SLOVENSKI STANDARD
SIST EN 795:1996

01-december-1996

Varovanje pred padci z viġine - Sidriġļ a - Zahteve in preskuġanje

Protection against falls from a height - Anchor devices - Requirements and testing

Schutz gegen Absturz - Anschlageinrichtungen - Anforderungen und Prüfverfahren

Protection contre les chutes de hauteur - Dispositifs d'ancrage - Exigences et essais

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Descriptors: personal protective equipment, accident prevention, protection against fall, height, safety devices, anchorages, specifications, classifications, tests, utilization, marking

English version

Protection against falls from a height - Anchor devices - Requirements and testing

Protection contre les chutes de hauteur - Dispositifs d'ancrage - Exigences et essais

Schutz gegen Absturz - Anschlageinrichtungen - Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 1996-03-29. 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.

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CEN

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

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

Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 160 "Protection against falls from a height including working belts" 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of an identical text or by endorsement, at the latest by January 1997, and conflicting national standards shall be withdrawn at the latest by January 1997.

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.

The annex A is informative and contains installation recommendations. Annex B is also informative, relating to anchor devices at point of sale and classes covered by the PPE directive.

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 United Kingdom.

1 Scope

This standard specifies requirements, test methods and instructions for use and marking for anchor devices designed exclusively for use with personal protective equipment against falls from a height.

This standard does not apply to hooks designed to EN 517 or walkways to EN 516, nor to fixed anchor points forming part of the original structure.

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 354	Personal protective equipment against falls from a height - Lanyards
EN 355	Personal protective equipment against falls from a height - Energy absorbers
EN 360	Personal protective equipment against falls from a height - Retractable type fall arresters
EN 362 : 1992	Personal protective equipment against falls from a height - Connectors
EN 364 : 1992	Personal protective equipment against falls from a height - Test methods
EN 365	Personal protective equipment against falls from a height - General requirements for instructions for use and for marking
EN 516	Prefabricated accessories for roofing - Installations for roof access - walkways, treads and steps
EN 517	Prefabricated accessories for roofing - Roof safety hooks
ISO 1140	Ropes - Polyamide - Specification

3 Definitions

For the purposes of this standard the following definitions apply.

3.1 Anchor device

An element or series of elements or components which incorporates an anchor point or anchor points.

3.2 Element

A part of a component or a sub-system. Ropes, webbing, attachment elements, fittings and anchor lines are examples of elements.

3.3 Component

A part of a system at a point of sale by the manufacturer, supplied with packaging, marking and instructions for use. Body supports and lanyards are examples of components of systems.

3.4 Anchor point

An element to which personal protective equipment can be attached after installation of the anchor device.

3.5 Structural anchor

An element, or elements, permanently secured to a structure, to which an anchor device or personal protective equipment can be attached.

3.6 Extremity structural anchor

The structural anchor at each extremity of a flexible anchor line.

3.7 Intermediate structural anchor

Structural anchor which can be additionally necessary between the extremity structural anchors.

3.8 Anchor line

A flexible line between structural anchors, to which personal protective equipment can be attached.

3.9 Anchor rail

A rigid line between structural anchors, to which personal protective equipment can be attached.

3.10 Mobile anchor point

An additional, movable element on the anchor line or anchor rail, to which personal protective equipment may be attached.

3.11 End stop

Feature which ensures that it is not possible for the mobile anchor point or personal protective equipment to become detached from the anchor device unintentionally.

3.12 Attachment

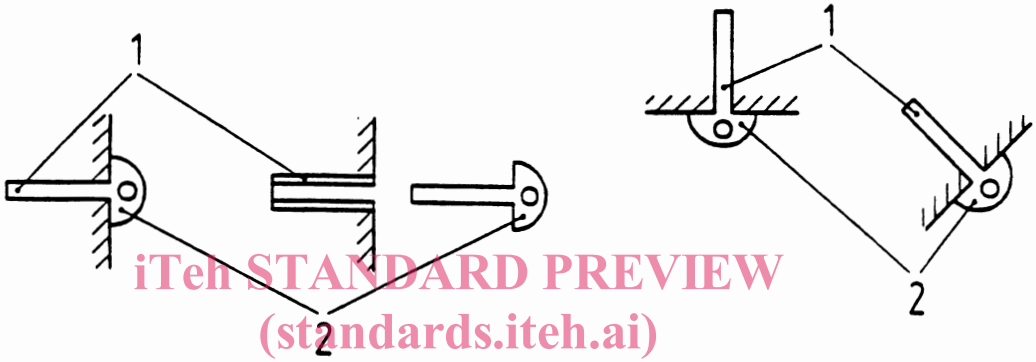
A lanyard, energy absorber or other device attached to the mobile anchor point of a flexible anchor line and which performs to the manufacturer's specification.

3.13 Classes

3.13.1 Class A

3.13.1.1 Class A1

Class A1 comprises structural anchors designed to be secured to vertical, horizontal and inclined surfaces - e.g. walls, columns, lintels (see figure 1).

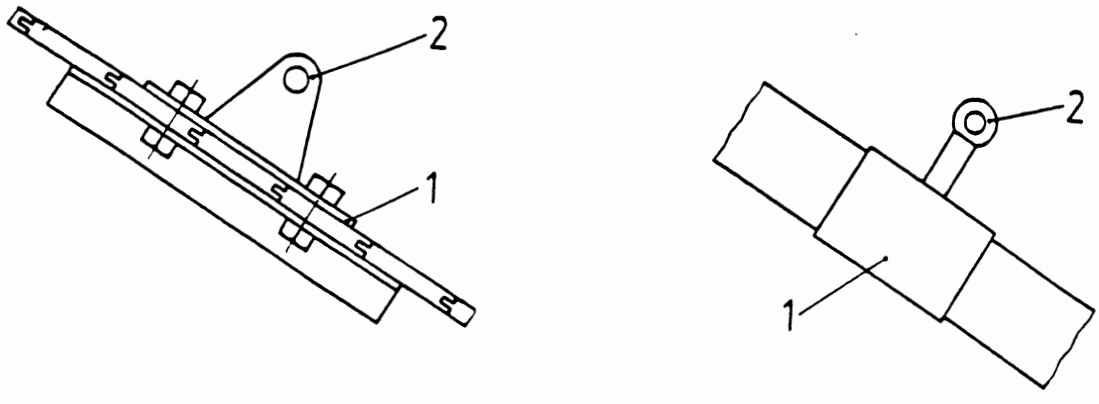


1 Structural anchor
2 Anchor point

Figure 1: Class A1 - Examples of structural anchors designed to be secured to vertical, horizontal and inclined surfaces

3.13.1.2 Class A2

Class A2 comprises structural anchors designed to be secured to inclined roofs (see figure 2).

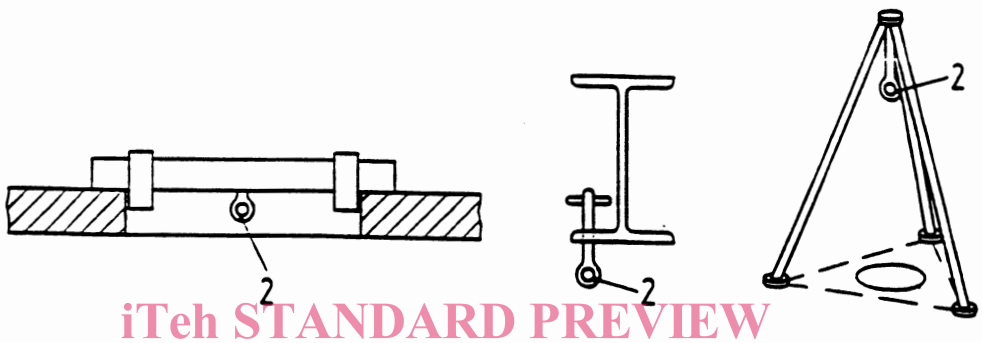


1 Structural anchor
2 Anchor point

Figure 2: Class A2 - Examples of structural anchors designed to be secured to inclined roofs

3.13.2 Class B

Class B comprises transportable temporary anchor devices (see figure 3).



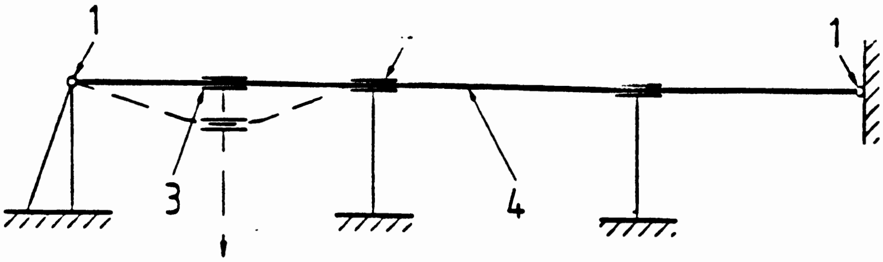
2 Anchor point

a) Cross beam b) Girder clamp c) Tripod

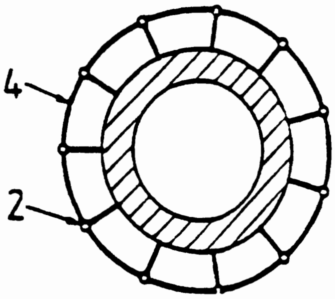
Figure 3: Class B - Examples of transportable temporary anchor devices

3.13.3 Class C

Class C comprises anchor devices employing horizontal flexible lines (see figure 4). For the purpose of this standard a horizontal line is understood to be a line which deviates from the horizontal by not more than 15°.



a) Anchor device, e.g. at a roof



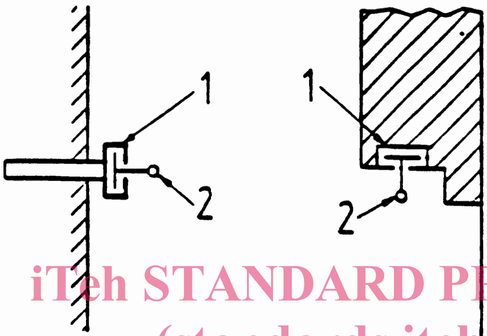
b) Anchor device, e.g. at a chimney

1 Extremity structural anchor
2 Intermediate structural anchor
3 Mobile anchor point
4 Anchor line

Figure 4: Class C - Examples of anchor devices employing horizontal flexible anchor lines

3.13.4 Class D

Class D comprises anchor devices employing horizontal rigid anchor rails (see figure 5).

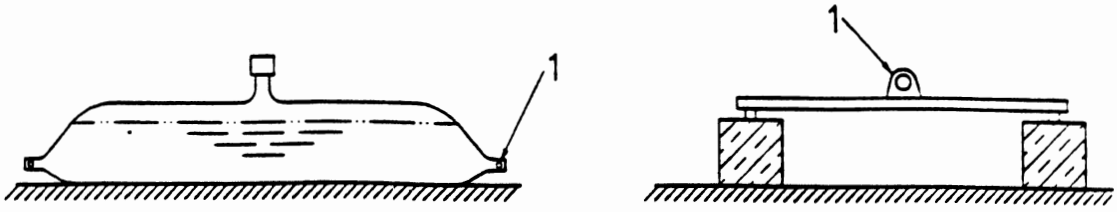


1 Anchor rail
2 Mobile anchor point

Figure 5: Class D - Examples of anchor devices employing horizontal rigid anchor rails

3.13.5 Class E

Class E comprises deadweight anchors for use on horizontal surfaces (see figure 6). For the use of deadweight anchors a horizontal surface is understood to deviate from the horizontal by not more than 5°.



1 Anchor point

Figure 6: Class E - Examples of deadweight anchors

4 Requirements

4.1 Requirements for test apparatus

4.1.1 Requirements for static testing apparatus

The static strength test apparatus shall comply with 4.1 of EN 364:1992.

4.1.2 Requirements for dynamic testing apparatus

4.1.2.1 Force measurement apparatus for general applications

The dynamic strength test apparatus shall comply with 4.4, 4.5 and 4.6 of EN 364:1992.

4.1.2.2 Force measurement apparatus for horizontal lines

The force measuring apparatus for horizontal lines shall be capable of measuring forces from 2 kN to 40 kN. In all other ways it shall comply with 4.4.2 of EN 364:1992.

4.2 General requirements for anchor devices

The anchor device(s), anchor point(s) and mobile anchor point(s) shall be so designed as to accept the personal protective equipment and ensure that it is not possible for correctly connected personal protective equipment to become detached unintentionally.

Where an anchor device comprises more than one element the design shall be such that those elements cannot appear to be correctly assembled without being positively locked together.

Exposed edges or corners shall be relieved either with a radius of at least 0,5 mm or a 45° chamfer.

All metallic parts of anchor devices shall comply with the corrosion protection of 4.4 of EN 362:1992. Those parts designed for permanent exposure to the outdoor environment shall have corrosion protection at least equivalent to the hot dip galvanised values of 4.4 of EN 362:1992.

Deadweight anchor devices shall not be used where the distance to the edge of the roof is less than 2500 mm (see figure 7).

Deadweight anchor devices shall not be used when there is risk of frost, or in freezing conditions.

Dimensions in millimetres

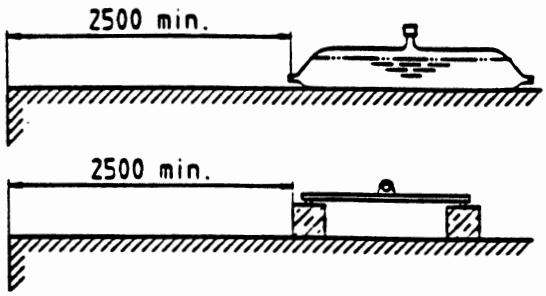


Figure 7: Limit of distance to roof edge for deadweight anchor devices

4.3 Specific requirements for anchor devices

4.3.1 Class A

4.3.1.1 Class A1 - Type tests for anchor devices designed to be secured to vertical, horizontal and inclined surfaces

A static test shall be carried out as described in 5.2.1 with a force of 10 kN applied in the direction in which the force can be applied in service. The force shall be maintained for 3 min.

The anchor device shall hold the force.

A dynamic strength test shall be carried out as described in 5.3.2. The drop mass shall be arrested.

4.3.1.2 Class A2 - Type tests for anchor devices designed to be secured to inclined surfaces

A static test shall be carried out as described in 5.2.2 with a force of 10 kN applied in the direction in which the force can be applied in service. The force shall be maintained for 3 min.

The anchor device shall hold the force.

A dynamic strength test shall be carried out as described in 5.3.3. The drop mass shall be arrested.

4.3.2 Class B - Type tests for transportable temporary anchor devices

A static test shall be carried out as described in 5.2.3 with a force of 10 kN applied in the direction in which the force can be applied in service. The force shall be maintained for 3 min. The anchor device shall hold the force.

A dynamic strength test shall be carried out as described in 5.3.2. The drop mass shall be arrested.

4.3.3 Class C - Anchor devices employing horizontal flexible anchor lines

4.3.3.1 General

These shall be so designed that it is not possible for a mobile anchor point to become detached unintentionally, e.g. end stops shall be fitted. If the mobile anchor point is equipped with an opening device it shall be so designed that it can only be detached or attached by at least two consecutive deliberate manual actions.

For devices employing horizontal anchor lines of fibre rope, webbing or wire rope, the minimum breaking strength of the rope or webbing shall be at least twice the maximum line tension in the said rope or webbing at the designed arrest event for that device, proved by test or by calculation. Such devices shall be designed using the manufacturer's design methods and criteria. These design methods and criteria shall be proved in accordance with 4.3.3.3. (This principle shall also apply when the manufacturer's instructions permit two or more persons to use the device simultaneously).

All other force bearing elements in the line of force of the anchor line (e. g. structural anchor posts, bearing plates, bolts, etc.) and securing the anchor line to the main supporting structure shall be designed to withstand twice the force arising in such elements or components from the maximum line tension at fall-arrest or restraint (calculations to be performed by a qualified engineer).

Where the design of horizontal flexible anchor line devices necessitates attachments outwith the requirements of EN 354, EN 355 and EN 360, such attachments shall comply with 4.3.3.2, 4.3.3.3 and 4.3.3.4.

4.3.3.2 Type test - Static strength

Representative samples of the anchor line, line fittings and terminations (e. g. swaged connections) shall be statically tested as described at 5.2.4 to 1,5 times the manufacturer's permitted design force. The force shall be maintained for 3 min. The samples shall hold the force.

4.3.3.3 Type test - Dynamic performance

The manufacturer shall prove on a series of tests as described at 5.3.4.2 that, with a suitable selection of systems of differing system length and differing span lengths (and including a 90° corner fitting if this is part of the device), the line tension and deflection do not vary by more than ± 20 % from that determined by the manufacturer's method of prediction.

4.3.3.4 Type test - Dynamic strength

One of the devices included in 4.3.3.3 shall be selected for dynamic strength testing in accordance with 5.3.4.3. The device shall not release the mass.

4.3.4 Class D - Type tests for devices employing horizontal rigid anchor lines

A static test shall be carried out as described in 5.2.5 with a force of 10 kN applied in the direction in which the force can be applied in service. The force shall be maintained for 3 min. The anchor device shall hold the force.

A dynamic strength test shall be carried out as described in 5.3.5. The drop mass shall be arrested.

If the manufacturer's instructions permit two or more persons to use the device simultaneously a static test shall be carried out as described in 5.2.5 with a force of 10 kN for the first person, and 1 kN for each additonal person (e. g. for three persons the force shall be 10 kN + 1 kN + 1 kN = 12 kN). The force shall be maintained for 3 min. The anchor device shall hold the force.

4.3.5 Class E - Type test for deadweight anchor devices

A dynamic strength test shall be carried out as described at 5.3.6. The displacement *L* of the centre of mass of the deadweight anchor device shall not exceed 1000 mm . Displacement *H* shall be measured 3 min after drop test and shall not exceed 1000 mm.

5 Test methods

5.1 Principle

The sample anchor device shall be tested with forces applied in line with expected service. The configuration for a test shall be in accordance with the manufacturer's instructions, including pre-tension where applicable, to represent the worst case for each type of anchor device.

5.2 Static strength test procedures

5.2.1 Class A1 - Anchor devices

Install the anchor device according to its installation instructions in a sample of the type of construction in which it is intended for use (figure 8 shows the minimum sample size for brickwork).

Install the 4.1.1 static strength test apparatus to apply the test force in the direction or directions of use in service and submit the anchor point to the static test force specified in 4.3.1.1. Observe that the anchor device holds the force.