BS EN 568:2015

BSI Standards Publication

Mountaineering equipment — Ice anchors — Safety requirements and test methods

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National foreword

This British Standard is the UK implementation of EN 568:2015. It supersedes BS EN 568:2007 which is withdrawn.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 - Ice anchors - Safety requirements and test methods

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Bergsteigerausrüstung - Verankerungsmittel im Eis - Sicherheitstechnische Anforderungen und Prüfverfahren

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

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European foreword

This document (EN 568:2015) 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of an identical text or by endorsement, at the latest by May 2016, and conflicting national standards shall be withdrawn at the latest by May 2016.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 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.

This document supersedes EN 568:2007.

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

a) now included: the option of using cellular concrete in holding strength test instead of ice type 2;

b) clarification of figures.

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 Q "ice anchors" (Union Internationale des Associations d'Alpinisme), 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 ice anchors, i.e. ice screws and ice pitons for use in mountaineering including climbing.

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 566, *Mountaineering equipment — Slings — Safety requirements and test methods*

3 Terms and definitions

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

3.1
ice anchor
general term for ice screws and ice pitons

3.2
ice screw
anchor which is screwed into the ice and is screwed out again after use

3.3
ice piton
anchor which is hammered into the ice and is removed again after use

3.4
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

Note 1 to entry: See Figure 1.

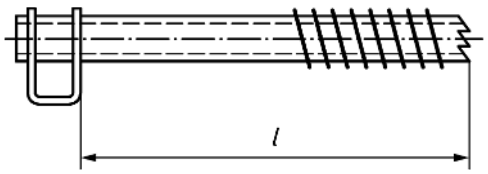


Figure 1 — Placement length, *l*

4 Safety requirements

4.1 Design

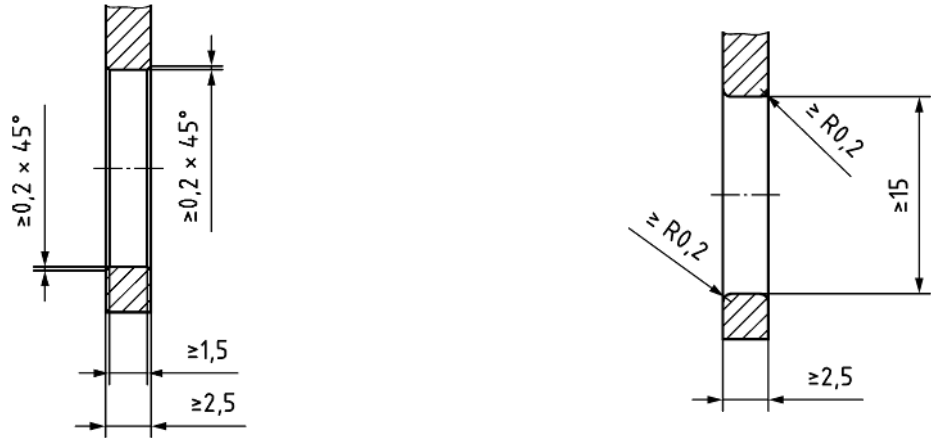
4.1.1 Ice screws shall consist of a cylindrical or semi-cylindrical hollow body with thread. At the screw head, there is an eye into which a connector can be clipped.

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

4.1.2 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 have a chamfer larger than 0,2 mm × 45°. See a) in Figure 2.

Dimensions in millimetres



a) **b)**

Figure 2 — Attachment point eye dimensions

4.1.3 When tested according to 5.1, the eye shall have an internal diameter of at least 15 mm. See b) in Figure 2.

4.2 Resistance to hammering of ice pitons

When tested in accordance with 5.2.4.1, 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 Deformation due to hammering, as occurs with chisels, is not considered detrimental.

If the ice anchor has a sling for attachment, which is removable without tools, the sling shall conform to EN 566.

4.3 Screwability of the ice screws

When tested in accordance with 5.2.4.2 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.

4.4 Holding strength

4.4.1 Holding strength in the radial direction

When tested in accordance with 5.2.4.3.1, anchors shall withstand a force of at least 10 kN in the radial direction, without being pulled out of the ice or breaking.

Permanent deformation during the test is permitted.

4.4.2 Holding strength in the axial direction

When tested in the axial direction in accordance with 5.2.4.3.2, ice anchors shall withstand a force of at least 5 kN without the hanger breaking or becoming detached.

All test samples shall meet the requirement.

5 Test methods

5.1 Examination of design

Test the requirements specified in 4.1 by tactile and visual examination and measurement.

5.2 Determination of screwability of the ice screws and resistance to fracture and holding force of ice anchors

5.2.1 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			
	5.2.4.1	5.2.4.2	5.2.4.3.1	5.2.4.3.2
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 5.2.4.2, the ice screw is used for the test according to 5.2.4.3.2.

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

5.2.2 Apparatus

5.2.2.1 Ice blocks.

5.2.2.2 Steel ice container of the following dimensions:

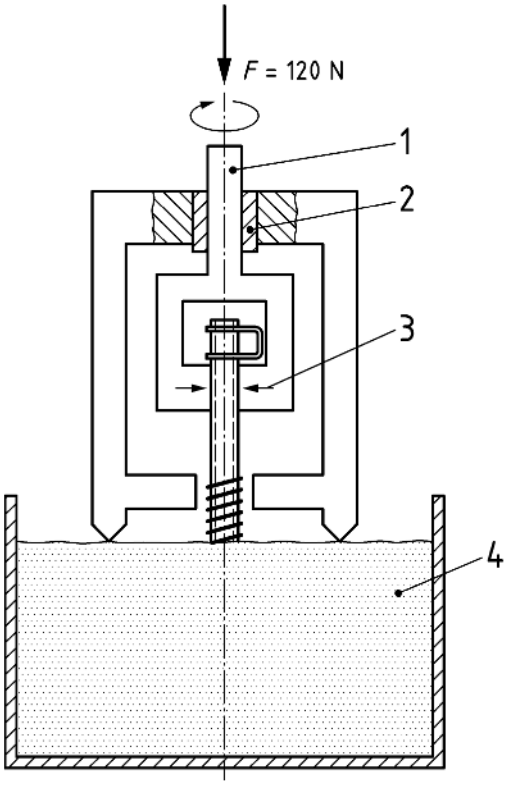
minimum length 350 mm
minimum width 220 mm } internal dimensions
minimum depth 330 mm

minimum wall thickness 6 mm

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

5.2.2.3 A vertically guided falling body of mass (10 ± 0,02) kg with a flat impact area of 30 mm (± 10) mm diameter of hardness, HV (40) = (800 ± 10) %.

5.2.2.4 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

5.2.3 Preparation of the test block

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

5.2.3.2 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 5.2.4.3.1.

The block of ice type 2 can be alternatively replaced by a block of cellular concrete with following characteristics:

— Material: cellular concrete

— Density: 500 kg/m^3 (± 50) kg/m^3

— Compressive strength: 4 MPa ± 0,25 MPa

— Minimum dimensions: Width: 200 mm, Height: 400 mm, Depth: 250 mm

— High, low, left and right faces have to be held with metal plates to avoid cracks

— The temperature treatment for the test has to be analogue to ice type 2

5.2.4 Procedure

5.2.4.1 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 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 from each other and from the edges.

5.2.4.2 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 4.3 are met.

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

5.2.4.3 Determination of holding strength of ice anchors

5.2.4.3.1 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 5.2.3.2 at an angle of (90 ± 5)°. If the ice block is used 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 or cellular concrete block. Complete the test within 3 min of removal from the conditioning atmosphere.

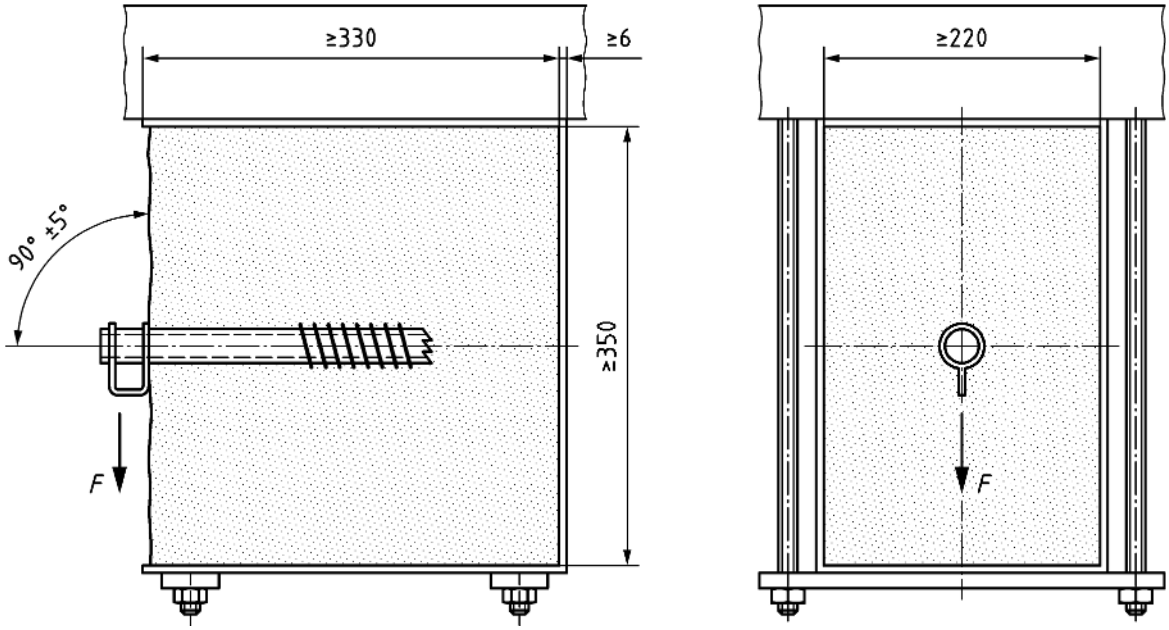


Figure 4 — Test for the holding force

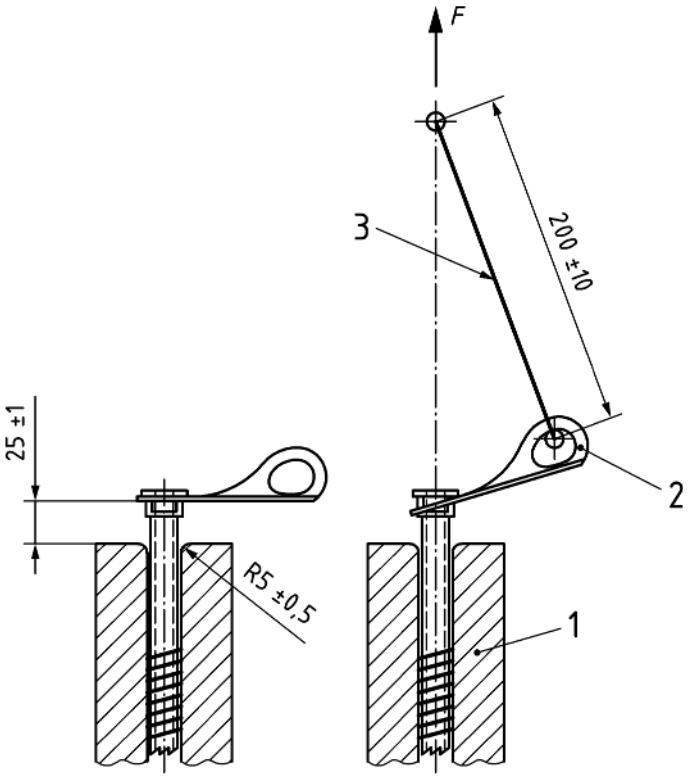
5.2.4.3.2 Testing in axial direction

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



Key:

1 jaw
2 hanger
3 metal link

Figure 5 — Testing in axial direction

6 Marking

The body or the eyes of the ice anchors shall be marked clearly, indelibly and durably with at least the following:

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

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

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

c) graphical symbol (see Figure 6), which advises the user to read the information given by the manufacturer:

Figure 6 — Graphical symbol (according to ISO 7000, Symbol No. 1641)

d) If the ice anchor is fitted with a non-metallic load bearing element the year of manufacture shall be present on the element.

7 Information supplied by the manufacturer

The information supplied by the manufacturer shall contain at least the following items:

a) name and address of the manufacturer or its authorized representative [1];

b) reference of this European Standard, i.e. EN 568;

c) the meaning of any markings on the product;

d) the use of the product:

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

   2) how to insert and extract the ice anchor;

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

   4) where and how to attach to the ice anchor.

e) how to maintain and service the product;

f) the lifespan of the product and factors affecting the lifespan;

g) advice that the product shall 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 persons;

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

i) conditions of storage;

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

k) placement length (l).

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)/sub-clause(s) of this EN	Essential Requirements (ERs) of Directive 89/686/EEC	Qualifying remarks/ Notes
4.1.2	1.2.1.2 Satisfactory surface condition of all PPE parts in contact with the user	
4.2, 4.3 and 4.4	1.3.2 Lightness and design strength	
4.4	3.1.2.2 Prevention against falling from heights	Ice anchors according to this standard are only one part of the safety chain and should be used in conjunction with other compatible equipment.
Clause 7	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.

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

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