



SLOVENSKI STANDARD
SIST EN 959:1998
01-september-1998

Gorniška oprema – Sidra za skalo – Varnostne zahteve in preskusne metode

Mountaineering equipment - Rock anchors - Safety requirements and test methods

Bergsteigerausrüstung - Bohrhaken - Sicherheitstechnische Anforderungen und Prüfverfahren

Equipement d'alpinisme et d'escalade - Amarrages pour le rocher - Exigences de sécurité et méthodes d'essai

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Ta slovenski standard je istoveten z: EN 959:1996

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EUROPEAN STANDARD

EN 959

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 1996

ICS 97.220.40

Descriptors: mountaineering, mooring devices, accident prevention, safety, specifications, equipment specifications, materials, mechanical strength, instructions, marking

English version

Mountaineering equipment - Rock anchors - Safety requirements and test methods

Équipement d'alpinisme et d'escalade -
Amarrages pour le rocher - Exigences de
sécurité et méthodes d'essai

Bergsteigerausrüstung - Bohrhaken -
Sicherheitstechnische Anforderungen und
Prüfverfahren

This European Standard was approved by CEN on 1996-06-20. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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 April 1997, and conflicting national standards shall be withdrawn at the latest by April 1997.

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

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

This European Standard 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(s), see informative Annex ZA, which is an integral part of this standard.

Annexes A, B and ZA of this European Standard are informative.

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

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1 Scope

This standard specifies safety requirements and test methods for rock anchors for use in mountaineering including climbing.

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 10088-3

Stainless steels – Part 3: Technical delivery conditions for semi-finished products, bars, rods and sections for general purposes

ISO 1920

Concrete tests – Dimensions, tolerances and applicability of test specimens

ISO TR 9492

Bases for design of structures – Temperature climatic actions

3 Definition

For the purposes of this standard, the following definition applies:

rock anchor: Anchoring equipment with an eye in which a connector can be attached for belaying purposes by inserting into a drill hole in rock and kept in place by gluing or expansion forces.

4 Safety requirements

4.1 Materials

Rock anchors shall be manufactured from corrosion-resistant material with properties at least equivalent to material number 1.4307 in accordance with EN 10088-3 or, what concerns corrosion resistancy, equivalent material, except number 1.4305.

All components of the rock anchor shall consist of materials between which no electrolytic corrosion can occur.

NOTE: Examples of suitable types of materials see table B.1.

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4.2 Design

4.2.1 The internal surface of the eye shall have – in the cross-section – a width of at least 3 mm.

4.2.2 All corners that will be more than 12 mm from the rock surface shall be rounded to a radius R of at least 10 mm (see figure 1).

Dimensions in millimetres

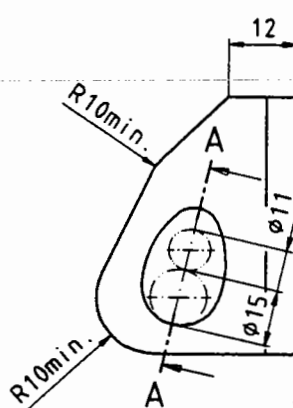


Figure 1: Clear width and external and internal shape of the eye (A-A see figure 2)

4.2.3 All edges that can be handled after placement of the rock anchor in the rock shall be rounded to a radius R of at least 0,2 mm or bevelled to at least 0,2 mm \times 45° (see figure 2). This applies to inner and outer edges.

Dimensions in millimetres

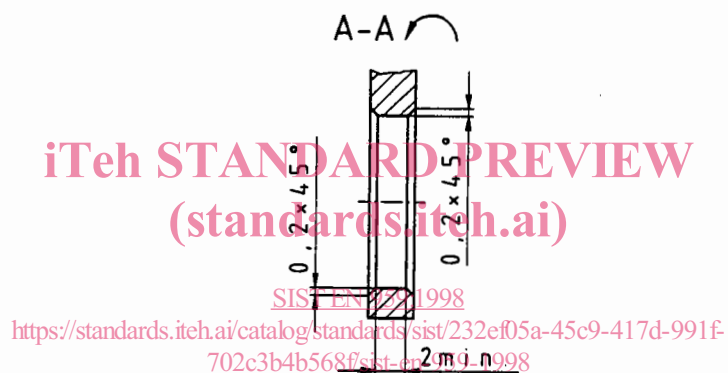


Figure 2: Internal edges of the eye (A-A in figure 1)

4.2.4 After insertion of the rock anchor in the concrete block, the eye shall be wide enough to accommodate two pins, one of diameter $(15 \pm 0,1)$ mm for the lower part and one of diameter $(11 \pm 0,1)$ mm for the upper part (see figure 1).

4.2.5 In case of expansion-type rock anchors the expansion shall not be dependent on contact with the bottom of the drilled hole.

4.3 Loadbearing capacity

4.3.1 Axial loadbearing capacity

When tested in accordance with 5.2.2.2, the rock anchor shall withstand an axial load of 15 kN, without being pulled out of the concrete block or breaking.

Permanent deformation is permissible.

4.3.2 Radial loadbearing capacity

When tested in accordance with 5.2.2.3, the rock anchor shall withstand a radial load of 25 kN, without being pulled out of the concrete block or breaking.

Permanent deformation is permissible.

5 Test methods

5.1 Apparatus

5.1.1 Tensile testing machine

5.1.2 **Concrete block** with minimum dimensions of 200 mm × 200 mm × 200 mm and compressive strength of (50 ± 10) N/mm² as specified in ISO TR 9492.

The maximum grain size of the aggregate shall not exceed 16 mm.

The compressive strength of the concrete block shall be verified as specified in ISO TR 9492 on three test samples produced as specified in ISO 1920.

NOTE: All concrete testing centres produce these types of concrete blocks to order.

5.2 Procedure

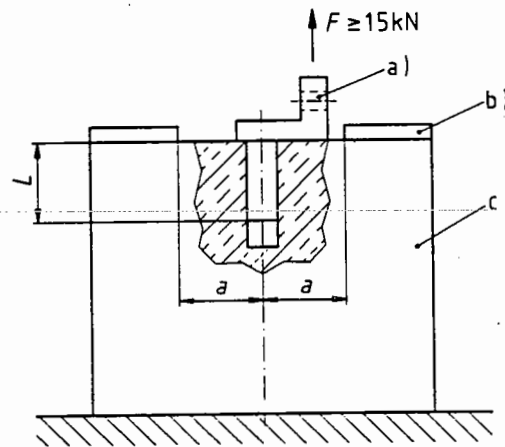
5.2.1 Examination of design

Ensure by visual examination and check of dimensions that the specifications in accordance with 4.2.1 to 4.2.5 are met.

5.2.2 Determination of loadbearing capacity

5.2.2.1 Insert the rock anchor into a concrete block in accordance with the manufacturer's instructions.

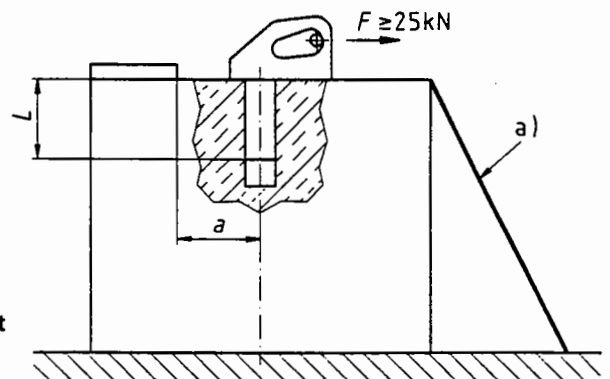
5.2.2.2 Attach the concrete block to the tensile testing machine using clamps at a distance a = placement depth $L + 5\%$ of the axis of the rock anchor (see figure 3). Apply an axial load to the rock anchor using a pin with a diameter of $(10 \pm 0,1)$ mm in the eye at a rate of (35 ± 15) mm/min until failure or until it is pulled out of the concrete block.



- a) eye (clip) of the rock anchor
- b) clamp
- c) concrete block

Figure 3: Axial test

5.2.2.3 Attach the concrete block to the tensile testing machine using clamps at a distance a = placement depth $L + 5\%$ of the axis of the rock anchor (see figure 4). Apply a radial load to the rock anchor using a pin with a diameter of $(10 \pm 0,1)$ mm in the eye at a rate of (35 ± 15) mm/min until failure or until it is pulled out of the concrete block.



- a) support over total width

Figure 4: Radial test

6 Information to be supplied

- a) the name or trademark of the manufacturer, importer or supplier;
- b) the number of this European Standard, EN 959;
- c) the model name (if more than one model is available);
- d) the size (if more than one size is available);
- e) the meaning of any marks on the product;
- f) the components comprising the complete rock anchor;
- g) on the use of the rock anchor;
- h) how to insert the rock anchor;

- i) on how to choose other components for use in the system;
- j) a warning that the rock anchor can have a shorter service life when affected by sea water.

7 Marking

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

- a) the name or trademark of the manufacturer, importer or supplier;
- b) the model name (if several models are marketed by the manufacturer).

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