

# Protection against falls from a height — Anchor devices — Requirements and testing

The European Standard EN 795:1996, with the incorporation of amendment A1:2000 has the status of a British Standard

ICS 13.340.99

# Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee PH/5, Industrial safety belts and harnesses, upon which the following bodies were represented:

- Arboricultural Safety Council
- Association of Consulting Scientists
- British Constructional Steelwork Association Ltd.
- British Electrical Systems Association (BEAMA Ltd.)
- British Forging Industry Association
- British Narrow Fabrics Association
- British Telecommunications plc
- Construction Fixings Association
- Cordage Manufacturers Institute
- Department of Trade and Industry (National Engineering Laboratory)
- Electricity Association
- Health and Safety Executive
- Industrial Rope Access Trade Association
- National Federation of Master Steeplejacks and Lightning Conductor Engineers
- Royal Society for the Prevention of Accidents
- Safety Equipment Association
- Suspended Access Equipment Manufacturers' Association
- Tes-bretby Ltd.

This British Standard, having been prepared under the direction of the Health and Environment Sector Board, was published under the authority of the Standards Board and comes into effect on 15 February 1997

## Amendments issued since publication

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# Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Foreword	2
Text of EN 795	5

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## National foreword

This British Standard has been prepared by Technical Committee PH/5 and is the English language version of EN 795:1996, *Protection against falls from a height — Anchor devices — Requirements and testing*, including amendment A1:2000, published by the European Committee for Standardization (CEN). It partly supersedes BS 5845:1991, which is withdrawn. The remainder of BS 5845 is superseded by the code of practice BS 7883:1997.

### Cross-references

Attention is drawn to the fact that CEN and CENELEC Standards normally include an annex which lists normative references to international publications with their corresponding European publications. The British Standards which implement these international or European publications may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

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### Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 22, an inside back cover and a back cover.

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Sidelining in this document indicates the most recent changes by amendment.

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ICS 13.340.20

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

(includes amendment A1:2000)

Protection contre les chutes de hauteur —  
Dispositifs d'ancrage —  
Exigences et essais  
(inclut l'amendement A1:2000)

Schutz gegen Absturz —  
Anschlageinrichtungen —  
Anforderungen und Prüfverfahren  
(enthält Änderung A1:2000)

This European Standard was approved by CEN on 1996-03-29. Amendment A1:2000 was approved by CEN on 2000-09-15. 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.

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 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 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.

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 the United Kingdom.

## Foreword to amendment A1

This amendment EN 795:1996/A1:2000 to EN 795:1996 has been prepared by Technical Committee CEN/TC 160, Protection against falls from height including working belts, the Secretariat of which is held by DIN.

This amendment to the European Standard EN 795:1996 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2001, and conflicting national standards shall be withdrawn at the latest by April 2001.

This amendment to the European Standard EN 795:1996 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.

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

## Contents

	Page
Foreword	2
1 Scope	5
2 Normative references	5
3 Definitions	5
4 Requirements	9
5 Test methods	12
6 Marking	19
7 Information supplied by the manufacturer	19
8 Instructions for installation	19
Annex A (informative) Installation recommendations	20
Annex B <i>deleted</i>	21
Annex ZA (informative) Clauses of this European Standard addressing essential requirements or other provisions of EU directives	22
Figure 1 — Class A1 — Examples of structural anchors designed to be secured to vertical, horizontal and inclined surfaces	6
Figure 2 — Class A2 — Examples of structural anchors designed to be secured to inclined roofs	7
Figure 3 — Class B — Examples of transportable temporary anchor devices	7
Figure 4 — Class C — Examples of anchor devices employing horizontal flexible anchor lines	8
Figure 5 — Class D — Examples of anchor devices employing horizontal rigid anchor rails	9
Figure 6 — Class E — Examples of deadweight anchors	9
Figure 7 — Limit of distance to roof edge for deadweight anchor devices	10
Figure 8 — Minimum size of brickwork	13
Figure 9 — Dynamic performance test for anchor devices designed to be secured to inclined roofs	14
Figure 10 — Dynamic performance test on class C anchor devices	16
Figure 11 — Dynamic strength test on horizontal rigid anchor devices	17
Figure 12 — Dynamic performance test on deadweight anchor devices	18
Table ZA —	22





## 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 subsystem. 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

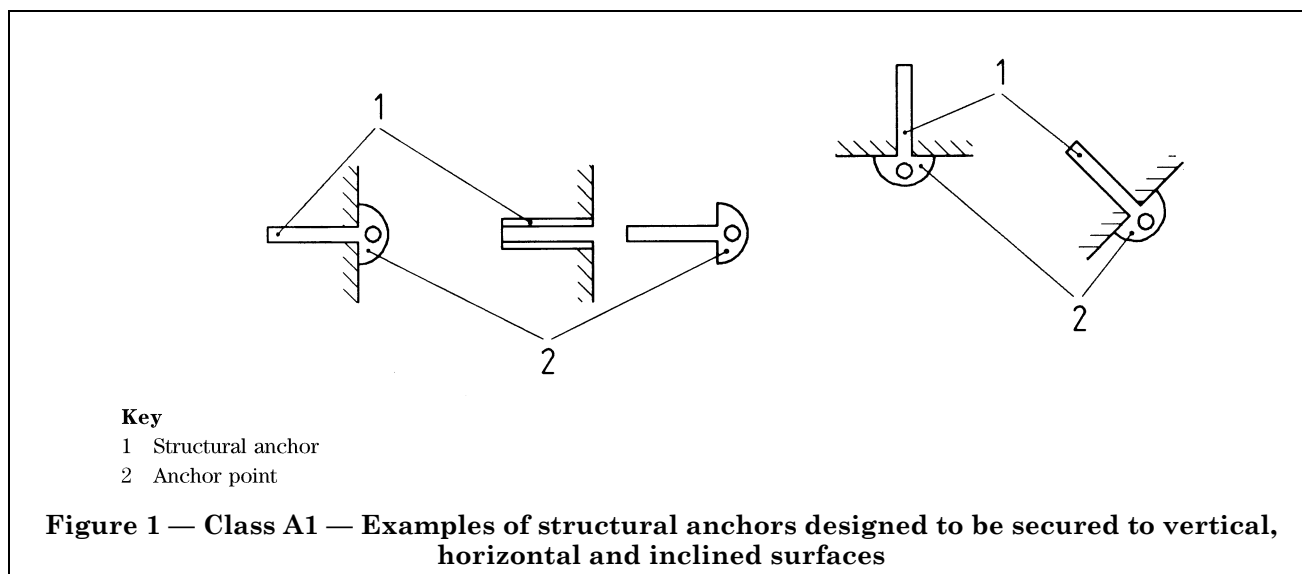
##### class A1

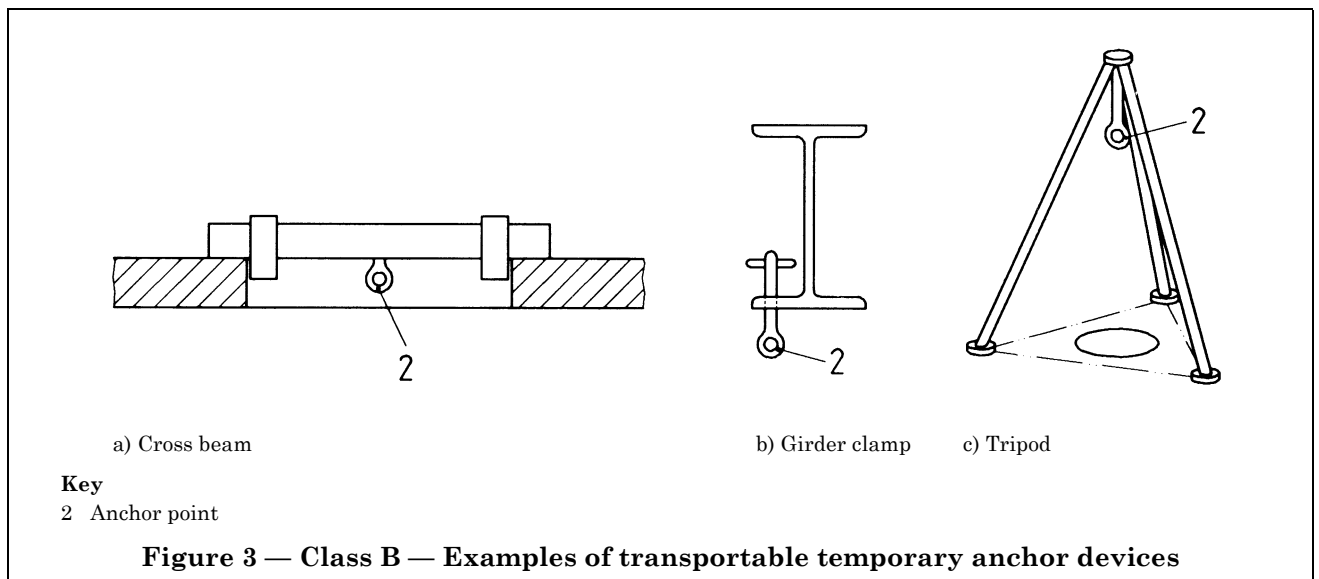
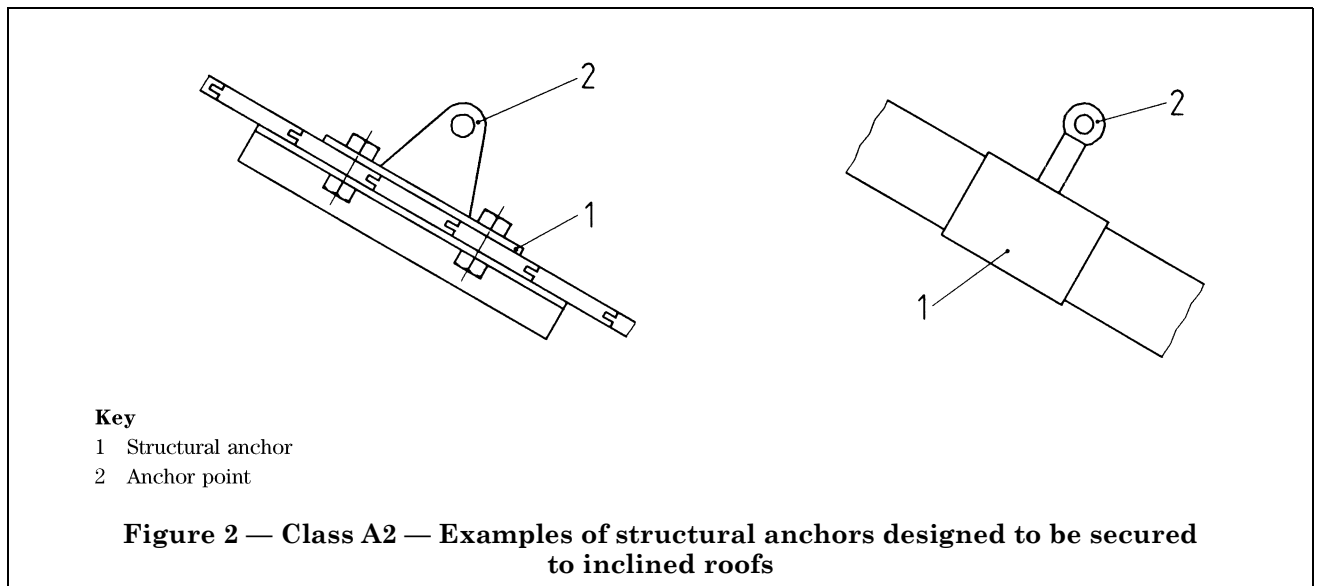
class A1 comprises structural anchors designed to be secured to vertical, horizontal and inclined surfaces, e.g. walls, columns, lintels (see Figure 1)

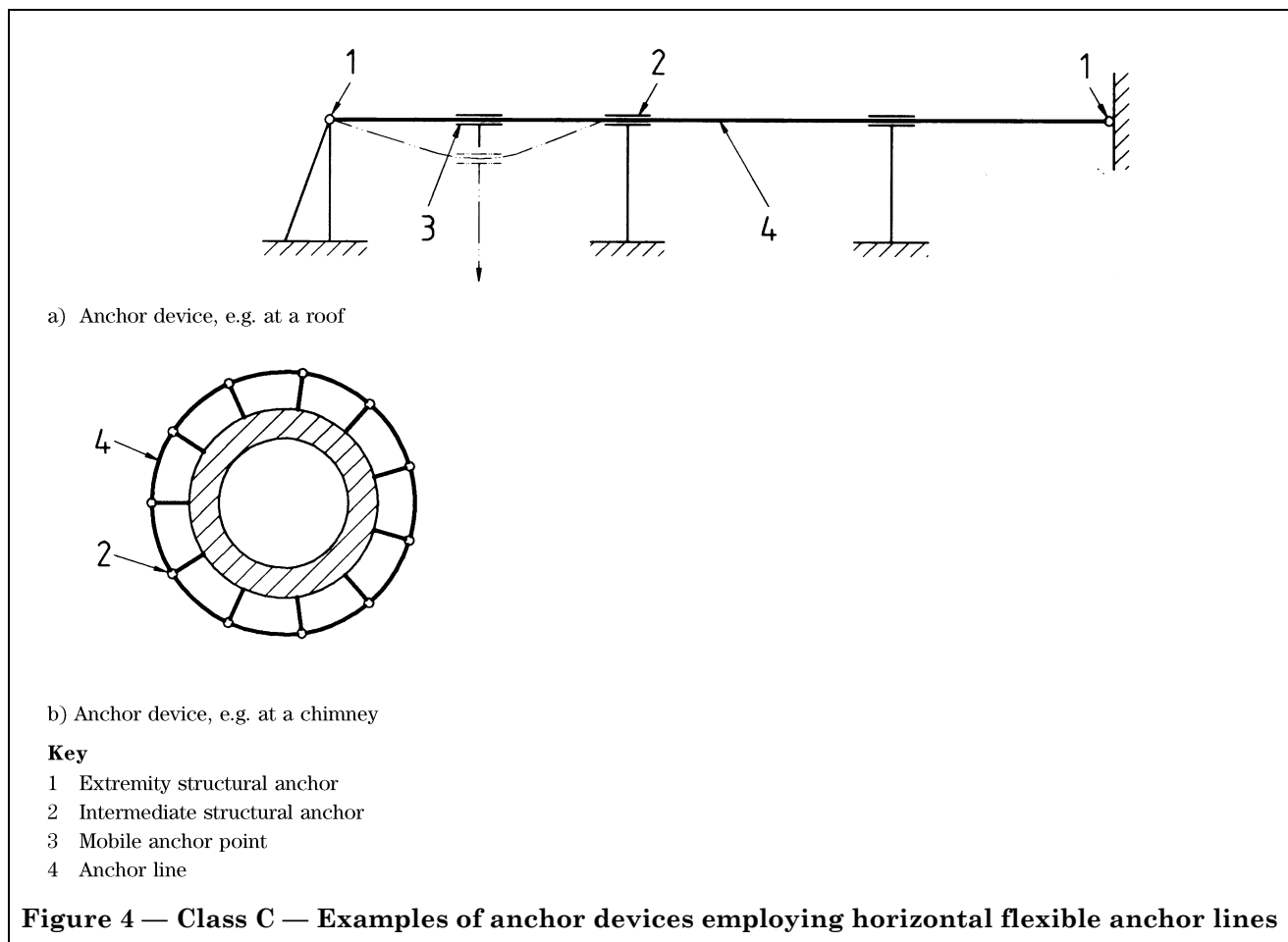
##### 3.13.1.2

##### class A2

class A2 comprises structural anchors designed to be secured to inclined roofs (see Figure 2)







### 3.13.2

#### **class B**

class B comprises transportable temporary anchor devices (see Figure 3)

### 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°

### 3.13.4

#### **class D**

class D comprises anchor devices employing horizontal rigid anchor rails (see Figure 5)

### 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°

## 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.

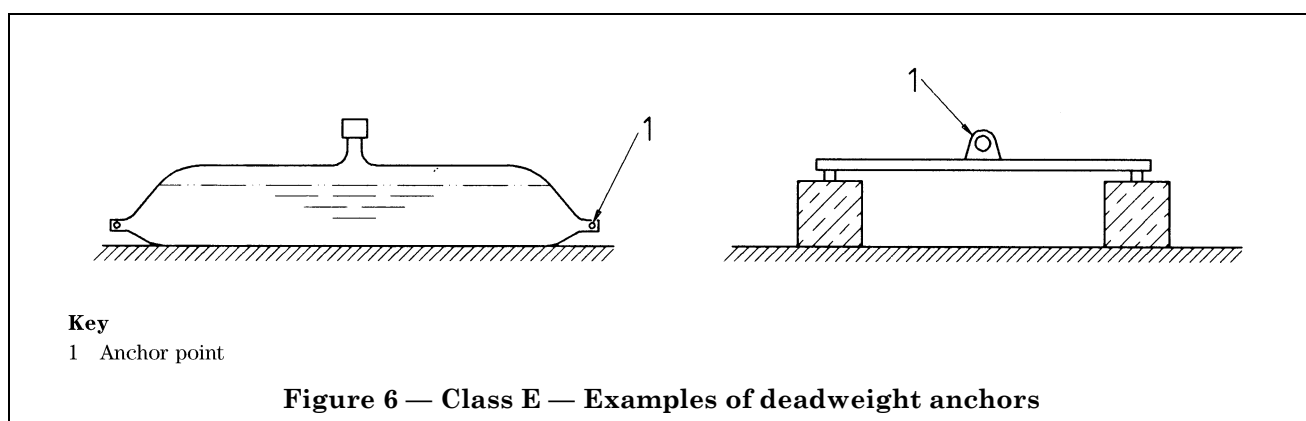
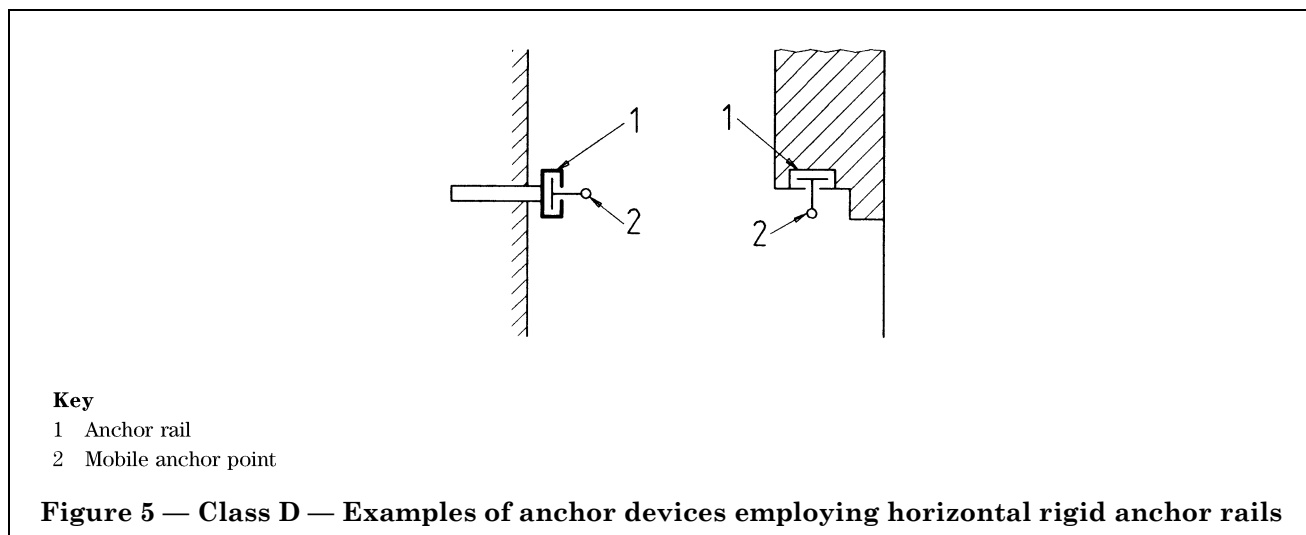
#### 4.1.2 Requirements for dynamic testing apparatus

##### 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 galvanized 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 2 500 mm (see Figure 7).

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

## 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.

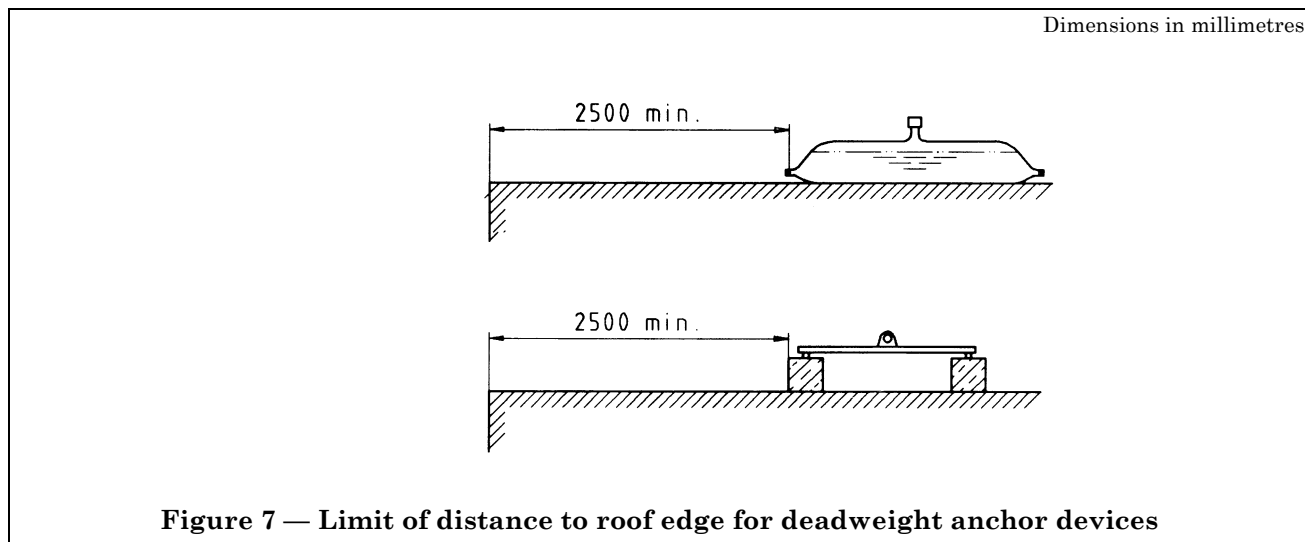
The anchor device shall hold the force.

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 outside 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 in 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 in 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  $\pm 20\%$  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 additional person (e.g. for three persons the force shall be  $10\text{ kN} + 1\text{ kN} + 1\text{ kN} = 12\text{ kN}$ ). 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

When tested in accordance with 5.3.6, class E anchor devices shall not release the drop mass. The test shall be repeated for each critical direction in which an arrest force could be applied. New anchor devices may be used for each test if the manufacturer so desires.

The displacement  $L$  of the centre of mass of the deadweight anchor device shall not exceed 1 000 mm. Displacement  $H$  shall be measured 3 min after the drop test and shall not exceed 1 000 mm (see Figure 12). The test shall be carried out under each condition, and on each type of roof surface for which the manufacturer claims suitability.

## 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 static strength test apparatus (4.1.1) 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.

#### 5.2.2 Class A2 — Anchor devices

Install the anchor device according to its installation instructions in a sample of each type of construction for which the manufacturer claims suitability.

Install the static strength test apparatus (4.1.1) to apply the test force in the direction of use in service and submit the anchor point to the static test force specified in 4.3.1.2. Observe that the anchor device holds the force.

#### 5.2.3 Class B — Anchor devices

Install the static strength test apparatus (4.1.1) to apply the test force in the direction of use in service and submit the anchor point to the static test force specified in 4.3.2. Observe that the anchor device remains stable and holds the force.

#### 5.2.4 Class C — Anchor devices

Install a sample of anchor line with line fittings and terminations in the static strength test apparatus (4.1.1) and apply the anchor line test force specified from 4.3.3.2. Observe that the test assembly holds the force.

#### 5.2.5 Class D — Anchor devices

Install the sample of anchor rail with structural anchors in the static strength test apparatus (4.1.1) and, at the mobile anchor point, apply the force specified in 4.3.4 at the statically most unfavourable points. Observe that the test assembly holds the force.

### 5.3 Dynamic testing procedures

#### 5.3.1 General

The fibre rope test lanyard required for tests on class A and B anchor devices shall be made from three strand, 12 mm diameter hawser laid polyamide (nylon) rope complying with ISO 1140. An eye ( $75 \pm 10$ ) mm long shall be spliced into each end of the lanyard with a splice of five full tucks. The effective length of the lanyard measured at  $(40 \pm 5)$  N shall be  $(2\ 000 \pm 50)$  mm.

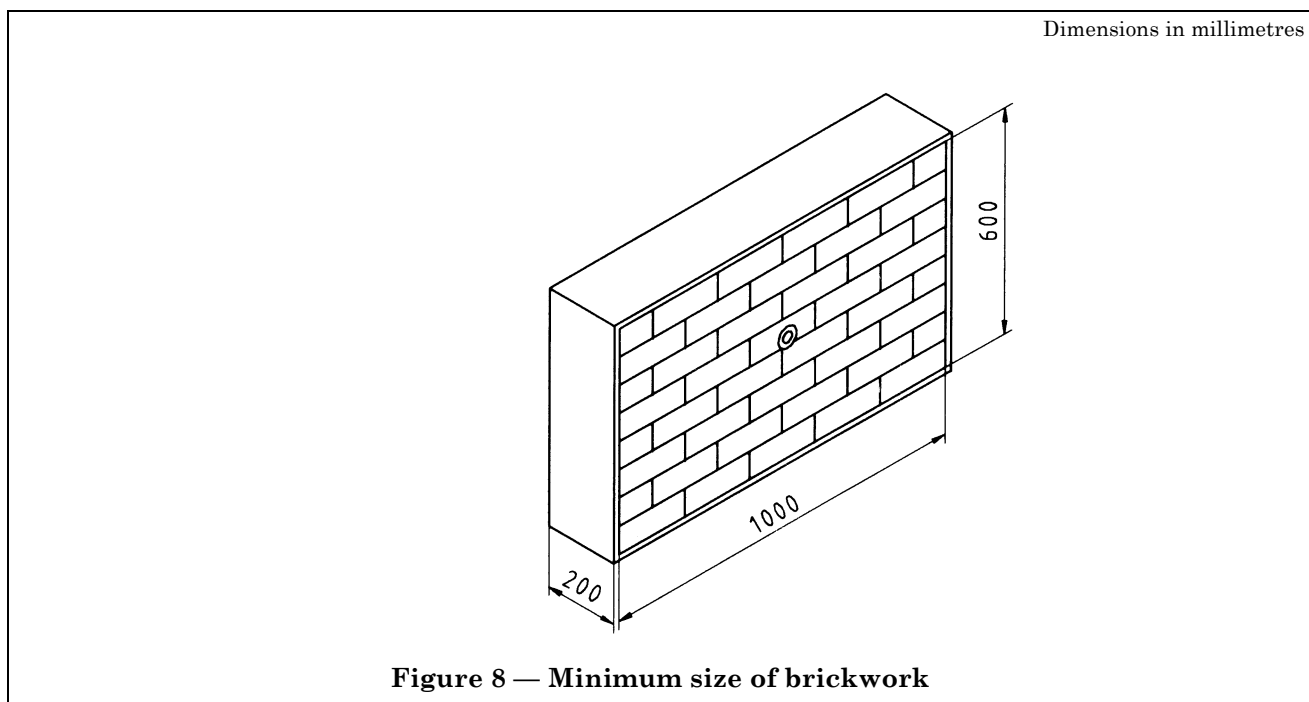
#### 5.3.2 Class A1 and class B — Anchor devices

Secure one end of the test lanyard by means of a connector to the anchor device under test and the other, also by means of a connector, to the 100 kg mass.

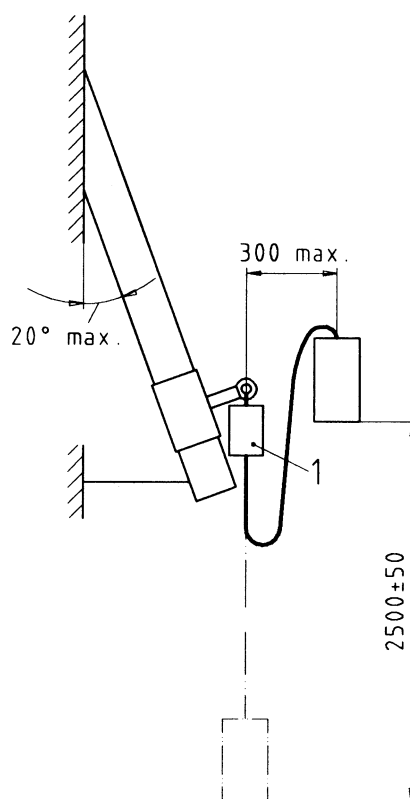
At a maximum of 300 mm horizontally from the anchor point and by means of the quick release device, support the solid mass so that when released it will fall freely through  $(2\ 500 \pm 50)$  mm before the lanyard starts to arrest the fall.

Release the mass and observe whether the mass is arrested. (For class B anchor devices, observe also that the device is stable).





Dimensions in millimetres

**Key**

1 Force measuring device

**Figure 9 — Dynamic performance test for anchor devices designed to be secured to inclined roofs**

### 5.3.3 Class A2 — Anchor devices

Attach the anchor device according to its installation instructions, at an angle no greater than 20° from vertical, to a sample of the construction material for which it is specified (see Figure 9). Secure one end of the test lanyard by means of a connector to the anchor device under test and the other, also by means of a connector, to the 100 kg mass.

At a maximum of 300 mm horizontally from the anchor point and by means of the quick release device, support the solid mass so that when released it will fall freely through  $(2\,500 \pm 50)$  mm before the lanyard starts to arrest the fall.

Release the mass and observe whether the mass is arrested.

### 5.3.4 Class C — Anchor devices

A chain lanyard is required. This shall comply with 5.3.4.1.1 of EN 364:1992.

#### 5.3.4.1 Dynamic performance testing procedure

Install each anchor device according to the manufacturer's instructions.

Adjacent to one of the extremity structural anchors, and in line with the anchor line, attach a 4.1.2.2 force measuring device (loadcell — see Figure 10). If a corner unit of 90° or greater is included in the device a second 4.1.2.2 force measuring device shall be attached at the other extremity structural anchor.

Attach the chain lanyard via the 4.1.2.1 force measuring apparatus to the mobile anchor point, and attach the other end of the lanyard to the 100 kg mass.

Position the mobile anchor point at the centre of the test span (midway between structural anchors).

Raise the mass to provide sufficient fall energy to develop at least 6 kN fall arrest peak force in the chain. At a maximum of 300 mm horizontally from the mobile anchor point, hold the mass by the quick release device.

Release the mass and measure the peak force in the anchor line and the line deflection (by high speed video or other suitable means) at the mobile anchor point at the moment of peak arrest force in the chain. These data shall be used to verify the manufacturer's claims for the device as described in 4.3.3.3. Components may be replaced between tests.

#### **5.3.4.2** *Dynamic strength test*

The test procedure is as described in 5.3.4.2 but the mass is raised to a height which will provide sufficient fall energy to develop at least 12 kN fall arrest peak force in the chain lanyard. The 12 kN force may be shared between two mobile anchor points but the separation between these shall be the minimum necessary for carrying out the test. The mass shall be retained.

#### **5.3.5** *Class D — Anchor devices*

**5.3.5.1** Install the horizontal rigid anchor device according to the manufacturer's instructions for the dynamic strength test.

Secure one end of a 5.3 test lanyard by means of a connector to the mobile anchor point and the other, also by means of a connector, to the 100 kg mass.

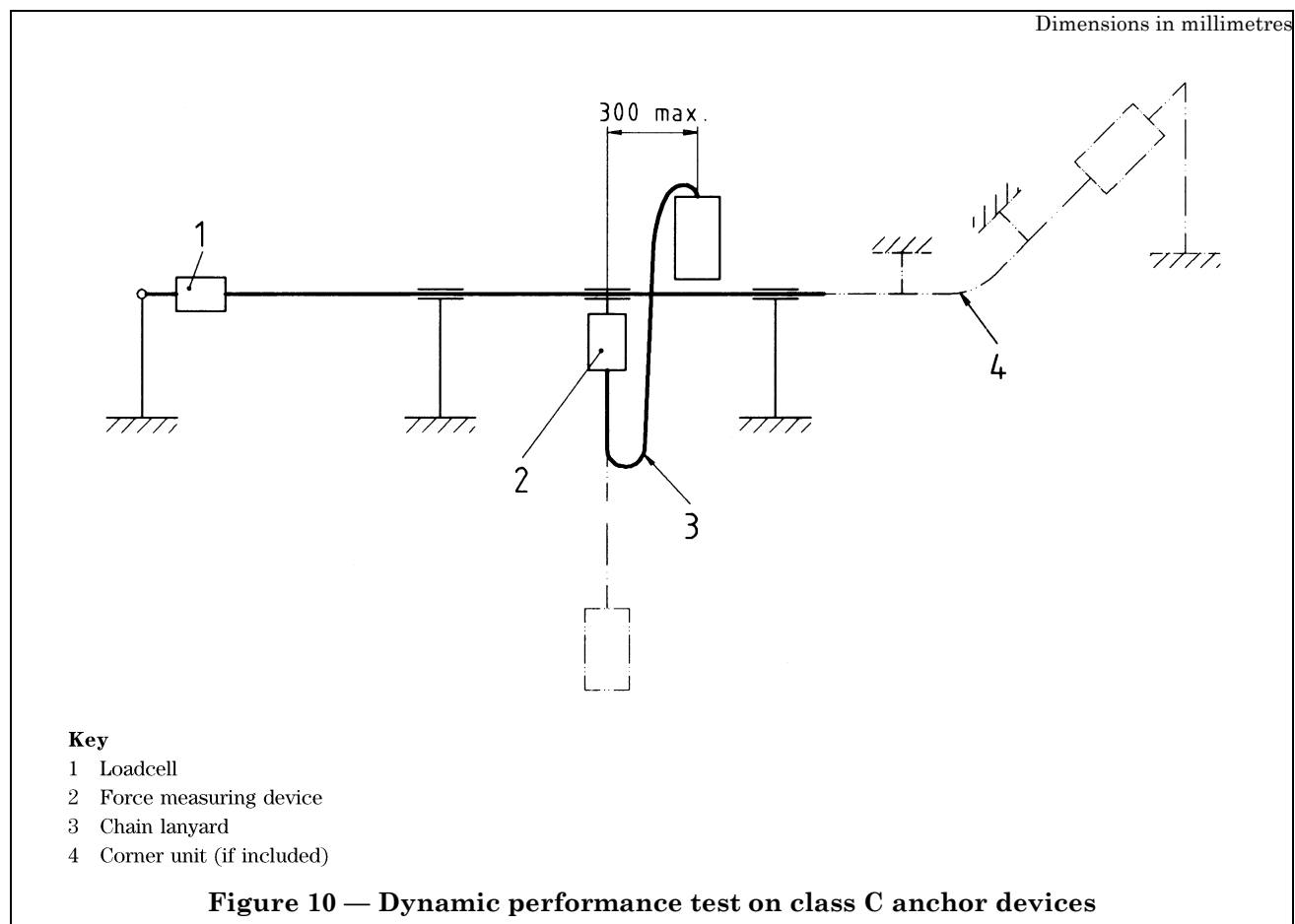
Position the mobile anchor point at the centre of the test span (midway between structural anchors).

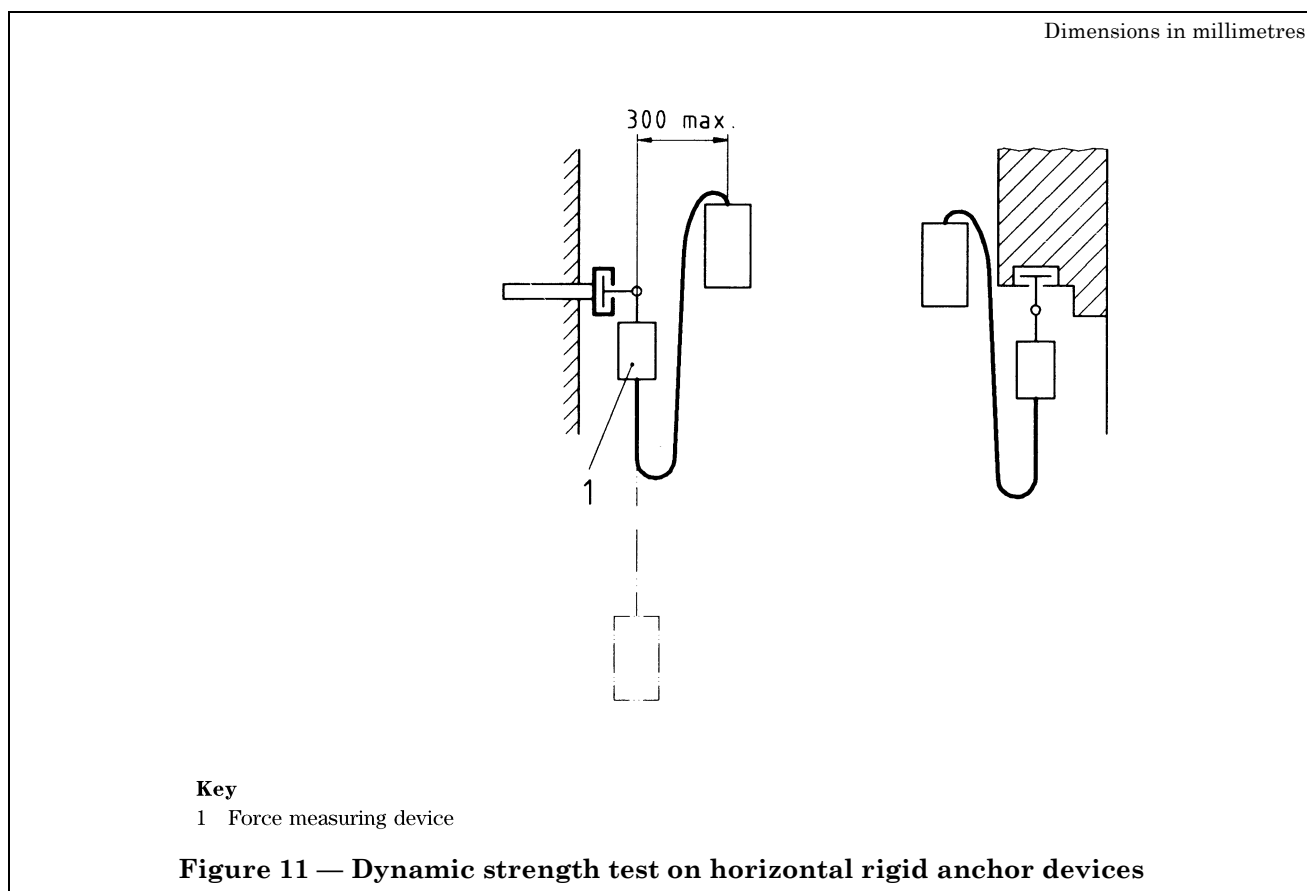
At a maximum of 300 mm horizontally from the mobile anchor point and by means of the quick release device, support the 100 kg mass so that when released it will fall freely through  $(2\,500 \pm 50)$  mm before the lanyard starts to arrest the fall (see Figure 11).

Release the mass and observe whether the mass is arrested.

**5.3.5.2** Repeat the dynamic strength test with the mobile anchor point positioned at an intermediate structural anchor.

**5.3.5.3** Repeat the dynamic strength test with the mobile anchor point positioned at an extremity structural anchor.





### 5.3.6 Class E — Deadweight anchors

A wire rope of 8 mm diameter is required for the dynamic test.

Install the anchor device according to its installation instructions on typical samples to demonstrate every combination of types of construction material and conditions for which the manufacturer claims suitability. The simulated roof surface used for testing shall be wet.

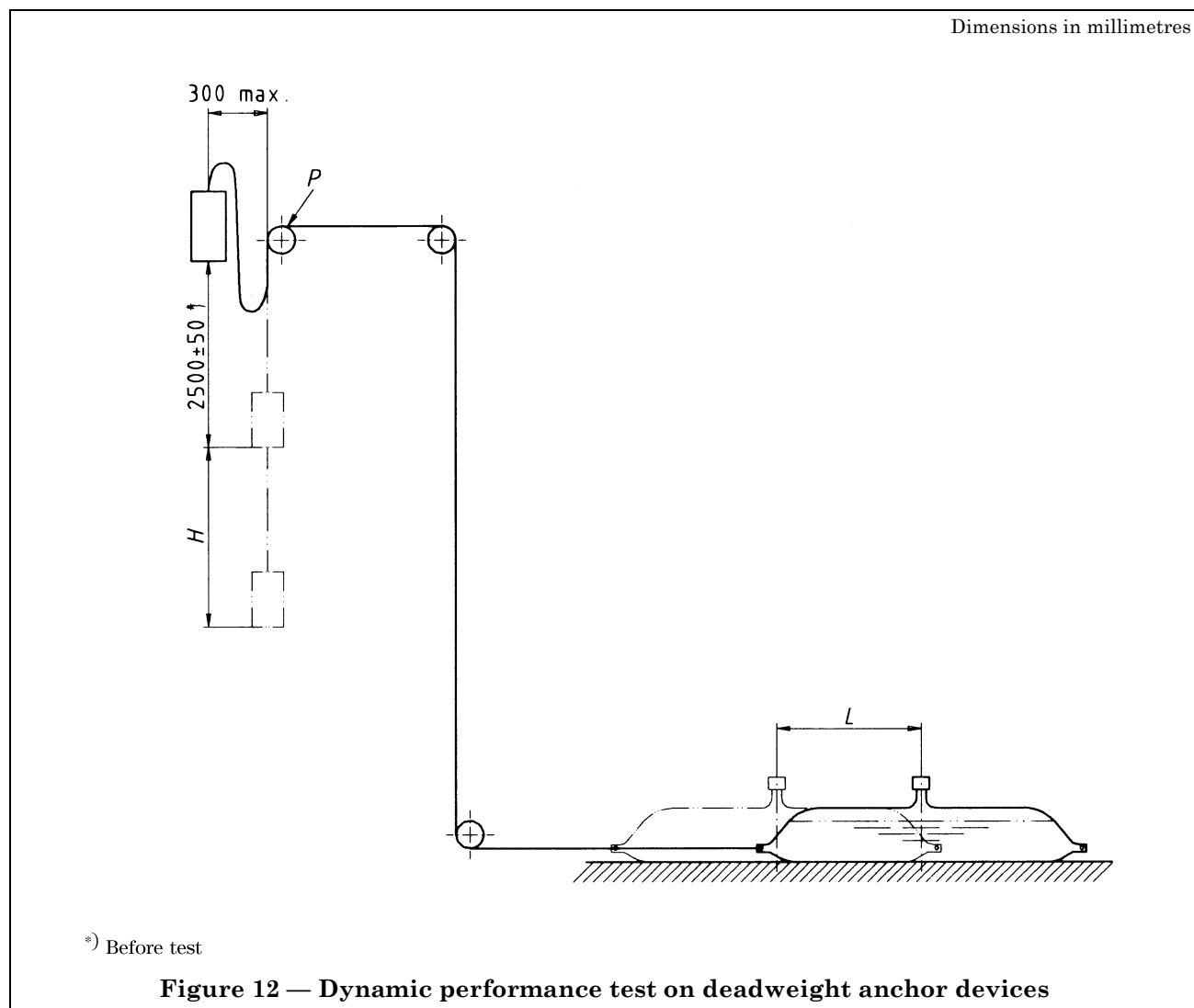
Before assembling the deadweight anchor device on the test surface, and no more than 1 h before the drop mass is released, water in the temperature range 10 °C to 25 °C should be applied at the rate of 0,5 l/m<sup>2</sup> of the test surface.

Attach the wire rope to the 100 kg mass and route the wire rope over the pulleys shown in Figure 12. The pulleys shall have a minimum diameter of 100 mm. Secure the wire rope to the deadweight anchor device.

Raise the mass (2 500 ± 50) mm and, at a maximum of 300 mm horizontally from the radius of the pulley *P*, hold the mass by the quick release device.

After assembly and positioning, and immediately before releasing the test mass, further water in the temperature range 10 °C to 25 °C shall be applied at the rate of 0,5 l/m<sup>2</sup> of test surface.

Release the mass within 2 min of the second application of water and measure displacements *L* and *H*.



## 6 Marking

Marking shall comply with EN 365 and any text shall be in the language(s) of the country of destination. In addition to complying with EN 365 the marking shall include the following.

For class C and class E anchor devices, the manufacturer or installer shall clearly mark on or near the anchor device the following parameters:

- a) the maximum number of attached workers;
- b) the need for energy absorbers;
- c) the ground clearance requirements.

## 7 Information supplied by the manufacturer

The instructions for use shall be provided in the language(s) of the country of destination, and shall comply with EN 365. A statement shall be included by the manufacturer that the anchor devices have been tested to this standard (EN 795) and that, unless otherwise stated, they are appropriate for single person use with an energy absorber to EN 355. In addition:

- a) For class C anchor devices (anchor devices employing horizontal flexible anchor lines) the instructions for use shall include the maximum force that can be permitted at the extremity and intermediate structural anchors.
- b) For class E anchor devices (deadweight anchor devices), it is imperative that the instructions for use contain the following guidance:
  - that deadweight anchor devices shall not be used where there is a risk of frost, or in freezing conditions;
  - on the use of deadweight anchor devices where there is contamination of the roof surface and/or anchor device by oil, grease, etc. or by the growth of algae;
  - on the types of roof surface on which the device may be used (i.e. those surfaces on which it has been successfully tested);
  - that deadweight anchor devices should be positioned to avoid areas where water accumulates;
  - that where the deadweight anchor device is to be used on a roof that is covered with stone chippings, all loose stones shall be removed (e.g. sweeping with a hard brush) before assembly of the anchor device.
- c) For class E anchor devices (deadweight anchor devices), it is imperative that the instructions for use state:
  - the potential dangers that arise when deadweight anchor devices are combined with retractable type fall arresters (EN 360), which have not been tested together as a complete fall arrest system;
  - the potential dangers that arise when deadweight anchor devices are combined with energy absorbing lanyards (EN 355), which have not been tested together as a complete fall arrest system;
  - that where users intend to combine any fall arrest personal protective equipment (PPE) with deadweight anchor devices they should seek guidance from the manufacturer of the fall arrest PPE first.

## 8 Instructions for installation

The manufacturer shall supply instructions for installation.

Installers shall ensure the suitability of base materials into which structural anchor devices are fixed.

## **Annex A (informative)**

### **Installation recommendations**

#### **A.1 General**

Where an anchor device is intended to be used exclusively for personal protective equipment, it should be clearly marked by pictogram, or other clearly seen and understood marking, on or near the anchor device, clearly stating that the device is designed exclusively for use of personal protective equipment.

Anchor devices are only to be used with CE marked fall arrest systems, which will not generate forces in excess of 6 kN at the anchor device.

#### **A.2 Class A1 — Anchor devices designed to be secured to vertical, horizontal and inclined surfaces**

For fixings in steelwork or timber, the design and installation should be verified by calculation by a qualified engineer to be capable of sustaining the type test force.

For fixings in other structural materials, the installer should verify the suitability by submitting each individual structural anchor (see definition in 3.5), after installation in that material, to an axial pull-out force of 5 kN to confirm the soundness of the fixing. The structural anchor should sustain the force for a minimum of 15 s.

#### **A.3 Anchor devices designed to be secured to inclined roofs**

For fixings in steelwork or timber, the design and installation should be verified by calculation by a qualified engineer to be capable of sustaining the type test force.

For fixings in other materials the installer should verify the suitability by carrying out a test in a sample of the material. The sample should meet the type test requirement of 4.3.1.2.

#### **A.4 Class B — Transportable temporary anchor devices**

Due care should be taken to assess the suitability of a transportable temporary anchor device and any associated fixings for the application in which it is to be used. The viability of any installation should be verifiable by a qualified engineer.

#### **A.5 Anchor devices employing flexible anchor lines**

For devices employing horizontal anchor lines of fibre rope, webbing or wire rope, the minimum breaking soundness of the rope or webbing should 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 should be designed using the manufacturer's design methods and criteria. These design methods and criteria should be proved in accordance with 4.3.3.3.

Wherever possible, the device should be installed on structures that allow the device to be tested. Where it is not practicable to subject the main supporting structure to test forces, all extremity and intermediate structural anchors used in the device should be previously shown to be capable of sustaining twice the maximum predicted force. Calculations performed by a qualified engineer should verify that the main supporting structure with extremity and intermediate structural anchors will sustain such forces.

In applications where it is not possible to verify by calculation, e.g. where mechanical properties of installation materials are not known, the installer should verify the suitability by installing a device in the site material and ensuring that the test requirements of 4.3.3 are met.

For fixings in all materials each extremity or intermediate structural anchor, after installation, should be submitted to a pull-out test to confirm the strength of the fixing. The test force should be 5 kN. The structural anchor should sustain the force for a minimum of 15 s.

If an installation contains sections of anchor line at angles greater than 15° from the horizontal, the installer should ensure that the structural anchor is designed to withstand the forces that can be generated in the line in the event of a fall arrest, and the distance of the fall should be minimized.

The installer should also ensure that the distance required or necessary to arrest the fall of a falling worker does not exceed the distance available on site.



**A.6 Class D — Anchor devices employing rigid anchor lines**

For fixings in steelwork or timber, the design and installation should be verified by calculation by a qualified engineer to be capable of sustaining the type test force.

For fixings in other materials the installer should verify the suitability by carrying out a test in a sample of the material. The sample should meet the type test requirement of 4.3.4. Thereafter each structural anchor, after installation in that material, should be submitted to an axial pull-out force of 5 kN to confirm the soundness of the fixing. The structural anchor should sustain the force for a minimum of 15 s.

The installer should ensure that the distance required or necessary to arrest the fall of a falling worker does not exceed the distance available on site.

**A.7 Class E — Deadweight anchor devices**

Deadweight anchor devices of the water-weight type should be withdrawn from service if any leakage occurs.

**Annex B** *deleted*

**Annex ZA (informative)****Clauses of this European Standard addressing essential requirements or other provisions of EU directives**

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 Directives.

WARNING. Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

The following clauses of this standard are likely to support requirements of Directive 89/686/EEC, Annex II, clause 3.1.2.2.

4.2 and 4.3.1 (anchor device class A)
4.2 and 4.3.2 (anchor device class B)
4.2 and 4.3 (anchor device class D)
4.2 and 4.3.5 (anchor device class E)
Elements and components of the class C system may be covered by the PPE directive, and may additionally be covered by other directives, e.g. the construction products directive.

Compliance with these clauses of this standard provides one means of conforming with the specific essential requirements of the Directive concerned and associated EFTA Regulations.

**Table ZA —**

Requirements of Annex II of the Directive 89/686/EEC		Clauses of this Standard
1.1.1	Ergonomics	4.2
1.1.2.1	Highest level of protection possible	4.2, 4.3
1.2.1.2	Satisfactory surface condition of all PPE parts in contact with the user	4.2
1.3.2	Lightness and design strength	4.2, 4.3
1.4	Information supplied by the manufacturer	clause 7, Annex A
2.1	PPE incorporating adjustment systems	4.2
2.12	PPE bearing one or more identification or recognition marks directly or indirectly relating to health and safety	clause 6
3.1.2.2	Prevention of fall from a height	4.2, 4.3



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