BRITISH STANDARD

BS EN
568:2007

Mountaineering equipment — Ice anchors — Safety requirements and test methods

The European Standard EN 568:2007 has the status of a British Standard

ICS 97.220.40

National foreword

This British Standard is the UK implementation of EN 568:2007. It supersedes BS EN 568:1997 which is withdrawn.

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.

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

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 July 2007

ISBN 978 0 580 57966 0

Amendments issued since publication

Amd. No.	Date	Comments

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 568

July 2007

ICS 97.220.40

Supersedes EN 568:1997

English Version

Mountaineering equipment - Ice anchors - Safety requirements and test methods

Equipement d'alpinisme et d'escalade - Broches à glace - Exigences de sécurité et méthodes d'essai

Bergsteigerausrüstung - Verankerungsmittel im Eis - Sicherheitstechnische Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 9 June 2007.

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Ref. No. EN 568:2007: E

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Foreword

This European Standard (EN 568:2007) has been prepared by the 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of an identical text or by endorsement, at the latest by January 2008, and conflicting national standards shall be withdrawn at the latest by January 2008.

This document supersedes EN 568:1997.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to support Essential Requirements of EU Directive 89/686/EEC.

For relationship with EU Directives, see informative Annex ZA, which is an integral part of this European Standard.

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Introduction

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

This 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 ice anchors, i.e. ice screws and ice pitons for use in mountaineering including climbing.

2 Terms and definitions

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

2.1
ice anchor
general term for ice screws and ice pitons

2.2
ice screw
anchor which is screwed into the ice and is screwed out again after use

2.3
ice piton
anchor which is hammered into the ice and is removed again after use

2.4
placement length
l
length of the anchor from its end to the part of the eye/connector hole intended to be in contact with the ice after it has been screwed or hammered in (see Figure 1)

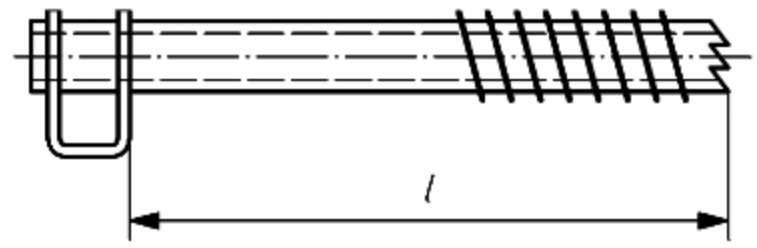


Figure 1 — Placement length, l

2.5
initial torque
maximum torque necessary for achieving the first revolution of the ice screw

3 Safety requirements

3.1 Design

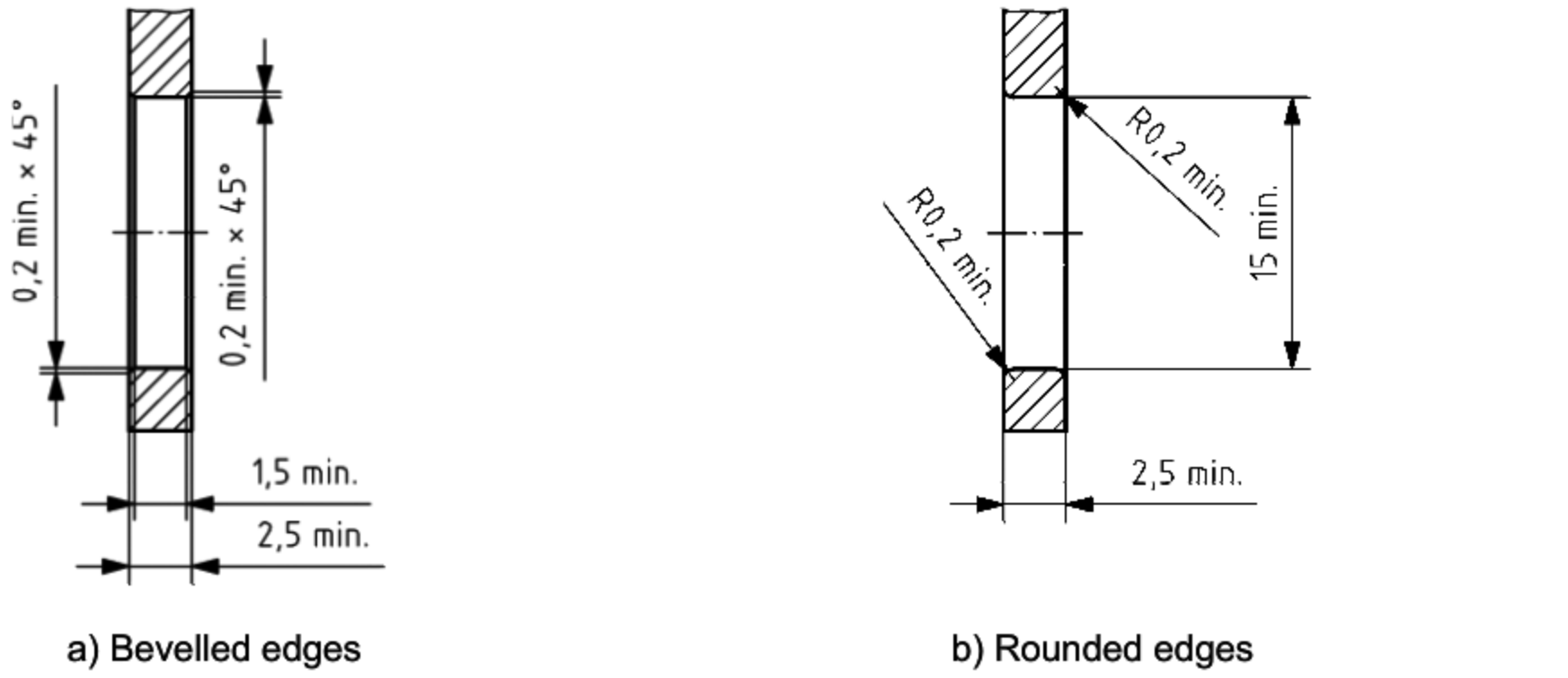
3.1.1 Ice screws shall consist of a cylindrical or semi-cylindrical hollow body with thread. At the screw head, there is an eye into which a connector can be clipped.

Ice pitons shall consist of a cylindrical or semi-cylindrical hollow body and have an eye into which a connector can be clipped.

3.1.2 The head and the eye shall be free from burr and sharp edges.

The internal edges of the eye shall be rounded with a radius larger than 0,2 mm or larger than 0,2 mm × 45°. See a) in Figure 2.

Dimensions in millimetres



a) Bevelled edges

b) Rounded edges

Figure 2 — Attachment point eye dimensions

3.1.3 When tested according to 4.1, the eye shall have an internal diameter of at least 15 mm. See b) in Figure 2.

3.2 Resistance to hammering of ice pitons

When tested in accordance with 4.2.4.1, ice pitons shall not show any deformation likely to affect safety e.g. cracks, or separation of components. The impact area of the head shall remain sufficiently intact so as to allow further hammering.

NOTE Mushrooming, as occurs with chisels, is not considered detrimental.

3.3 Screwability of the ice screws

When tested in accordance with 4.2.4.2 after a maximum of 10 full rotations of the ice screw the penetration of the following rotation shall be equal to the pitch of the thread of the ice screw.

3.4 Resistance to fracture and holding force

3.4.1 When tested in accordance with 4.2.4.3.1, anchors shall withstand a force of at least 10 kN in the radial direction, without being pulled out of the ice or breaking.

NOTE Permanent deformation during the test is permitted.

3.4.2 When tested in the axial direction in accordance with 4.2.4.3.2 ice anchors shall withstand a force of at least 5 kN without the hanger breaking or becoming detached.

4 Test methods

4.1 Examination of design

Test the requirements specified in 3.1 by tactile and visual examination and measurement.

4.2 Determination of resistance of hammering of ice pitons, screwability of the ice screws and resistance to fracture and holding force of ice anchors

4.2.1 Test samples

Carry out the test on four ice screws or four ice pitons according to Table 1.

Table 1 — Number of test samples

Type of ice anchor	Number of samples for testing according to			
	4.2.4.1	4.2.4.2	4.2.4.3.1	4.2.4.3.2
Ice piton	1 (largest length)[b]	0	3 (shortest length)[b]	0
Ice screw	0	1[a]	3 (shortest length)[b]	1

[a] After being tested according to 4.2.4.2, the ice screw is used for the test according to 4.2.4.3.2.

[b] If anchors of different length, but otherwise same design, are available.

4.2.2 Apparatus

4.2.2.1 Ice blocks

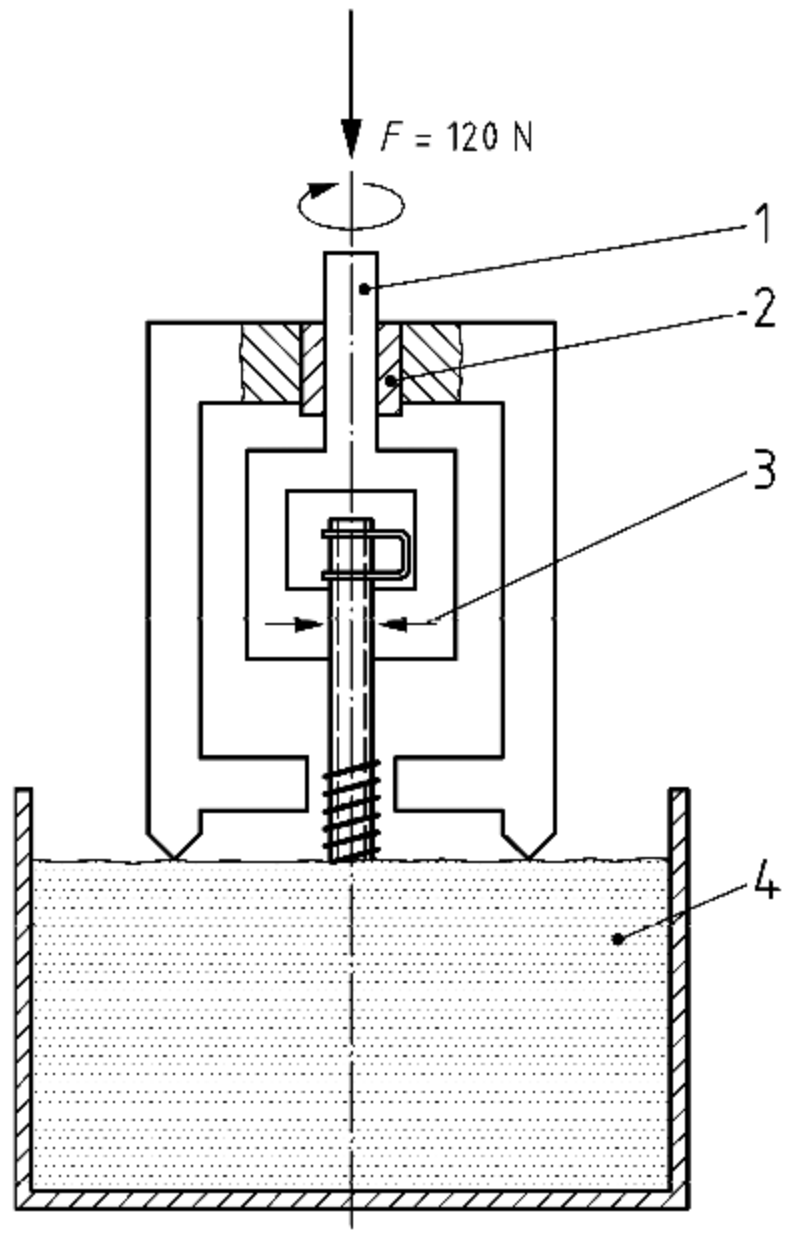
4.2.2.2 Steel ice container of the following dimensions:

minimum length	350 mm	internal dimensions
minimum width	220 mm	
minimum depth	330 mm	
minimum wall thickness	6 mm	

The base of the ice container shall be rigid so that it does not influence the test results.

4.2.2.3 A vertically guided falling body of mass (10 ± 0,002) kg and an impact area of hardness, HV (40) = (800 ± 10) %.

4.2.2.4 A device as shown in Figure 3 to hold a shaft at right angles to the ice surface, the lower end of the shaft having a clamping mechanism for an ice screw, which holds the screw concentrically. A lever is fitted to the top of the shaft for screwing in the ice screw.



Key
1 Rotary shaft
2 Guide
3 Radial clamp
4 Ice

Figure 3 — Device for testing the screwability of ice screws

4.2.3 Preparation of ice blocks

4.2.3.1 Type 1: Fill the ice container with water and store it at (– 10 ± 1) °C for at least 20 h. Smooth off any uneven surface of the ice.

4.2.3.2 Type 2: Fill the ice container alternately 50 mm deep with layers of ice grains with a maximum diameter of 10 mm and 250 ml of cold potable water and store it at (– 8 ± 2) °C, for at least 20 h. When the ice container is full, load the ice for (5 ± 0,5) min with a steel plate of mass (100 ± 2) kg, the clearance between the steel plate and the side walls of the container not exceeding 10 mm. The ice block shall be used immediately for testing according to 4.2.4.3.1.

4.2.4 Procedure

4.2.4.1 Determination of resistance of ice pitons when hammered in

Carry out the test at (– 10 ± 3)° C. Drive the ice piton into an ice block of type 1, using a vertically guided falling body. Ensure that the ice surface is horizontal and that the ice piton is within 1° of vertical before the first drop.

For the first impact, fix the drop height at (375 ± 5) mm above the impact surface of the ice piton.

For each successive impact, increase the drop height by the amount the piton has penetrated the ice.

Hammer in the ice piton until the lower edge of the eye is in contact with the surface of the ice.

Repeat the procedure, inserting and pulling out the piton slowly from the ice 100 times, without removing the ice core by hand between the individual placements.

The piton may be placed in the same ice block several times, providing the placements are at least 75 mm apart.

4.2.4.2 Determination of screwability of ice screws

Fix the ice screw concentrically to the shaft of the holding device by means of the clamp. Store the ice screw and test device at (– 10 ± 1) °C for a minimum of 4 h.

Place the ice screw on the surface of a type 1 ice block and adjust the holding device to keep the ice screw at right angle to the ice surface.

Screw in the ice screw with a continuous contact force of (120 ± 3) N.

After a maximum of 10 turns check that the requirements specified in 3.3 are met.

Complete the test within 5 min of removal from the conditioning atmosphere.

4.2.4.3 Determination of resistance to fracture and holding force of ice anchors

4.2.4.3.1 Testing in radial direction

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

Insert the ice anchor as specified in the information supplied by the manufacturer, in the middle of the surface of a type 2 ice container prepared as described in 4.2.3.2 at an angle of (90 ± 5) °C. Smooth the ice surface around the anchor and store the ice block and test sample at (– 18 ± 1) °C for 20 h.

Apply a load by means of a (10 ± 0,1) mm steel bar placed in the eye of the hanger of the ice anchor, as specified in the information supplied by the manufacturer, parallel to the ice surface (see Figure 4), at a rate of (100 ± 10) mm/s until the ice anchor fails or is pulled out of the ice block. Complete the test within 3 min of removal from the conditioning atmosphere.

All test samples shall meet the requirement.

Dimensions in millimetres

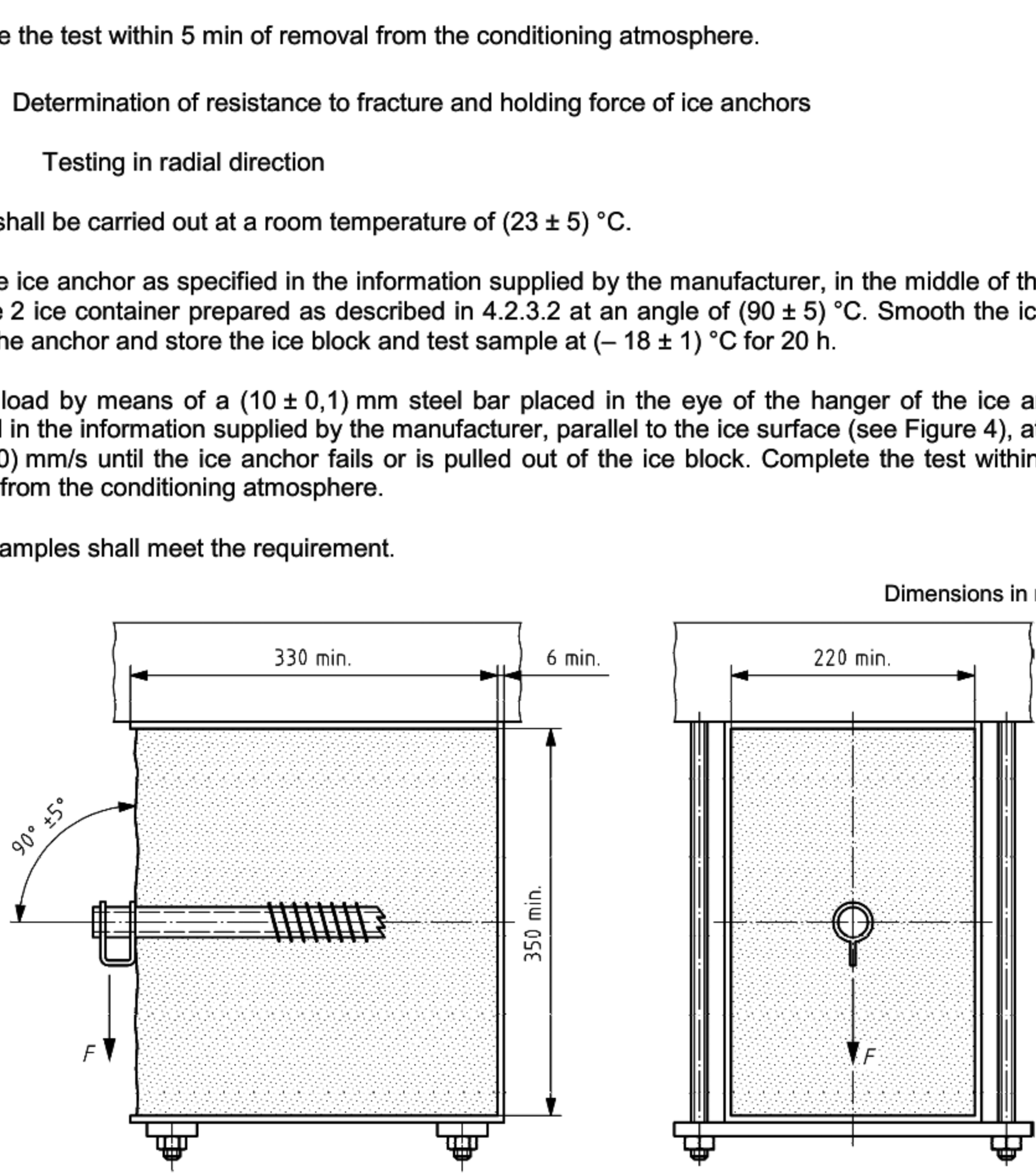


Figure 4 — Test for the holding force

4.2.4.3.2 Testing in axial direction

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

Clamp the test sample in shaped metal jaws as shown in the left side of Figure 5. The edge of the jaws shall be (25 ± 1) mm from the part of the ice anchor hanger that touches the ice when fully inserted. Ensure that the body of the test sample is held rigidly without deformation that could affect the attachment of the hanger to the body of the test sample. If necessary an internal support may be used but this support shall not extend to within 25 mm of the outer edge of the jaw. Where the edge of the jaw comes into contact with the test sample, the edge shall have a radius of (5 ± 0,5) mm. If required the jaw and test sample may be drilled and pinned to restrain the body of the test sample.

Connect the eye of the hanger to the jaw of the test machine using a metal link with a universal joint or a flexible metal link of length (200 ± 10) mm, as shown in the right side of Figure 5. Apply a force to the test sample using a test speed of 20 mm/min to 50 mm/min. Increase the force to 5 kN.

Dimensions in millimetres

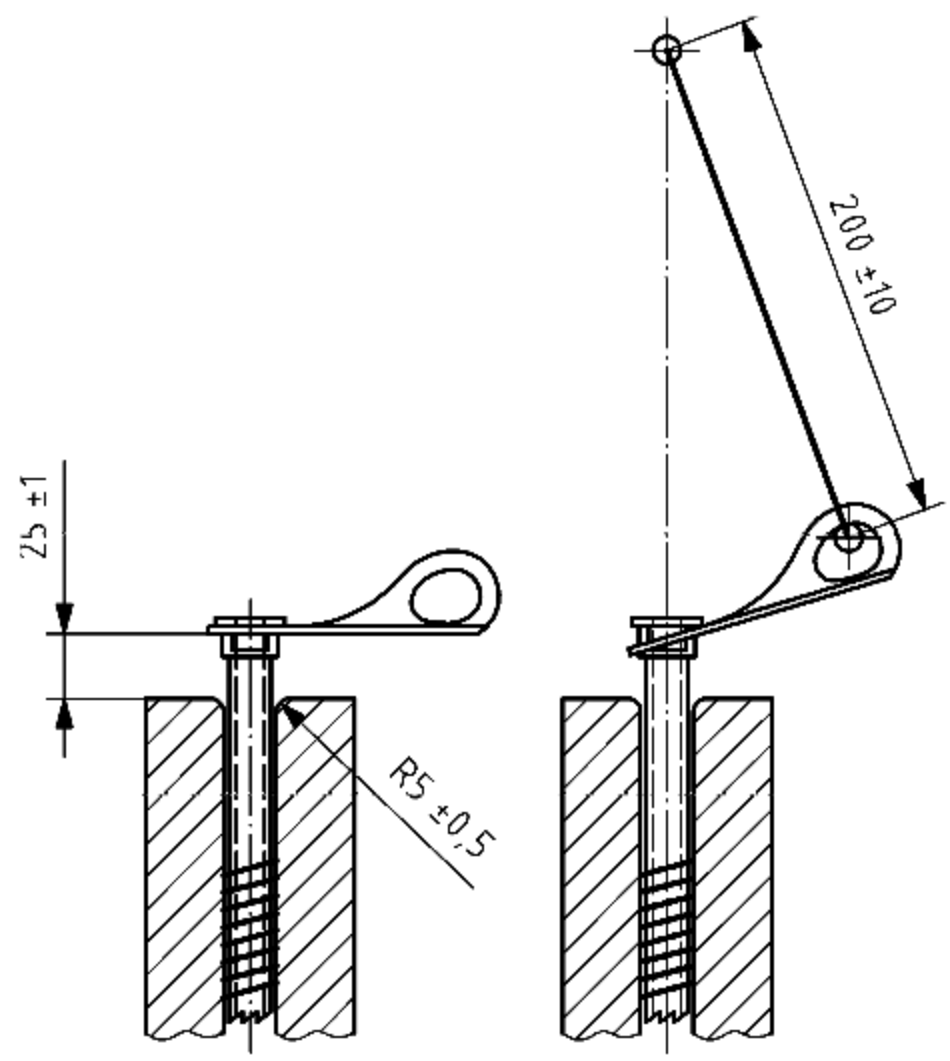


Figure 5 — Testing in axial direction

5 Marking

Ice anchors shall be marked clearly, indelibly and durably with at least the following:

a) name of the manufacturer or their representative in the European Community;

b) model identifier (if several models are marketed by the manufacturer);

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

6 Information supplied by the manufacturer

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

a) name and address of the manufacturer or their authorised representative;

b) reference of this European Standard: EN 568;

c) meaning of any markings on the product;

d) use of the product;

e) how to insert the ice anchor;

f) how to extract the ice anchor;

g) how to check the ice anchor to ensure safe further use;

h) how to choose other components for use in the system;

i) how to maintain and service the product;

j) lifespan of the product;

k) effects of chemical reagents and temperature on the product;

l) ice pitons shall not be placed in such a position that they will be loaded in an axial direction (only for ice pitons).

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	prEN 15151	Mountaineering equipment — Descenders — Safety requirements and test methods
18	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 Communities 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)/sub-clause(s) of this EN	Essential Requirements (ERs) of Directive 89/686/EEC		Qualifying remarks/ Notes
3.1	1.2.1	Absence of risks and other "inherent" nuisance factors	
3.1.2	1.2.1.2	Satisfactory surface condition of all PPE parts in contact with the user	
3.2, 3.3 and 3.4	1.3.2	Lightness and design strength	
6	1.4	Information supplied by the manufacturer	

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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