

BS EN 12492:2012



BSI Standards Publication

# Mountaineering equipment — Helmets for mountaineers — Safety requirements and test methods

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**National foreword**

This British Standard is the UK implementation of EN 12492:2012. It supersedes BS EN 12492:2000 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PH/6/6, Protective helmets for sport and leisure.

A list of organizations represented on this committee can be obtained on request to its secretary.

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## Mountaineering equipment - Helmets for mountaineers - Safety requirements and test methods

Equipements d'alpinisme et d'escalade - Casques  
d'alpinistes - Exigences de sécurité et méthodes d'essai

Bergsteigerausrüstung - Bergsteigerhelme -  
Sicherheitstechnische Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 17 December 2011.

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## Foreword

This document (EN 12492:2012) has been prepared by Technical Committee CEN/TC 158 “Head protection”, the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by August 2012, and conflicting national standards shall be withdrawn at the latest by August 2012.

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 supersedes EN 12492:2000.

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(s), see informative Annex ZA, which is an integral part of this document.

Annex B provides details of significant technical changes between this European Standard and the previous edition.

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, 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 protection given by a helmet depends on the circumstances of the accident and wearing a helmet cannot always prevent death or long term disability.

A proportion of the energy of an impact is absorbed by the helmet, thereby reducing the force of the blow sustained by the head. The structure of the helmet may be damaged in absorbing this energy and any helmet that sustains a severe blow needs to be replaced even if damage is not apparent.

Mountaineers' helmets are fitted with a retention system to retain the helmet on the head. However, there may be a foreseeable risk that helmets could become trapped and thereby cause a risk of strangulation.

## 1 Scope

This European Standard specifies safety requirements and test methods for safety helmets for use in mountaineering.

## 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 960:2006, *Headforms for use in the testing of protective helmets*

ISO 6487, *Road vehicles — Measurement techniques in impact tests — Instrumentation*

## 3 Terms and definitions

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

### 3.1

#### **helmet for mountaineers (hereafter referred to as helmet)**

headwear primarily intended to protect the upper part of a wearer's head against hazards which might occur during activities carried out by mountaineers

### 3.2

#### **shell**

hard, smoothly finished material that provides the general outer form of the helmet

### 3.3

#### **helmet type**

helmet which is characterized by:

- a) the tradename or mark;
- b) the materials and dimensions of the shell;
- c) the materials and dimensions of the protective padding;
- d) the materials and dimensions of the retention system

### 3.4

#### **protective padding**

material which is used to absorb impact energy

### 3.5

#### **comfort padding**

liner material provided for the wearer's comfort

### 3.6

#### **sizing padding**

liner material used for adjustment of the helmet size

### 3.7

#### **retention system**

complete assembly by means of which the helmet is maintained in position on the head, including any devices for adjustment of the system or to enhance the wearer's comfort



### **3.8**

#### **chin strap**

part of the retention system consisting of a strap which passes under the wearer's jaw to retain the helmet in position

### **3.9**

#### **headform**

shape replacing the head which is used for testing certain characteristics

Note 1 to entry: The headform is designed in accordance with EN 960:2006.

## **4 Requirements**

### **4.1 Construction requirements**

#### **4.1.1 Materials**

For those parts of the helmet that come into contact with the skin, materials which are known to be likely to cause skin irritation or any adverse effect on health shall not be used. For a material not in general use, advice as to its suitability shall be sought before its introduction.

#### **4.1.2 Projections**

There shall be no sharp edges, roughness or projection on any part of the helmet which is in contact or potential contact with the wearer when the helmet is worn, such as is likely to cause injury to the wearer.

#### **4.1.3 Retention system**

The helmet shall be fitted with a retention system, including a chin strap. The retention system shall have at least three separate points of attachment to the shell. The chin strap shall be adjustable in length. That part of the chin strap which comes into contact with the jaw shall have a minimum width of 15 mm under a load of 250 N.

#### **4.1.4 Ventilation**

All helmets shall be ventilated.

The sum of the cross-sectional areas of such ventilation shall not be less than 4 cm<sup>2</sup> when measured on the surface of the helmet.

### **4.2 Performance requirements**

#### **4.2.1 Shock absorption**

##### **4.2.1.1 Vertical energy absorption capacity**

When a helmet is tested by the method described in 5.5, the force transmitted to the headform shall not exceed 10 kN, for a drop height of (2 000 ± 10) mm of the hemispherical striker described in 5.5.3.4.

##### **4.2.1.2 Front energy absorption capacity**

When a helmet is tested by the method described in 5.5, the force transmitted to the headform shall not exceed 10 kN, for a drop height of (500 ± 10) mm of the flat striker described in 5.5.3.4.

#### **4.2.1.3 Side energy absorption capacity**

When a helmet is tested by the method described in 5.5, the force transmitted to the headform shall not exceed 10 kN, for a drop height of  $(500 \pm 10)$  mm of the flat striker described in 5.5.3.4.

#### **4.2.1.4 Rear energy absorption capacity**

When a helmet is tested by the method described in 5.5, the force transmitted to the headform shall not exceed 10 kN, for a drop height of  $(500 \pm 10)$  mm of the flat striker described in 5.5.3.4.

#### **4.2.2 Penetration**

When a helmet is tested on two points of impact, apart from each other as at least 50 mm, by the method described in 5.6, there shall be no contact between the striker and the headform, for a drop height of  $(1\ 000 \pm 5)$  mm of the conical striker described in 5.6.3.4.

#### **4.2.3 Retention system strength**

When a helmet is tested by the method described in 5.7, the maximum elongation of the whole system shall not exceed 25 mm.

#### **4.2.4 Retention system effectiveness (roll off)**

When a helmet is tested by the method described in 5.8, for the front way and rear way tests, the helmet shall not come off the headform.

## **5 Test methods**

### **5.1 Sampling**

For every type of helmet, helmet samples shall be submitted for testing in the condition in which they are offered for sale, including any requisite holes in the shell and any means of attachment for accessories specified by the manufacturer.

No helmet that has been subjected to testing shall be offered for sale.

For every type of helmet, 11 helmet samples are required for the tests (see Table 1):

- 6 of the smallest size of the range of the helmet type; and
- 5 of the largest size of the range of the helmet type.

### **5.2 Helmet adjustment**

Before any testing on a headform, the helmet shall be adjusted to the headform size and positioned in accordance with the manufacturer's instructions.

The smallest headform is the smallest size, in accordance with 5.4, which is within the size range specified by the manufacturer for the particular size and type of helmet.

The largest headform is the largest size, in accordance with 5.4, which is within the size range specified by the manufacturer for the particular size and type of helmet.

## 5.3 Conditioning

### 5.3.1 General

Before any testing the helmet shall be conditioned in accordance with the conditioning defined in Table 1 and the relevant specifications defined in 5.3.2 to 5.3.4.

**Table 1 — Conditioning of test samples and size of test headforms**

	Stabilizing procedure	UV ageing	Thermal plus +35 °C	Thermal minus -20 °C	Ambient +20 °C	Helmet N°
Top impact	Yes	Smallest	Largest	Largest		1-2-3
Front impact	Yes	Size and conditioning to be chosen by the laboratory				4
Side impact	Yes	Size and conditioning to be chosen by the laboratory				5
Back impact	Yes	Size and conditioning to be chosen by the laboratory				6
Penetration	Yes	Largest	Smallest	Smallest		7-8-9
Retention strength	Yes	--	--	--	Smallest	10
Roll off front and back	Yes	--	--	--	Smallest	11

### 5.3.2 U.V. ageing

#### 5.3.2.1 Apparatus

A high pressure xenon 450 Watt lamp with quartz casing, operated in accordance with the lamp manufacturer's instructions.

A means to support the helmet so that it is exposed to the radiation.

#### 5.3.2.2 Procedure

Secure the helmet so that the vertical axis through the crown of the helmet (as worn) is perpendicular to the axis of the lamp and the distance between the crown of the helmet and the axis of the lamp is  $(150 \pm 5)$  mm.

Expose the helmet to the radiation for  $(400 \pm 4)$  h. It shall then be removed and allowed to return to laboratory ambient conditions.

NOTE The method described in Annex A may be used as an alternative.

#### 5.3.3 'Thermal plus' conditioning

The helmet shall be exposed to a temperature of  $(35 \pm 2)$  °C for between 4 h and 24 h.

#### 5.3.4 'Thermal minus' conditioning

The helmet shall be exposed to a temperature of  $(-20 \pm 2)$  °C for between 4 h and 24 h.

## 5.4 Headforms

The head forms used shall comply with EN 960:2006. The sizes in Table 2 shall be used, except for determination of shock absorbing capacity, for which only size designations 495, 535, 575, 605 and 625 shall be used.

NOTE Table 2 gives the EN 960:1994 equivalent letter codes to the EN 960:2006 size designations for headforms with similar nominal dimensions. These are as given in EN 960:2006, Annex C. The EN 960:2006 size designation approximates to the circumference of the headform at the reference plane, in mm.

**Table 2 — Sizes of headforms**

Size designation (circumference of headform at reference plane, mm)	Code letter (EN 960:1994)
495	A
515	C
535	E
555	G
575	J
585	K
605	M
625	O

## 5.5 Shock absorption

### 5.5.1 Impact points

The four impact points are shown in Figure 1.

### 5.5.2 Principle

A specified striker is allowed to fall with specified energy on to a helmet which is fitted to a rigidly mounted headform. The transmitted force is measured by means of a force transducer located beneath the headform.

### 5.5.3 Apparatus

#### 5.5.3.1 General

The apparatus shall include:

- a base;
- a test headform;
- a striker;
- a guidance system;
- a means to measure impact speed;
- instrumentation to record and analyse the data.

### 5.5.3.2 Base

The base shall be solid, made of steel or a combination of steel and concrete and have a mass of no less than 500 kg. At least the uppermost 25 mm consist of steel, which shall be firmly attached to the concrete if present. No part of the base and headform mounting assembly shall have a resonant frequency liable to affect the measurements.

NOTE See 5.5.3.7 regarding frequency response.

### 5.5.3.3 Test headforms

The headforms shall be in accordance with 5.4.

The headform shall be positioned so that the impact axis coincides with those of the force transducer and striker.

### 5.5.3.4 Striker

The striker shall be made of steel and have a mass of  $(5 \pm 0,05)$  kg.

The flat striker shall have a flat striking face of diameter  $(130 \pm 3)$  mm, with the edge of its circumference radiused to nominally 2 mm.

The hemispherical striker shall have a hemispherical striking face of radius  $(50 \pm 1)$  mm.

### 5.5.3.5 Guidance system

Means shall be provided for the striker to be dropped in free or guided fall.

The guidance system shall be such as to ensure that the striker:

- shall be positioned above the headform so that its central axis coincides with the central vertical axis of the force transducer; and
- falls on to the required impact point with an impact speed of no less than 95 % of that which would theoretically be obtained for a free fall.

### 5.5.3.6 Means to measure impact speed

Unless free fall is employed, means shall be provided to measure the striker speed at a distance of no more than 60 mm prior to impact, to within an accuracy of  $\pm 1$  %.

The impact speed shall be measured during the commissioning of the apparatus. It need not be done for each impact.

### 5.5.3.7 Instrumentation to record and analyse data

#### 5.5.3.7.1 Force transducer

The non-inertial force transducer shall be firmly attached to the base and arranged so that its sensitive axis coincides with the axis passing through the Z point of the headform and the centre of the striker. The transducer shall be capable of withstanding a maximum compressive force of 100 kN without damage.

#### 5.5.3.7.2 Signal conditioning instrumentation

The instrumentation shall provide for the complete measuring channel to have a frequency response in accordance with channel frequency class (CFC) 600 of ISO 6487. If digital sampling is employed, a sample rate of at least 10 kHz shall be used. The required 600 Hz low pass filter may be included within the computer software.

Means shall be provided to record the maximum force transmitted during impact, to the nearest 10 N.

#### **5.5.4 Procedure**

Within 2 min of its removal from conditioning (this time applies to temperature conditioning only), the helmet shall be fitted to the appropriate headform in accordance with 5.2 and the striker shall be allowed to fall on to the specified impact point.

If the design of the helmet permits direct contact between the headform and the striker, the test shall not be performed and the result shall be declared a failure.

#### **5.5.5 Report**

Record and report the maximum force transmitted during the impact, to the nearest 10 N.

### **5.6 Resistance to penetration**

#### **5.6.1 Impact area**

The impact area to determine the resistance to penetration of the helmet is defined within a circle of radius 50 mm centred on the top of the helmet. Two tests shall be carried out in this area at least 50 mm apart from each other.

#### **5.6.2 Principle**

A specified striker is allowed to fall with specified energy on to a helmet which is fitted to a rigidly mounted test block. Note is taken of whether or not contact is made between the striker and the test block.

#### **5.6.3 Apparatus**

##### **5.6.3.1 General**

The apparatus shall include:

- a base;
- a test block;
- a restraining system;
- a striker;
- a guidance system;
- a means to measure impact speed.

##### **5.6.3.2 Base**

The base shall be solid, made of steel or a combination of steel and concrete and have a mass of no less than 500 kg. At least the uppermost 25 mm shall consist of steel, which shall be firmly attached to the concrete if present.

##### **5.6.3.3 Test block**

A hemispherical test block of hardwood with a soft metal insert located at the top of its central vertical axis is mounted on a rigid support. Elasticated restraining straps are provided to assist in retaining the helmet in position during the test. They should be such as not to affect the correct performance of the test. A suitable apparatus is shown in Figure 2.

#### 5.6.3.4 Striker

The characteristics of the conical striker are as follows:

- mass: (3 000 ± 25) g;
- angle of point: (60 ± 1)°;
- radius of point: (0,5 ± 0,1) mm;
- minimum height of cone: 40 mm;
- hardness of tip: (50 to 45) HRC.

#### 5.6.3.5 Guidance system

Means shall be provided for the striker to be dropped in free or guided fall.

The guidance system shall be such as to ensure that the striker:

- shall be positioned above the test block so that its central axis coincides with the point of impact on the helmet; and
- falls on to the required impact position with an impact speed of no less than 95 % of that which would theoretically obtain for a free fall.

#### 5.6.3.6 Means to measure impact speed

Unless free fall is employed, means shall be provided to measure the striker speed at a distance of no more than 60 mm prior to impact, to within an accuracy of ± 1 %.

The impact speed shall be measured during the commissioning of the apparatus. It need not be done for each impact.

#### 5.6.4 Procedure

Within 2 min of its removal from conditioning (this time applies to temperature conditioning only), the helmet shall be fitted to the test block and secure using the restraining system. Rotate the helmet so as to present the required impact point to the striker. The striker shall be allowed to fall on to the specified impact point.

Note whether contact is made between the striker and the test block or whether the surface of the soft metal (or equivalent) insert in the test block is visibly damaged. If necessary, restore the surface of the soft metal (or equivalent) insert in the test block, prior to a subsequent test.

If the design of the helmet permits direct contact between the headform and the striker, the test shall not be performed and the result shall be declared a failure.

#### 5.6.5 Report

Report whether contact was made between the striker and the test block or whether the surface of the soft metal (or equivalent) insert in the test block was visibly damaged.

### 5.7 Retention system strength

#### 5.7.1 Principle

A helmet is supported on a headform and a specified varying force is applied to the retention system via an artificial jaw. The elongation as well as the ultimate tensile strength of the system is measured.

## 5.7.2 Apparatus

### 5.7.2.1 General

The apparatus shall include:

- a test headform;
- a rigid structure to support the headform;
- an artificial jaw;
- a means of applying a known variable force to the artificial jaw;
- a means to measure the displacement of the artificial jaw.

An arrangement of a suitable apparatus is shown in Figure 3.

### 5.7.2.2 Test headforms

The headforms shall be in accordance with 5.4.

### 5.7.2.3 Rigid structure

The rigid structure shall be such as to support the headform so that it does not move during the test.

### 5.7.2.4 Artificial jaw

The artificial jaw comprises two rigid cylindrical rollers of diameter  $(12,5 \pm 0,5)$  mm, with their longitudinal axes separated by  $(75 \pm 2)$  mm. Any suitable means of applying a known variable force to the artificial jaw and measuring the displacement of the artificial jaw may be used.

## 5.7.3 Procedure

Mount the helmet on the appropriate headform and pass the chinstrap around the artificial jaw and secure it.

Apply an initial force of  $(30 \pm 3)$  N in order to ensure that the fastening device is correctly tightened. Note the position, P0, of the load bearing spindle to the nearest mm.

Increase the force linearly over a period of  $(30 \pm 3)$  s up to  $(500 \pm 10)$  N. Maintain this force for  $(120 \pm 3)$  s, then note the position, P1, of the load bearing spindle to the nearest mm.

Increase the force linearly at a rate of  $(500 \pm 50)$  N/min until the artificial jaw is released due to failure of the retention system. Record, for information only, the maximum force measured during the test and the mode of failure of the retention system.

## 5.7.4 Report

Calculate and report the elongation of the retention system as the difference between positions P0 and P1.

Report, for information only, the maximum force measured during the test and the mode of failure of the retention system.

## 5.8 Retention system effectiveness

### 5.8.1 General

Testing shall be performed in ambient conditions as described in 5.3.2.



The helmet shall be fitted to the appropriate headform, this shall be done in accordance with the manufacturer's fitting instructions, if supplied. If none are supplied, the helmet shall be fitted so as to simulate typical in use fitting.

The test shall be performed so that the pull is exerted from the front and the rear.

## **5.8.2 Principle**

The helmet is mounted on a test headform and then subjected to a sudden force applied at the front and rear edge of the helmet, tending to rotate it on the headform. The degree of any rotation is observed.

## **5.8.3 Apparatus**

### **5.8.3.1 General**

The apparatus shall include:

- a test headform;
- a rigid base to support the headform;
- a falling mass and associated guidance system;
- a means to measure impact speed.

An arrangement of a suitable apparatus is shown in Figure 4.

### **5.8.3.2 Test headforms**

The headforms shall be in accordance with 5.4.

### **5.8.3.3 Rigid base**

The rigid base shall be such as to support the headform so that its vertical axis is indeed vertical and so that during the test it does not move.

### **5.8.3.4 Falling mass and guidance system**

A guidance system shall be provided to enable the falling mass of  $(10 \pm 0,1)$  kg to be dropped in guided fall on to the metal end stop. The guidance system shall have a total mass of  $(3 \pm 0,1)$  kg.

The falling mass shall be connected to the helmet by means of a twisted steel wire of minimum diameter 3 mm running over a pulley of diameter  $(100 \pm 2)$  mm and a hook of nominal width 25 mm.

The guidance system shall be such as to ensure that the falling mass falls with an impact speed of no less than 95 % of that which would theoretically obtain for a free fall.

### **5.8.3.5 Means to measure impact speed**

Means shall be provided to measure the speed of the falling mass at a distance of no more than 60 mm prior to impact, to within an accuracy of  $\pm 1$  %.

The impact speed shall be measured during the commissioning of the apparatus. It need not be done for each test.

#### **5.8.4 Procedure**

Mark a horizontal datum line on the outside of the helmet. Fit the helmet in accordance with the manufacturer's fitting instructions to the smallest available headform appropriate to the helmet size.

Adjust the retention system as tight as possible, by hand.

Attach the hook over the front/rear edge of the helmet at the centre and arrange the wire to pass over the longitudinal vertical median plane of the helmet.

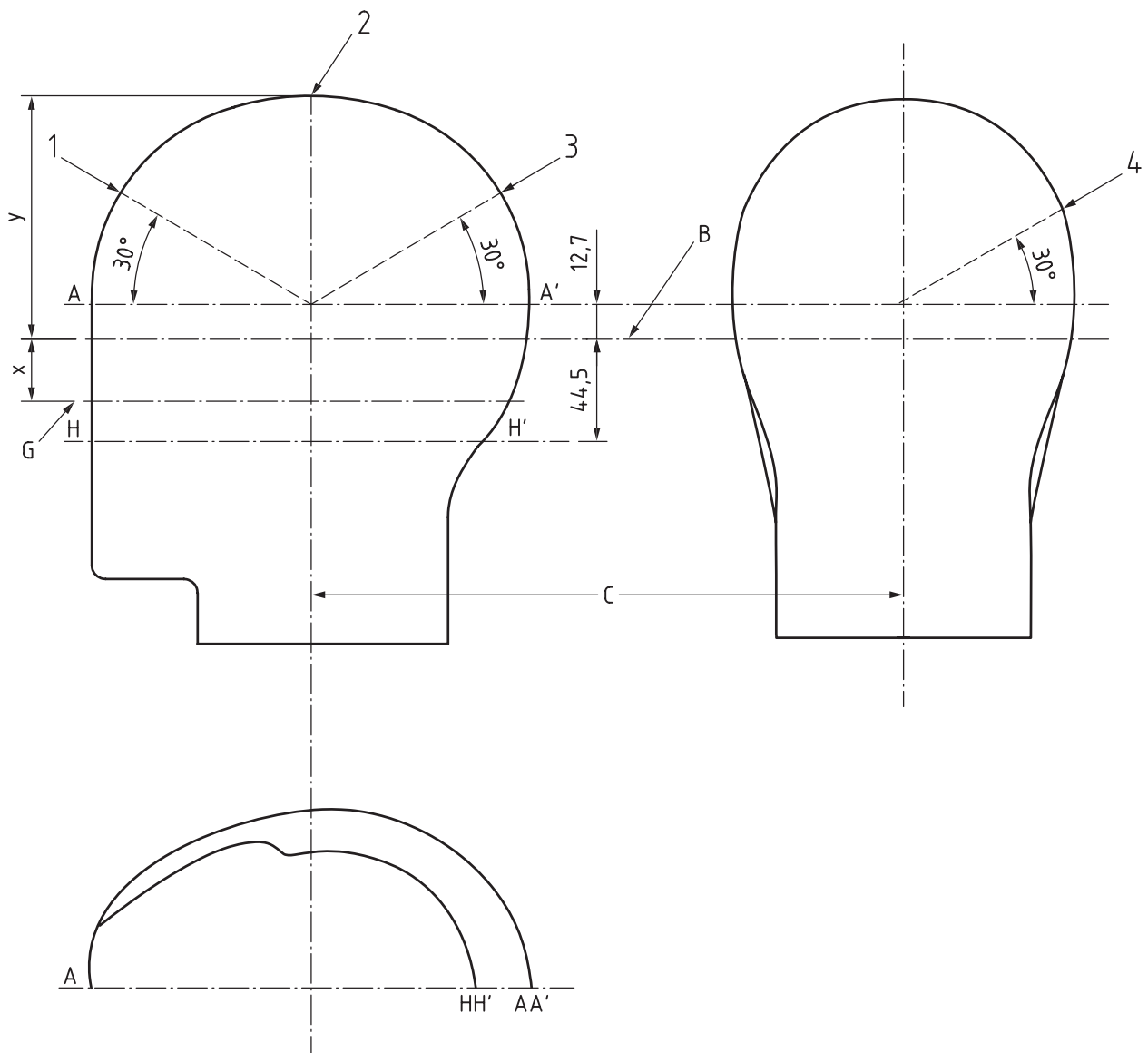
Arrange for the falling mass to drop through a distance of  $(175 \pm 5)$  mm and release the mass.

Observe whether the helmet comes off the headform completely. If it does not, measure the angle that the helmet has rotated to the nearest degree, being the angle between the datum line drawn on the helmet and the horizontal.

#### **5.8.5 Report**

Report if the helmet came off the headform completely or, alternatively, the angle through which it rotated.

Dimensions in millimetres (with a tolerance of  $\pm 1$  mm, unless otherwise indicated)

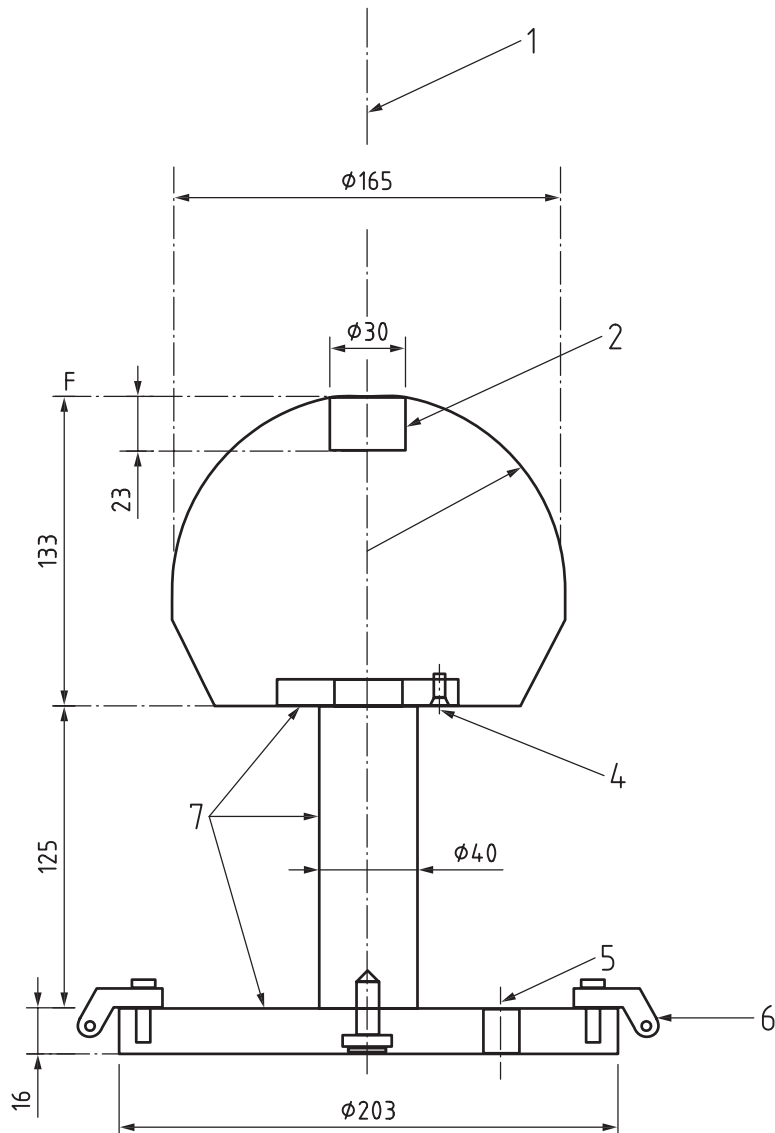


**Key**

- 1 to 4 impact points
- B reference plane
- C central vertical axis
- G basic plane
- AA' see EN 960:2006
- HH' a plane parallel to, and 44,5 mm vertically below, the reference plane

**Figure 1 — Impact points on helmet**

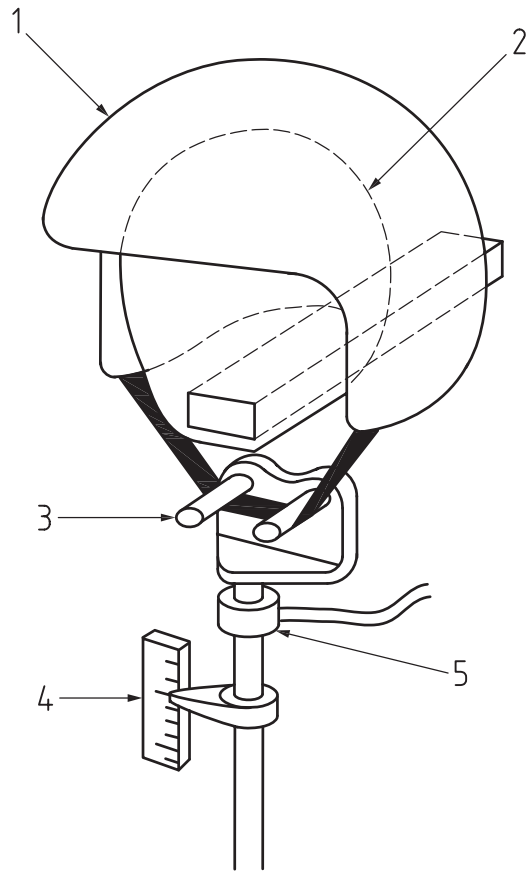
Dimensions in millimeters (tolerances  $\pm 1$  mm unless otherwise indicated)



**Key**

- 1 striker axis
- 2 soft metal insert
- 3 spherical radius ( $66,5 \pm 0,5$ )
- 4 3 screws equi-spaced
- 5 holes equi-spaced
- 6 strap anchors
- 7 metal

**Figure 2 — Test block for testing penetration resistance**

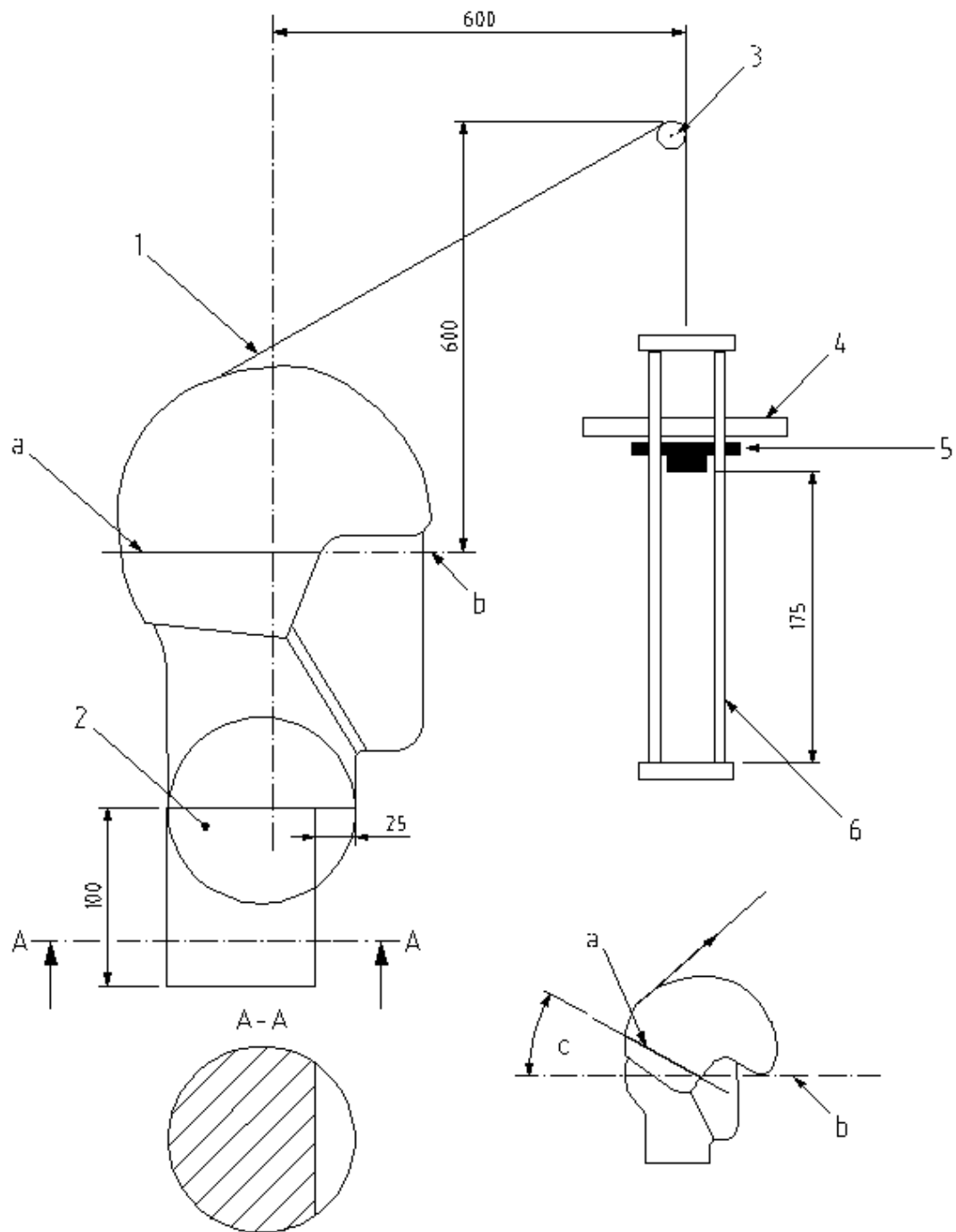


**Key**

- 1 helmet
- 2 headform
- 4 extension measuring device
- 3 chin strap stirrup
- 5 load cell (optional)

**Figure 3 — Apparatus for testing of the retention system strength**

Dimensions in millimetres



**Key**

- 1 flexible connection
- 2 base
- 3 pulley
- 4 frame
- 5 drop weight
- 6 guiding system
- a datum line on helmet
- b horizontal
- c angle of helmet rotation after test

**Figure 4 — Apparatus for testing of the retention system effectiveness**

## 6 Marking and labelling

### 6.1 Marking

Each helmet shall be marked in such a way that the following information is easily legible by the user and is likely to remain legible throughout the life of the helmet:

- a) the number of this European Standard;
- b) the name or trademark of the manufacturer and/or his authorized representative;
- c) the designation of the model;
- d) the year and quarter of manufacture;
- e) the size or size range (in cm).

### 6.2 Labelling

A label shall be attached to each helmet when offered to sales, giving the following instructions, at least in the official language(s) of the Member State of destination:

- a) the designation "Helmet for mountaineers";
- b) for adequate protection this helmet has to fit or to be adjusted to the size of the user's head;
- c) the helmet is made to absorb the energy of a blow by partial destruction or damage, and even though such damage may not be readily apparent, any helmet subjected to severe impact should be replaced;
- d) the attention of the users is also drawn to the damage of modifying or removing any of the original component parts of the helmet, other than as recommended by the helmet manufacturer. Helmets should not be adapted for the purpose of fitting attachments in any way not recommended by the helmet manufacturer;
- e) do not apply paint, solvents, adhesives or self-adhesive labels, except in accordance with instructions from the helmet manufacturer;
- f) for cleaning, maintenance or disinfection, use only substances that have no adverse effect on the helmet and are not known to be likely to have any adverse effect upon the wearer, when applied in accordance with the manufacturer's instructions and information.

## 7 Information supplied by the manufacturer

The following information, provided precisely and comprehensibly in the official language(s) of the country of sale, shall accompany each helmet:

- a) the name and address of the manufacturer and/or his authorized representative established in the community;
- b) instructions or recommendations regarding adjustment, fitting, use, cleaning, disinfection, maintenance, servicing and storage;
- c) details of suitable accessories and appropriate spare parts;
- d) relevant information regarding the obsolescence deadline or period of obsolescence of the helmet and component parts;
- e) relevant information regarding details of the type of packaging suitable for storage and transporting to the point of sale.

## Annex A (informative)

### Alternative test method for artificial ageing

The helmet submitted to artificial ageing should be exposed to the radiation of a xenon arc lamp. The radiant energy of the lamp should be filtered to provide a spectral power distribution that closely approximates that of terrestrial daylight.

The helmet should be fixed on a cylindrical holder concentric to the lamp and which rotates at a speed of 1 rev/min to 5 rev/min around its axis.

Each helmet which will subsequently be tested for shock absorption, or for penetration, should be orientated so that the area of test should be directed towards the lamp. The plane tangential to the shell at this point should be normal to a radius of the cylindrical holder.

The radiant energy incident in the plane of the test areas should be either measured or calculated from information provided by the manufacturer of the test apparatus the exposure interval should be adjusted so that the exposed samples should receive a total energy of 1 GJ/m<sup>2</sup> over the wavelength range 280 nm to 800 nm.

The sample should be sprayed with distilled or demineralized water (having a conductivity below 5 µS/cm) intermittently with a cycle of 18 min of spraying and 102 min without spraying. During the latter periods, the measured relative humidity should be (50 ± 5) %.

The temperature within the test chamber should be measured with a black standard thermometer placed at the same distance from the lamp as the exposed test areas of the helmets. The temperature should be maintained at (70 ± 3) °C.

All other test and calibration conditions for the apparatus should be in accordance with EN ISO 4892-1, EN ISO 4892-2 and EN ISO 4892-3, Method A.

NOTE 1 Not all available test apparatus, otherwise meeting the requirements of EN ISO 4892-1, EN ISO 4892-2 and EN ISO 4892-3, will incorporate sample holder frames of diameter sufficient to accommodate complete helmets.

NOTE 2 The position of the water sprays may require adjustment in order to avoid interference with the test samples.

NOTE 3 The energy output of the xenon arcs should be capable of being reduced below normal operational levels, so as to maintain acceptable intensities in the sample surface plane required by this procedure.



## Annex B (informative)

### Significant technical changes between this European Standard and EN 12492:2000

The significant changes with respect to the first edition of EN 12492 are as listed below.

**Table B.1 — Significant changes between this European Standard and EN 12492:2000**

Clause/paragraph/table/figure	Change
Clause 2	The normative references in Clause 2 and in the text have been updated.  EN 960 has been dated throughout the text.
Table 2	The headform circumferences have been changed to size designations and between brackets circumference of headform at reference plane. The values have been updated.  The equivalent code letters have been kept for reference.  An explanatory note has been added before the table.
Figure 1	The key has been updated.
Annex ZA	Has been updated.
Bibliography	Has been updated.
NOTE The technical changes referred include the significant technical changes from the EN revised but is not an exhaustive list of all modifications from the previous version.	

## Annex ZA (informative)

### Relationship between this European Standard and the Essential Requirements of EU Directive 89/686/EEC Personal Protective Equipment

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 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 the EU Directives**

EU Directive 89/686/ECC, Annex II	Clauses of this European Standard	Qualifying remarks/notes
1.2.1 Absence of risks and other inherent nuisance factors	4.1.3,4.2.4	
1.3.2 Lightness and design strength	5.3	
1.4 Information supplied by the manufacturer	6, 7	
2.1 PPE incorporating adjustment systems	4.2.3	
2.4 PPE subject to ageing	7 d)	
2.12 PPE bearing one or more identification or recognition marks directly or indirectly relating to health and safety	6	
3.1.1 Impact caused by falling or projecting objects and collision of parts of the body with an obstacle	4.2.1, 4.2.2	

## Bibliography

- [1] EN 564, *Mountaineering equipment — Accessory cord — Safety requirements and test methods*
- [2] EN 565, *Mountaineering equipment — Tape — Safety requirements and test methods*
- [3] EN 566, *Mountaineering equipment — Slings — Safety requirements and test methods*
- [4] EN 567, *Mountaineering equipment — Rope clamps — Safety requirements and test methods*
- [5] EN 568, *Mountaineering equipment — Ice anchors — Safety requirements and test methods*
- [6] EN 569, *Mountaineering equipment — Pitons — Safety requirements and test methods*
- [7] EN 892, *Mountaineering equipment — Dynamic mountaineering ropes — Safety requirements and test methods*
- [8] EN 893, *Mountaineering equipment — Crampons — Safety requirements and test methods*
- [9] EN 958, *Mountaineering equipment — Energy absorbing systems for use in klettersteig (via ferrata) climbing — Safety requirements and test methods*
- [10] EN 959, *Mountaineering equipment — Rock anchors — Safety requirements and test methods*
- [11] EN 12492, *Mountaineering equipment — Helmets for mountaineers — Safety requirements and test methods*
- [12] EN 12270, *Mountaineering equipment — Chocks — Safety requirements and test methods*
- [13] EN 12275, *Mountaineering equipment — Connectors — Safety requirements and test methods*
- [14] EN 12276, *Mountaineering equipment — Frictional anchors — Safety requirements and test methods*
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- [20] EN ISO 4892-3, *Plastics — Methods of exposure to laboratory light sources — Part 3: Fluorescent UV lamps (ISO 4892-3:)*
- [21] (00136079)<sup>1)</sup>, *Mountaineering equipment — Descenders — Safety requirements and test methods*

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<sup>1)</sup> In preparation.





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