BS EN 13087-4:2012

BSI Standards Publication

Protective helmets — Test methods

Part 4: Retention system effectiveness

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 13087-4:2012. It supersedes BS EN 13087-4:2000 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PH/6, Head protection.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 68426 5

ICS 13.340.20

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 29 February 2012.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13087-4

February 2012

ICS 13.340.20

Supersedes EN 13087-4:2000

English Version

Protective helmets - Test methods - Part 4: Retention system effectiveness

Casques de protection - Méthodes d'essai - Partie 4: Efficacité du système de rétention

Schutzhelme - Prüfverfahren - Teil 4: Wirksamkeit des Haltesystems

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

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword 3

Introduction 4

1 Scope 5

2 Normative references 5

3 Terms and definitions 5

4 Prerequisites 5

5 Method 5
5.1 General 5
5.2 Principle 6
5.3 Apparatus 6
5.3.1 General 6
5.3.2 Test headforms 6
5.3.3 Rigid base 6
5.3.4 Falling mass and guidance system 6
5.3.5 Means to measure impact speed 6
5.4 Procedure 7
5.5 Report 7

Annex A (normative) **Test results – Uncertainty of measurement** 9

Annex B (informative) **Significant technical changes between this European Standard and EN 13087-4:2000** 10

Annex ZA (informative) **Relationship between this European Standard and the Essential requirements of EU Directive 89/686/EEC Personal Protective Equipment** 11

Foreword

This document (EN 13087-4:2012) 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 13087-4:2000.

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.

This European Standard consists of the following ten parts:

Part 1 : Conditions and conditioning;

Part 2 : Shock absorption;

Part 3 : Resistance to penetration;

Part 4 : Retention system effectiveness;

Part 5 : Retention system strength;

Part 6 : Field of vision;

Part 7 : Flame resistance;

Part 8 : Electrical properties;

Part 9 : Mechanical rigidity[1]*;*

Part 10 : Resistance to radiant heat.

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.

[1] To be published.

Introduction

This European Standard is intended as a supplement to the specific product standards for protective helmets (helmet standards). Test methods may be applicable to complete helmets or parts thereof, and may be referenced in the other helmet standards.

Performance requirements are given in the appropriate helmet standard, as are such prerequisites as the number of samples, preconditioning, preparation of samples for the tests, sequence and duration of testing and assessment of test results. If deviations from the test method given in this standard are necessary, these deviations will be specified in the appropriate helmet standard.

1 Scope

This European Standard specifies methods of test for protective helmets. The purpose of these tests is to enable assessment of the performance of the helmet as specified in the appropriate helmet standard.

This European Standard specifies the method of test for retention system effectiveness.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

EN 13087-1, *Protective helmets — Test methods — Part 1: Conditions and conditioning*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in this standard may be found in the appropriate helmet standard.

4 Prerequisites

In order to implement this part of EN 13087, at least the following parameters shall be specified in the appropriate helmet standard:

a) performance requirements;

b) number of samples;

c) preparation of samples;

d) sequence of conditioning;

e) sequence of tests;

f) direction of application of the force;

g) sizes of the headforms;

h) impact energy, including tolerance, of the falling mass;

i) fitting instructions.

5 Method

5.1 General

Testing shall be performed in the ambient conditions specified in EN 13087-1.

This test may be performed so that the pull is exerted from the front and/or from the rear. The method to be used is specified in the helmet standard.

5.2 Principle

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

5.3 Apparatus

5.3.1 General

The apparatus shall include:

— a series of headforms;

— a rigid base to secure the headforms;

— a falling mass and associated guidance system;

— a means to measure impact speed;

— a steel wire.

The arrangement of the apparatus is shown in Figure 1.

5.3.2 Test headforms

The headforms shall be in accordance with EN 960:2006, 2.2 and 3. The sizes to be used are specified in the helmet standard, but shall be selected from size designations 495, 515, 535, 555, 575, 585, 605 and 625 (equivalent to codes A, C, E, G, J, K, M and O, respectively, EN 960:1994).

5.3.3 Rigid base

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

5.3.4 Falling mass and guidance system

A guidance system shall be provided to enable the falling mass of (10 ± 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 ± 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 ± 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 not less than 95 % of that which would theoretically obtain for a free fall.

5.3.5 Means to measure impact speed

Means shall be provided to measure the speed of the falling mass at a distance of not 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 test.

5.4 Procedure

Fit the helmet in accordance with the fitting instructions to the smallest available headform appropriate to the helmet size. Adjust the retention system as tight as possible, by hand.

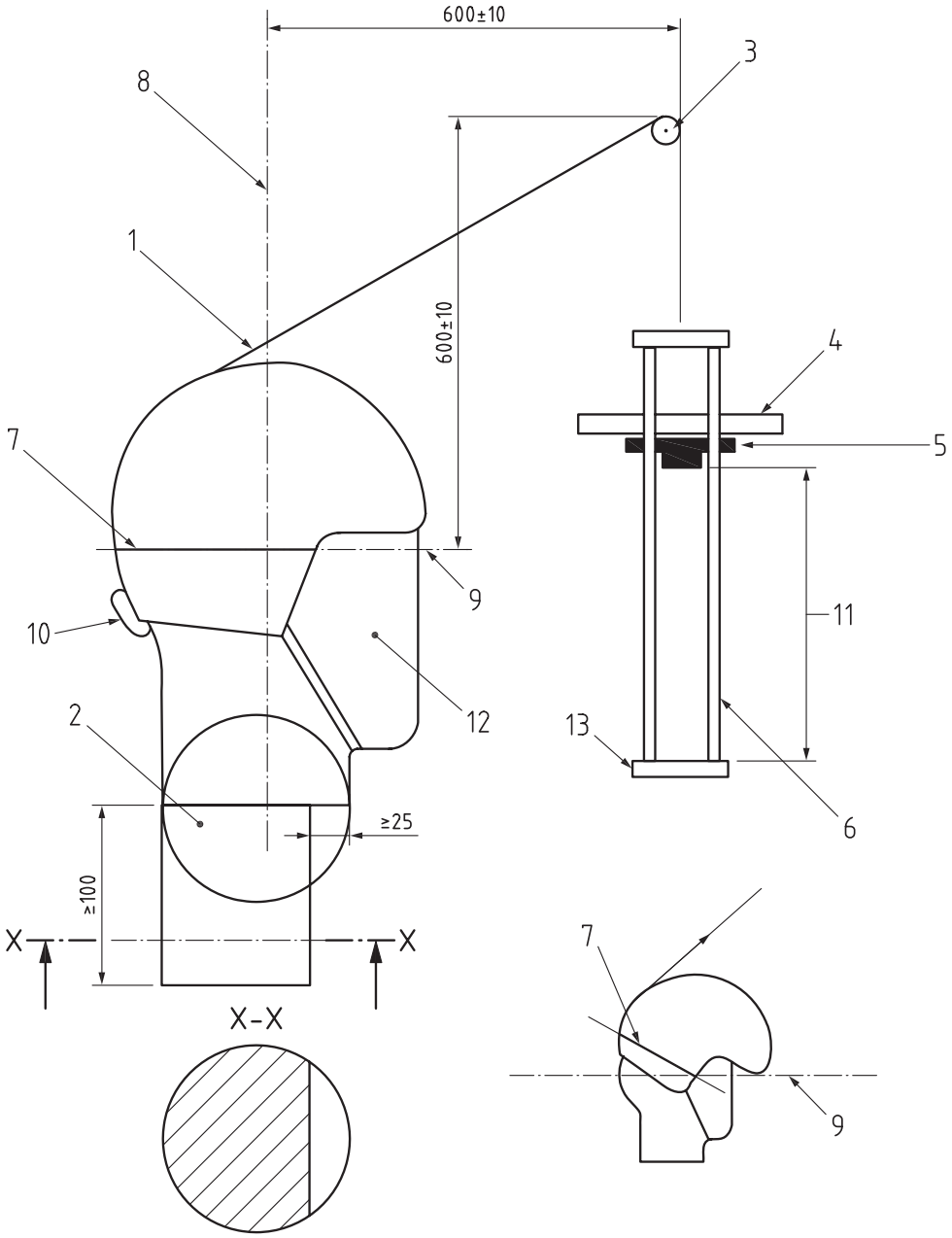
If the appropriate helmet standard requires the measurement of rotation, mark a horizontal datum line on the outside of the helmet.

Attach the hook over the front or rear edge of the helmet at the centre and arrange the steel wire to pass over the longitudinal vertical median plane of the helmeted headform. If the appropriate helmet standard requires the measurement of rotation, then measure to the nearest degree the angle that the helmet may have initially rotated. Arrange for the falling mass to fall through a drop height corresponding to the required impact energy specified in the appropriate helmet standard and release the mass. Observe whether the helmet comes off the headform completely. If it does not, and if required in the appropriate helmet standard, measure to the nearest degree the angle that the helmet has rotated, this being the angle between datum line drawn on the helmet and the horizontal (final rotation).

5.5 Report

Report if the helmet came off the headform completely or, alternatively, the angles of the initial (if required) and final rotations.

Dimensions in millimetres



Key

1	steel wire	8	central vertical axis
2	rigid base	9	reference plane
3	pulley	10	hook
4	frame	11	drop height
5	falling mass	12	headform
6	guiding system	13	metal end stop
7	datum line on the helmet		

Figure 1 — Arrangement of test apparatus

Annex A
(normative)

Test results – Uncertainty of measurement

For each of the required measurements performed in accordance with this standard, a corresponding estimate of the uncertainty of measurement shall be evaluated. This estimate of uncertainty shall be applied and stated when reporting test results, in order to enable the user of the test report to assess the reliability of the data.

Annex B
(informative)

Significant technical changes between this European Standard and EN 13087-4:2000

The significant changes with respect to the first edition of EN 13087-4 are as listed below.

Table B.1 — Significant changes between this European Standard and EN 13087-4:2000

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.
5.3.2	Update of cross references. Sizes have been extended to size designations and between brackets EN 960:1994 equivalent code letters.
Annex ZA	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, together with the relevant requirements given in the product standard, confers, within the limits of the scope of this standard, a presumption of conformity with the Essential Requirements 1.2.1 of Annex II of that Directive and associated EFTA regulations.

This page deliberately left blank

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

bsi.

...making excellence a habit.™