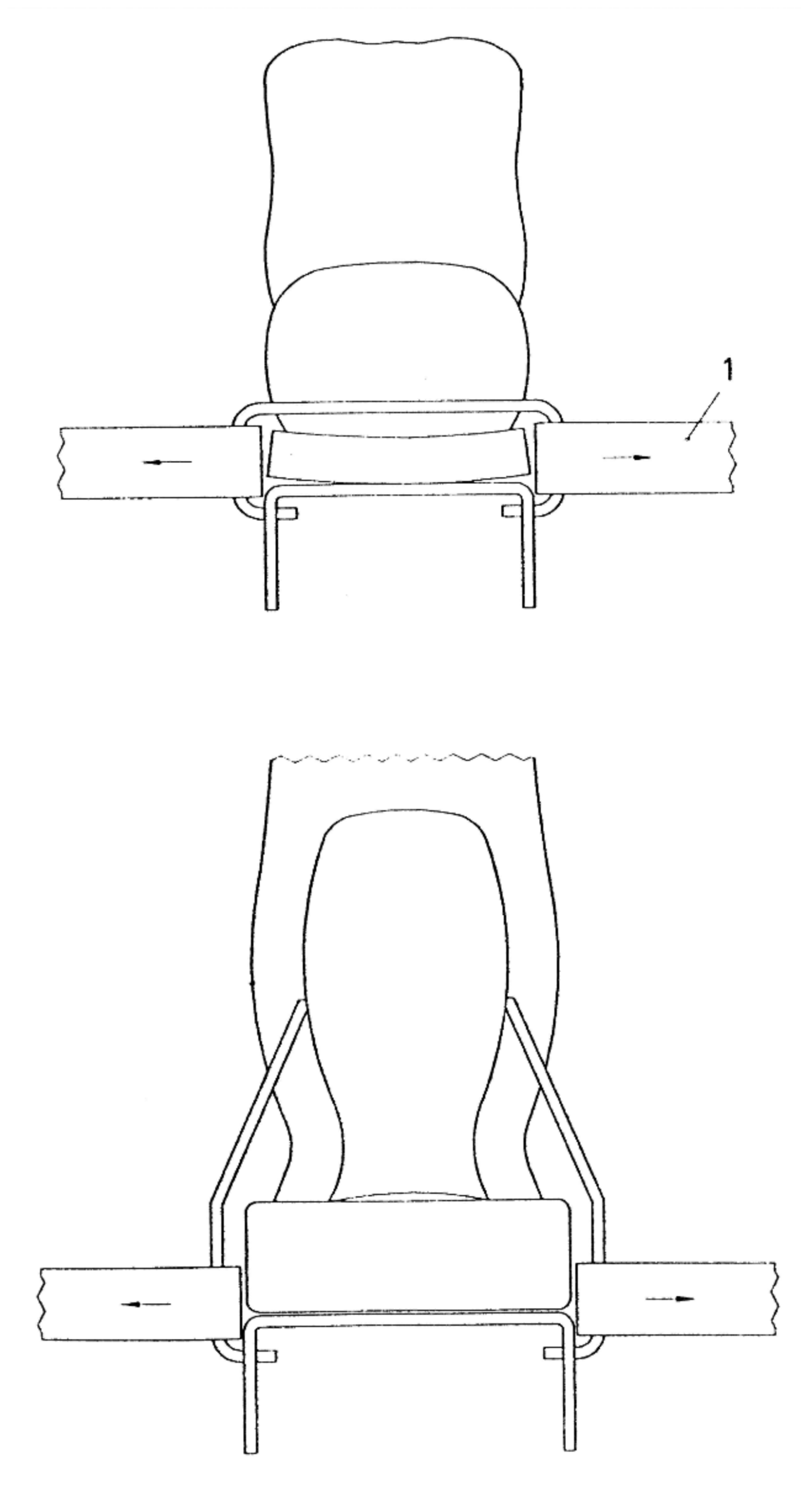
Then load the test sample to the minimum breaking strength as specified in table 1.

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

5.4.3 Transverse strength test on bails

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

Apply a force of $(1\,000 \pm 25)$ N on the bails with two tape slings in accordance with EN 565 with a width of (15 ± 2) mm as shown in figure 4, and hold the force for (60 ± 5) s.



1 Tape

Figure 4: Application of force on the bails

5.4.4 Strength test of binding parts other than bails

Mount the frame of the test sample as shown in figure 5 a). 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 as shown in figure 5 a).

Dimensions in millimetres

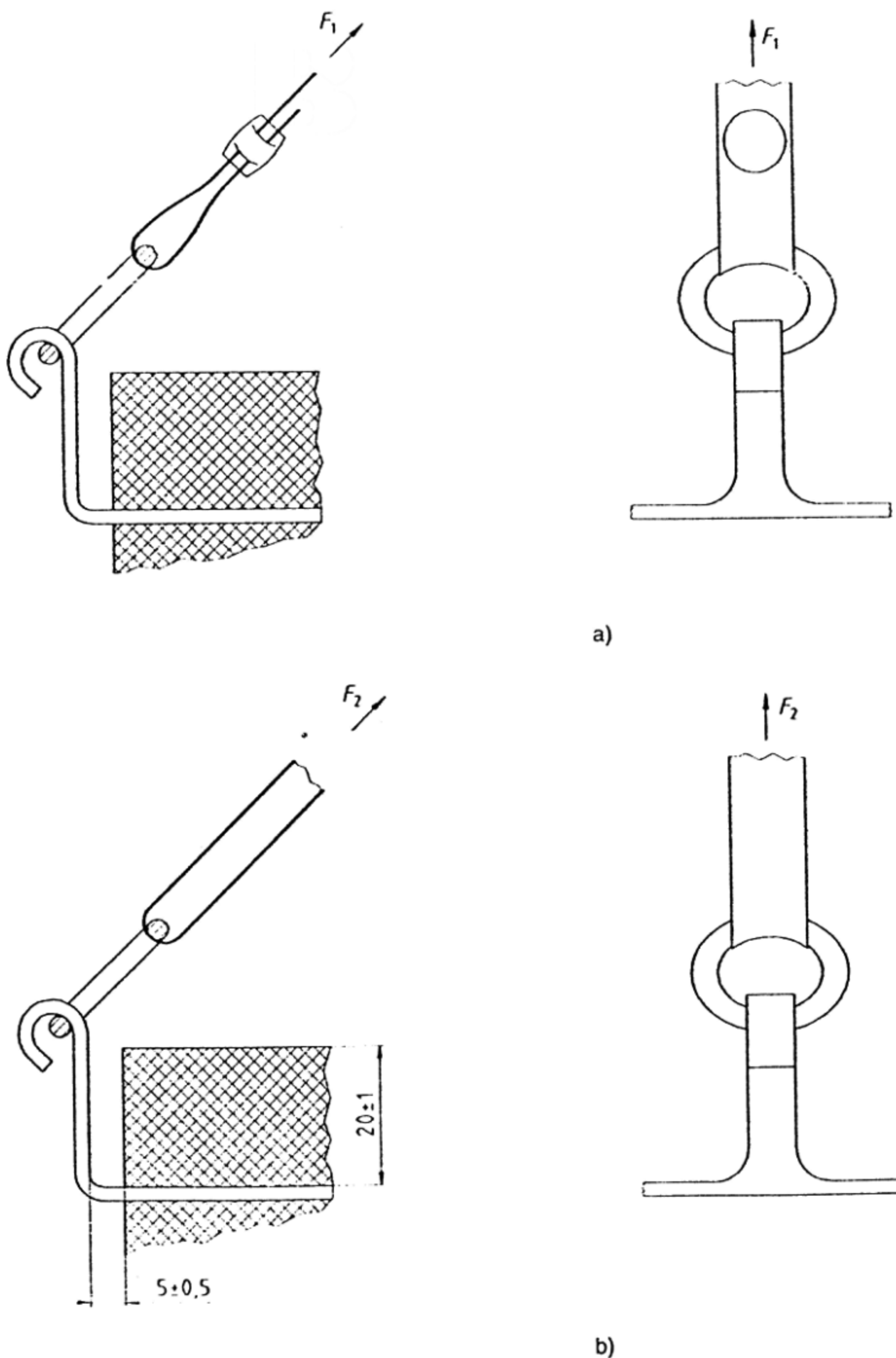


Figure 5: Mounting of the frame for strength test

Apply a force $F_1 = (1\,000 \pm 25)$ 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.

5.4.5 Strength test of binding closures

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

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

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

Mount the frame of the test sample as shown in figure 5 b). If it is not possible to mount the frame, cut out the attachment point together with the appropriate part of the frame. Mount this test sample as shown in figure 5 b).

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).

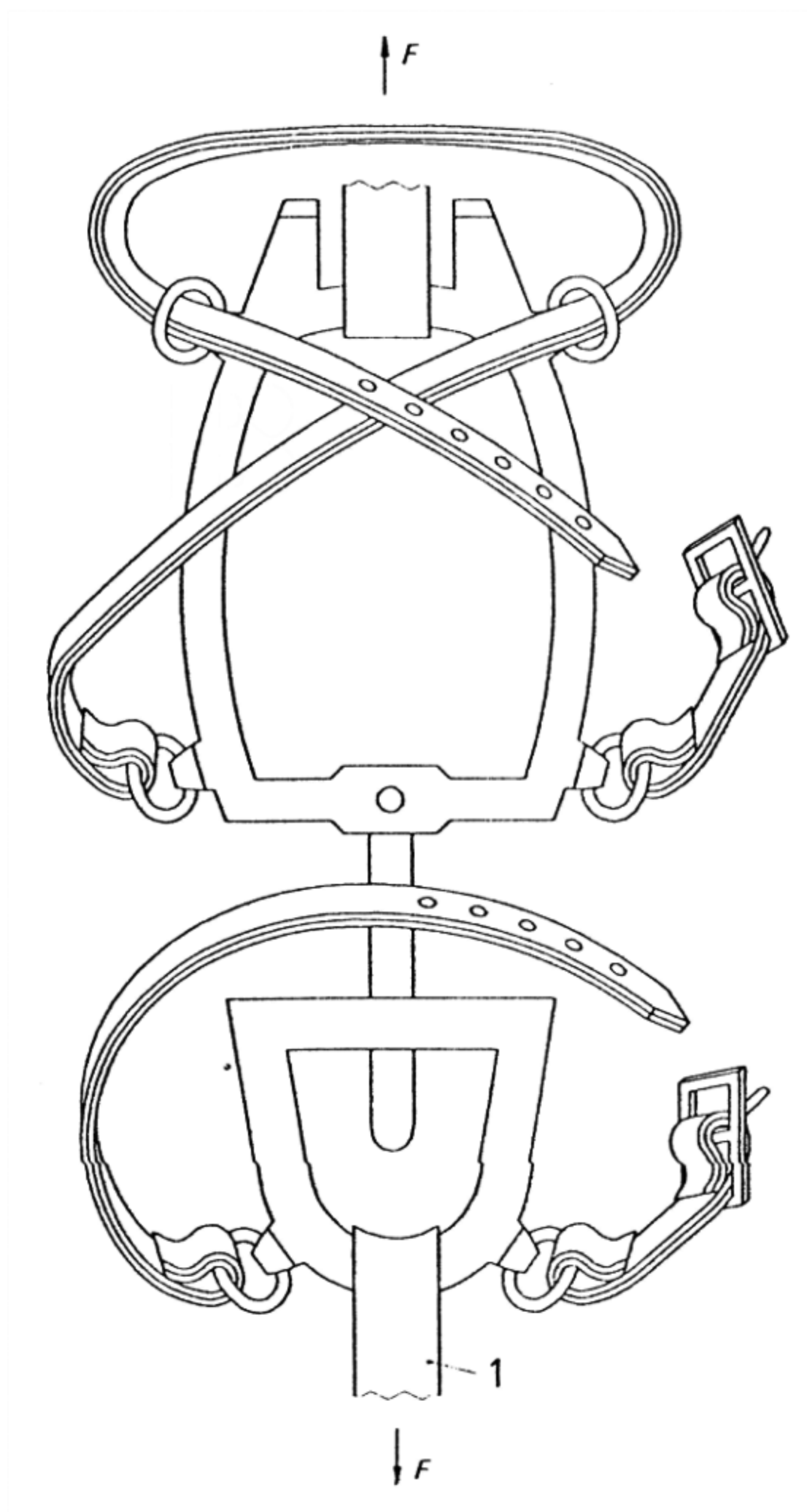
Apply a force $F_2 = (2\,000 \pm 50)$ N to the loop to load the ring or eye approximately in the direction in which it is intended to be loaded during use and hold the force for (60 ± 5) s. The rate of loading shall be (200 ± 50) mm/min.

5.4.7 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 6 in the minimum longitudinal adjustment position. Apply a force $F = (3\,000 \pm 75)$ N see 4.2.6 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.



1 Tape

Figure 6: Longitudinal strength test of the frame

6 Information supplied by the manufacturer

- a) the name or trademark of the manufacturer, importer or supplier;
- b) the number of this standard: EN 893;
- c) the use for which the product is intended;
- d) the type of boot with which the crampons are intended to be used;
- e) how to check whether the fit of the crampons to the boots is satisfactory;
- f) the meaning of any markings on the product;
- g) how to maintain and service the product;
- h) the lifespan of the product;
- i) how to store and transport the product;
- j) the effect of chemical reagents and temperature on the product;
- k) specification of appropriate spare parts.

7 Marking

Each crampon shall be marked clearly, indelibly and durably with at least the name or trademark of the manufacturer, importer or supplier.

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	prEN 12492	Mountaineering equipment – Climbers safety helmets – 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	¹⁾	Mountaineering equipment – Descenders – Safety requirements and test methods (00136079)
18	EN 12278	Mountaineering equipment – Pulleys – Safety requirements and test methods
¹⁾ in preparation		

Annex ZA (informative)

Clauses of this European Standard addressing essential requirements or other provisions of EU Directives

This European Standard supports essential requirements of EU Directive 89/686/EEC.

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

The following clauses of this standard are likely to support requirements of Directive 89/686/EEC:

EU-Directive 89/686/EEC, Annex II	Clause/Subclause of this standard
1.1.1 Ergonomics	4.1.3 b)
1.1.2.1 Highest level of protection possible	4.1, 4.2
1.2.1.2 Satisfactory surface condition of all PPE parts in contact with the user	4.1.4
1.2.1.3 Maximum permissible user impediment	4.1.3 b)
1.3.2 Lightness and design strength	4.2
1.4 Information supplied by the manufacturer	6
2.1 PPE incorporating adjustment systems	4.2.3, 4.2.4, 4.2.5, 4.2.6
2.4 PPE subject to ageing	6
2.9 PPE incorporating components adjusted or removed by the user	6
2.10 PPE for connection to another, external complementary device	6
2.12 PPE bearing one or more identification or recognition marks directly or indirectly relating to health and safety	7
3.1.2.1 Prevention of falls due to slipping	4, 6

Compliance with the clauses of this standard provides one means of conforming with the specific essential requirements of the Directive concerned and associated EFTA regulations.

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