



SLOVENSKI STANDARD

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Nadomešča:
SIST EN 959:2008

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 rocher - Exigences de sécurité et méthodes d'essai

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Ta slovenski standard je istoveten z: EN 959:2018

ICS:

97.220.40	Oprema za športe na prostem in vodne športe	Outdoor and water sports equipment
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EUROPEAN STANDARD

EN 959

NORME EUROPÉENNE

EUROPÄISCHE NORM

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ICS 97.220.40

Supersedes EN 959:2007

English Version

Mountaineering equipment - Rock anchors - Safety requirements and test methods

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

Bergsteigerausrüstung - Bohrhaken - Sicherheitstechnische Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 29 July 2018.

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This European Standard exists 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 959:2018) 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 June 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 959:2007.

Changes made in comparison with EN 959:2007:

- a) definition for “eye” added;
- b) definition for “connector” added;
- c) classes for rock anchors added in 4.1 “materials” and amendments of 4.1;
- d) amendment of 4.2 “Design” and change of the overall thickness of the border of the eye;
- e) amendment of 5.3.2 “Determination of load-bearing capacity”;
- f) amendment of Clause 6 “Marking”; [SIST EN 959:2019](https://standards.iteh.ai/catalog/standards/sist/a88bdb24-08d6-4b93-a8a9-9f7f5de24548/sist-en-959-2019)
- g) amendment of Clause 7 “Information supplied by the manufacturer”;
- h) inclusion of informative Annex C “Stress corrosion cracking of steel anchors”;
- i) Annex C “General guidance for placing rock anchors” changed to Annex D;
- j) editorial amendments;
- k) introduction of a new class of rock anchor designed especially for the top of a route for lowering/rappelling.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 959:2018 (E)

Introduction

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

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

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1 Scope

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

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 1920-3, *Testing of concrete - Part 3: Making and curing test specimens*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

rock anchor

anchoring device intended for repeated use after installation, that is inserted into a drilled hole in the rock and held in place by gluing, or expansion forces, or positive locking, and with an attachment point for a connector

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3.2

connector

openable device, which enables a mountaineer to link himself directly or indirectly to an anchor or to link parts of the equipment together

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[SOURCE: EN 12275:2013, definition 3.1]

3.3

eye

attachment point for a connector

3.4

body of the rock anchor

part of the rock anchor that will be installed in the rock

3.5

hanger

attachment point capable of being separated from the body of a rock anchor

3.6

installed length

distance from the rock surface to the furthest point of the body in mechanical contact with the rock or bonded to the rock, after installation

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3.7
belay rock anchor
rock anchors linked together specifically designed to be placed at the top of a pitch (section) of the climbing route, to enable the climbers to belay, be lowered down, or to lower themselves down

4 Safety requirements**4.1 Material(s)**

If rock anchors are manufactured from a combination of different materials, the materials shall be selected to avoid galvanic corrosion.

The use of polyester type glue shall not be recommended.

Depending on environmental factors, rock anchors are potentially liable to suffer from:

- a) galvanic corrosion,
- b) corrosion,
- c) Stress Corrosion Cracking (SCC).

For a choice of specified materials for rock anchor class, refer to Table 1, Annex B and Annex C. Other materials may be suitable if their resistance to SCC and other characteristics are demonstrable by the manufacturer to be equal to or better than the minimum specified in the relevant anchor class given in Table 1.

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Table 1 — Rock anchors class and characteristics

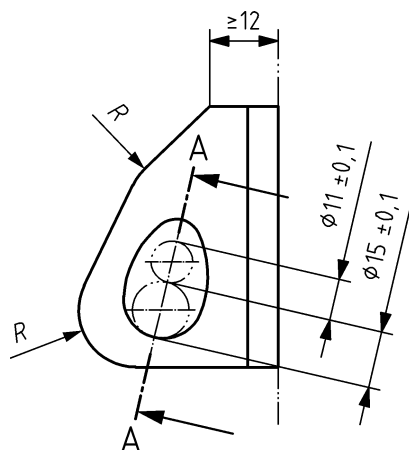
Anchor class	Suitable Environment	Characteristics of environment	Specified materials	Remarks
1	aggressive SCC environment	SCC in evidence high chloride concentration, temperature above 30 °C, humidity between (20 - 70)% sea salt and/or other salts (e.g. from karst: limestone/ dolomite) and/or acidic environment	Titanium grade 2 3.7035 & Stainless steel 1.4565 1.4529 1.4547 1.4539	Although SCC is commonly associated with seaside cliffs, it can also occur in inland locations and in other locations, e.g. indoor swimming pools.
2	outdoor environment, not aggressive enough to cause SCC	No SCC in evidence and none suspected some corrosion agents	1.4401 1.4404 1.4435	1.4301 and 1.4306 steel is not recommended for outdoor use.
3	indoor use, climbing gyms	No SCC in evidence and none suspected	low grade protection from corrosion, e.g. galvanization on steel, anodizing on aluminium alloy	Rock anchors in indoor gyms and in proximity to industrial areas, swimming pools, or the sea may require use of class 1 or class 2 anchor.

4.2 Design

4.2.1 The rock anchor shall have an eye which allows a connector to be attached. The overall thickness of the rock anchor in which the eye is made shall be $\geq 2,9$ mm (see Figure 2).

The overall thickness of the border of the eye shall be $\geq 2,9$ mm. If the edges are bevelled, the remaining inner surface shall have a minimum width of 2 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 a minimum 10 mm (see Figure 1).

**Key**

R minimum 10 mm

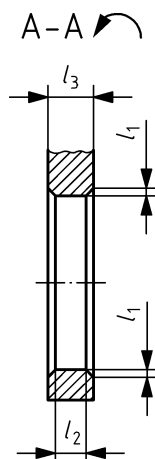
NOTE A-A see Figure 2

Figure 1 — Clear width and external shape of the eye

4.2.3 All edges that can be handled after placement of the rock anchor in the rock shall be free from burrs and sharp edges. The inner edges of the eye shall be rounded to a radius R of minimum 0,2 mm or bevelled to a minimum of $0,2 \text{ mm} \times 45^\circ$ (see Figure 2).

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**Key**

- l_1 minimum $0,2 \text{ mm} \times 45^\circ$
- l_2 minimum 2 mm
- l_3 minimum 2,9 mm

Figure 2 — Internal edges of the eye

4.2.4 After inserting the rock anchor into the concrete block, the eye shall be wide enough to accommodate two pins, one with a diameter of $(15 \pm 0,1)$ mm for the lower part and one with a diameter of $(11 \pm 0,1)$ 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.

4.2.6 For glued-in rock anchors, the installed length shall be a minimum of 70 mm. For mechanical rock anchors, the installed length shall be at least five times the diameter of the drilled hole (in accordance with the manufacturer's instructions).

NOTE For installation in rock softer rather than the concrete test block, a longer length can be necessary to achieve the required load-bearing capacity. Further information is given in Annex D.

4.2.7 If a belay rock anchor, as defined in 3.7, comprises two rock anchors permanently linked together each part of it shall withstand a load of 25 kN. All the components shall be made of the same material, if metallic.

4.2.8 If a rock anchor or a belay rock anchor is fitted with a rope attachment point, the rope attachment point shall have a minimum thickness of 9 mm. The material of the rope attachment point shall be the same as the rock anchor to which it is attached.

4.3 Load-bearing capacity**4.3.1 Axial load-bearing capacity**

When tested in accordance with 5.3.2.2, 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.