

Motorcyclists' protective clothing against mechanical impact —

Part 1: Requirements and test methods for impact protectors

The European Standard EN 1621-1:1997 has the status of a
British Standard

ICS 13.340.10; 43.140

National foreword

This British Standard is the English language version of EN 1621-1:1997.

The UK participation in its preparation was entrusted by Technical Committee PH/3, Protective clothing, to Subcommittee PH/3/9, Clothing for protection of riders of motorcycles, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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

Cross-references

The British Standards which implement international or European publications referred to in this document 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, the EN title page, pages 2 to 7 and a back cover.

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English version

Motorcyclists' protective clothing against mechanical impact — Part 1: Requirements and test methods for impact protectors

Vêtements de protection contre les chocs
mécaniques pour motocyclistes —
Partie 1: Exigences et méthodes d'essai des
protecteurs contre les chocs

Motorradfahrer-Schutzkleidung gegen
mechanische Belastung —
Teil 1: Anforderungen und Prüfverfahren für
Aufprall-Protektoren

This European Standard was approved by CEN on 17 November 1997.

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, Czech Republic, 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 162, Protective clothing including hand and arm protection and lifejackets, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 1998, and conflicting national standards shall be withdrawn at the latest by June 1998.

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 European 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.

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Introduction

This European Standard is part one of a standard for motorcycle riders' protective clothing. It contains requirements for impact protectors. Impact protectors meeting the requirements of this European Standard will provide some protection against injury caused by impacts with road surfaces in motorcycle accidents. They may also slightly reduce the injuries caused by impacts with objects such as other vehicles.

1 Scope

This European Standard specifies requirements and test methods for impact protectors incorporated or intended to be incorporated into motorcycle riders' clothing or used as separate items.

2 Normative reference

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.

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

3 Definitions

For the purposes of this European Standard the following definitions apply:

3.1

impact areas

areas of the body which are at greatest risk of impact in case of accidents

3.2

protector

an arrangement of energy absorbing and/or impact spreading materials designed to offer some protection to the impact areas

3.3

templates

pieces of flexible material used to define test areas

3.4

test areas

areas on which impact tests are performed

4 Requirements

4.1 General

Unless otherwise specified all dimensions and values shall be specified with a limit deviation of $\pm 2\%$.

4.2 Impact areas — protectors

The following body regions are specified as impact areas and protectors shall be categorized as follows:

- | | |
|--|----------------------|
| a) shoulder: | protector "S"; |
| b) elbow and forearm: | protector "E"; |
| c) hip: | protector "H"; |
| d) knee and upper tibia: | protector "K"; |
| e) knee, upper and middle tibia: | protector "K" + "L"; |
| f) the front of the leg below protector "K": | protector "L". |

The size of the impact areas shall comply with 5.2.2.

4.3 Force transmission

When impact protection is tested in accordance with clause 5, the mean value of the test results shall not exceed 35 kN and no single value shall exceed 50 kN.

5 Equipment

5.1 Apparatus

5.1.1 Dropping apparatus

The apparatus shall be such that a mass ("falling weight") may be released in order to drop along a guided vertical path onto the sample placed on a test anvil. The centre of the mass of the falling block shall lie over the centre of the anvil.

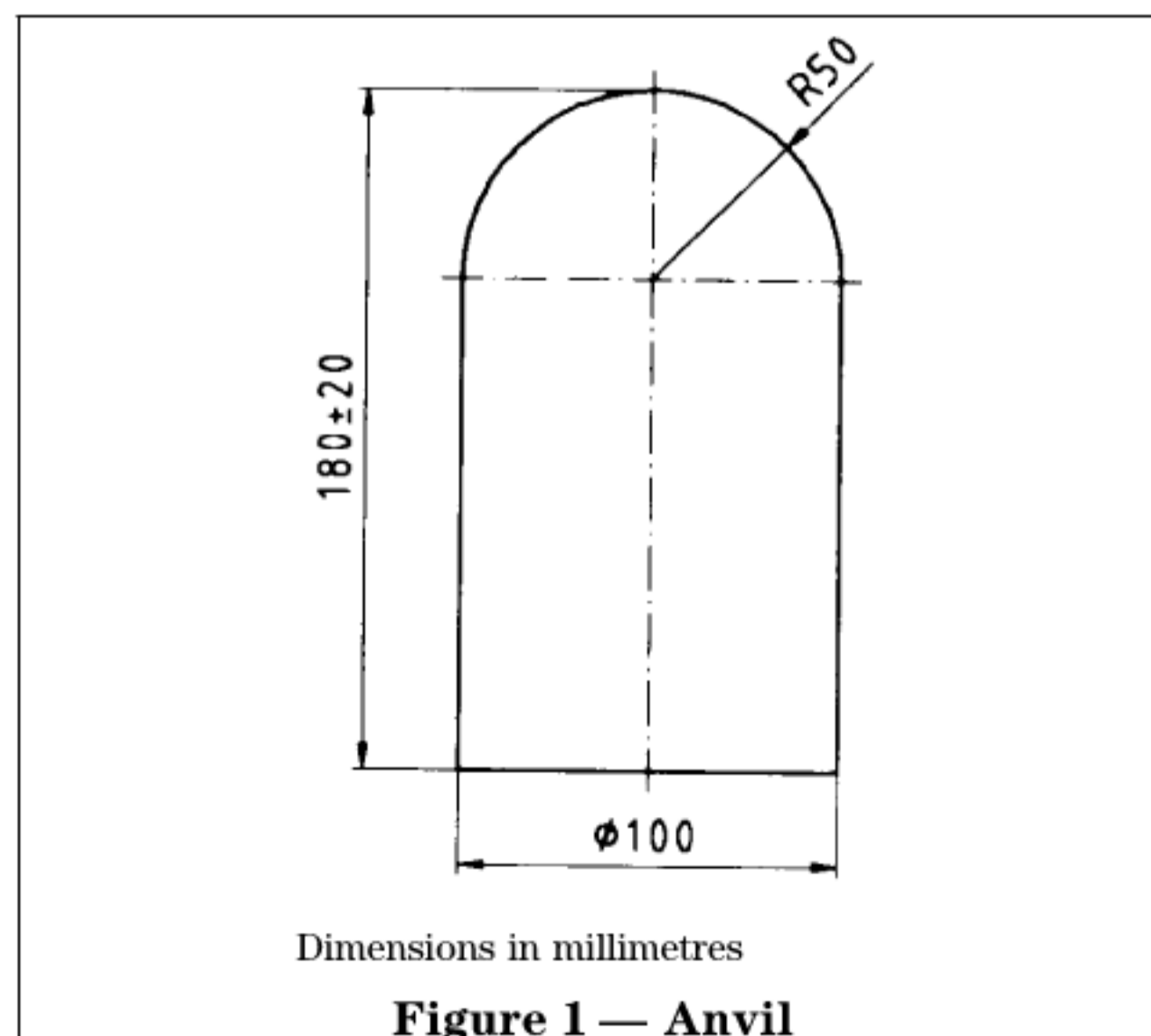
The mass shall weigh (5000 ± 10) g and its kinetic energy on impact shall be 50 J.

5.1.2 Drop striker

The striker face shall be made of polished steel with dimensions of 40 mm \times 80 mm and 5 mm radius edges.

5.1.3 Anvil

The anvil surface shall be hemispherical with a radius of 50 mm. The anvil shall be made of polished steel and have a total height of (180 ± 20) mm (see Figure 1). The anvil shall be attached through a piezoelectric load cell to a mass of at least 1000 kg. The cell shall be preloaded according to the manufacturer's instructions.



5.1.4 Force measurement instrumentation

The anvil shall be mounted so that during impact testing the whole force between the anvil and the massive base of the apparatus passes through a quartz force transducer in line with its sensitive axis. The force transducer shall have a calibrated range of not less than 200 kN and a lower threshold of less than 1 kN. The output of the force transducer shall be processed by a charge amplifier and displayed and recorded on suitable instruments. The measuring system including the drop assembly shall have a frequency response in accordance with channel frequency class (CFC) 1000 of ISO 6487.

5.2 Templates

5.2.1 Template material

Templates shall be prepared from a non-fraying (e.g. coated) fabric of a quality which basically maintains its shape and dimensions during all use.

NOTE A suitable material is the polyurethane (PUR)-coated polyethersulfone (PES) fabric of 280 g/m² to 360 g/m² used for truck tarpaulins.

5.2.2 Shape and dimensions of templates

The templates shall comply with the shapes specified in Figure 2 and the dimensions specified in Table 1.

The manufacturer shall provide sufficient information to the testing laboratory to allow it to select the appropriate size of testing template from the above table.

NOTE The type B protector dimensions are intended to cover the needs of most motorcycle riders. However, for ergonomic reasons, in certain cases the type B protectors may be unsuitable. In such cases the alternative type A protectors may be chosen by the user.

Table 1 — Dimensions of the templates

Protector	Templates for type A protectors			Templates for type B protectors		
	<i>r</i> ₁	<i>r</i> ₂	<i>l</i>	<i>r</i> ₁	<i>r</i> ₂	<i>l</i>
S	55	32	64	70	40	80
E	45	24	118	50	30	150
K	55	24	100	70	30	130
H	32	24	64	40	30	80
L	32	24	64	40	30	80
K + L	55	24	185	70	30	240

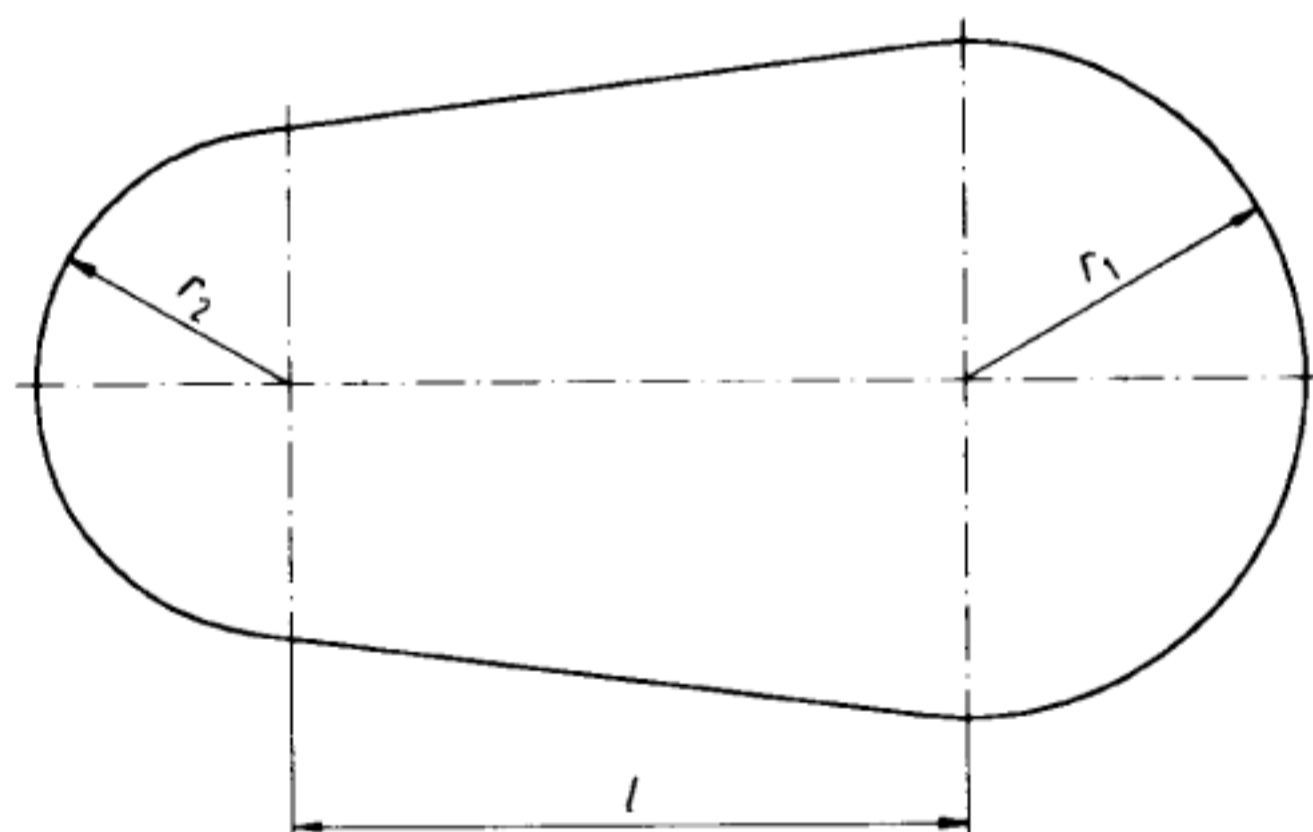


Figure 2 — Shape of the templates

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5.2.3 Use of templates

The templates shall be used to define the minimum area of the protectors as follows:

- the protector shall be formed to its 3-dimensional shape which can be expected during riding. A test person or a display dummy of proper size may help for that procedure;
- each protector shall be adjusted on the test body. When the best correspondence has been obtained, the template shall be adjusted on the protector to check the appropriate size.

6 Test method

6.1 Conditioning and testing atmosphere

The samples shall be conditioned for at least 24 h in an atmosphere with a temperature of $(20 \pm 2) ^\circ\text{C}$ and a relative humidity of $65\% \pm 5\%$. If the tests are carried out in an atmosphere different to these specified values, the tests have to be commenced within 5 min of being removed from the conditioning atmosphere.

6.2 Sampling

Protectors made to the same specification (e.g. material thickness, density etc.) can be considered as belonging to the same “family”. The test samples shall consist of three protectors from the same “family”. The testing laboratory may select the samples from any of the protector specified in 5.2.2.

6.3 Positioning of the sample

The samples shall be securely positioned on the test anvil.

NOTE A system of elastic straps has been found suitable. These are angled downwards around the anvil and pull the sample down to the anvil but do not compress the sample significantly. The straps are connected to a flat elastic ring that surrounds the impact area, but do not cover it. The downward force exerted is 5 N to 10 N.

6.4 Number of tests

Testing shall be carried out, using the equipment given in clause 5, at three different points on each sample piece, at least 50 mm apart within the template/test area. Of the nine points tested, three shall be in test area A, three in test area B and three in test area C; the Figure 3 defines the three test areas on the template.

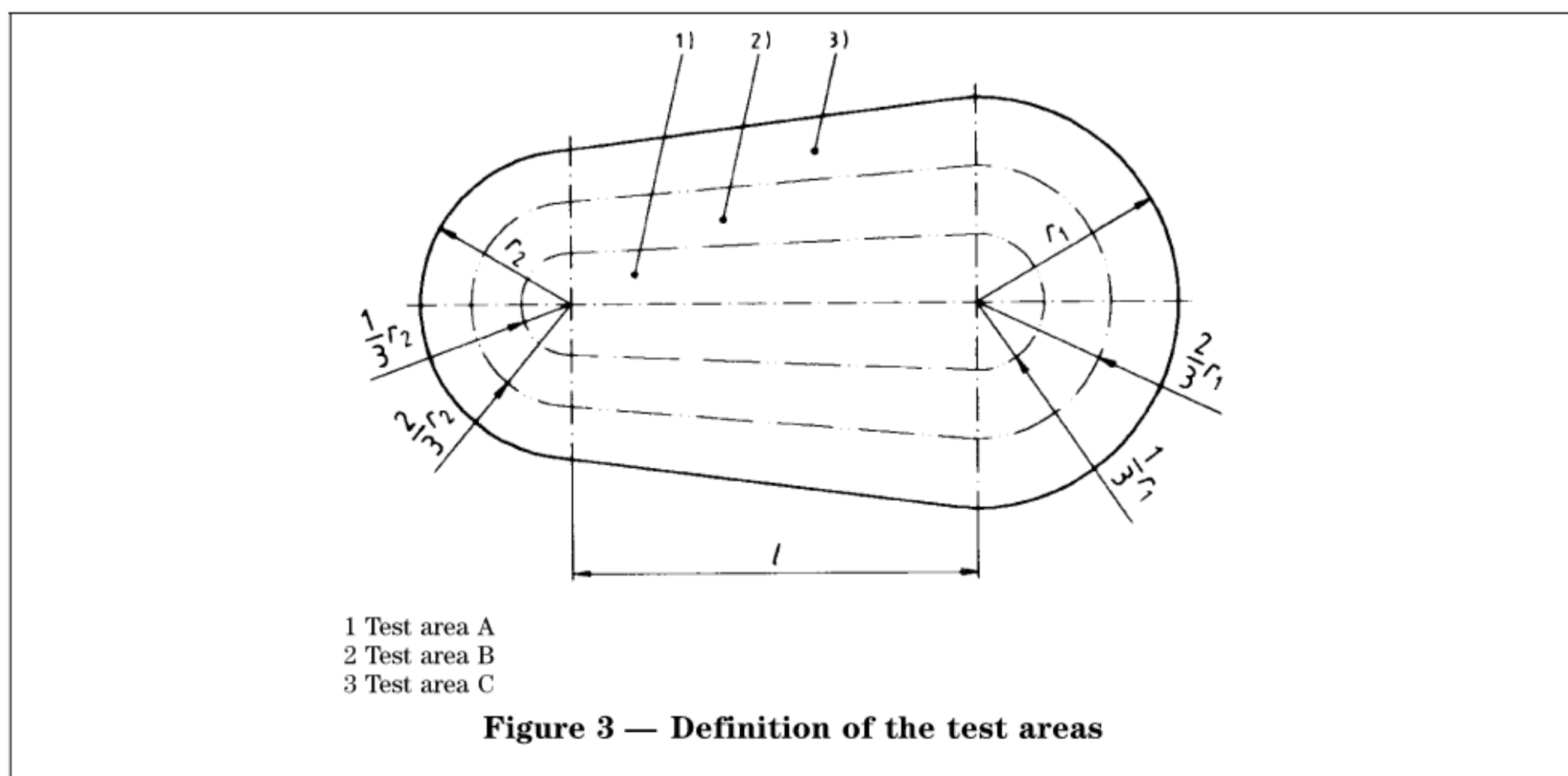
6.5 Test results

The mean value shall be calculated from the nine measurements.

6.6 Test report

The test report shall include the following information:

- a) identification of the impact protectors, including source, date of receipt, form of impact protectors;
- b) the method used by reference to this European Standard;
- c) results of the test;
- d) if relevant, any deviations from the method specified in this European Standard;
- e) any unusual features observed during the test;
- f) date of test;
- g) identification of the laboratory carrying out this test.



7 Marking

The marking shall include the following information:

- a) name, trade mark or other means of identification of the manufacturer or his authorized representative;
- b) identification of the product type, commercial name or code;
- c) protector type according to Table 1 (e.g. "S" type A);
- d) number of the specific European Standard (EN 1621-1).

Each protector shall be marked. The marking shall be:

- on the product itself or on labels attached to the product;
- affixed so as to be visible and legible;
- durable to the appropriate number of cleaning processes.

The marking should be large enough to convey immediate understanding and to allow the use of readily legible numbers.

8 Information supplied by the manufacturer

The protector shall be supplied to the customer with information written at least in the official language(s) of the country of destination. All information shall be unambiguous.

The following information shall be given:

- a) name and full address of the manufacturer and/or his authorized representative;
- b) product identification according to clause 7b) and c);
- c) number of the European Standard (EN 1621-1);
- d) instructions for use:
 - fitting, how to put on and off, if relevant;
 - limitations on use (e.g. temperature range, exchange after being exposed to an impact, ageing);
 - instructions for storage and maintenance;
 - instructions for cleaning;
 - appropriate warning against problems which could arise from particular properties or misuse, or alteration of the protector (e.g. cutting off parts, chemical contamination);
 - if helpful, illustrations, part numbers etc. shall be added;
- e) the type of packaging suitable for transport, if relevant.

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 Directive 89/686/EEC.

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

The following clauses of this European Standard are likely to support requirements of Directive 89/686/EEC, Annex II:

EU-Directive 89/686/EEC, Annex II	Clauses of this European Standard
1.4 Information supplied by the manufacturer	Clause 8
2.2 PPE "enclosing" the parts of the body to be protected	Clause 4
2.12 PPE bearing one or more identification or recognition marks directly or indirectly relating to health and safety	Clause 7
3.1 Protection against mechanical impact	Clause 4

Compliance with the clauses of this European Standard provides one means of conforming with the specific essential requirements of the Directive concerned and associated EFTA regulations.

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