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Knä- och armbågsskydd för inomhussporter – Säkerhetskrav och provningsmetoder

Knee and elbow protectors for indoor sports – Safety requirements and test methods



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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 15613

October 2008

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English Version

Knee and elbow protectors for indoor sports - Safety requirements and test methods

Protecteurs de genoux et de coudes pour les sports de salle - Exigences de sécurité et méthodes d'essai

Knie- und Ellbogenschützer für den Hallensport - Sicherheitstechnische Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 13 September 2008.

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Foreword

This document (EN 15613:2008) 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of an identical text or by endorsement, at the latest by April 2009, and conflicting national standards shall be withdrawn at the latest by month April 2009.

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 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.

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

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SS-EN 15613:2008 (E)

1 Scope

This European Standard specifies the requirements and test methods for ergonomics, sizing, adjust/restraint performance and impact performance of knee and elbow protectors used for indoor sports, e.g. volleyball and handball.

It applies for knee and elbow protectors to be used on smooth and level floors without mats.

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 340:2003, *Protective clothing — General requirements*

ISO 7000:2004, *Graphical symbols for use on equipment — Index and synopsis*

3 Terms and definitions

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

3.1

knee protector

device worn on the knee that is intended to reduce the risk of injuries of the knee caused by impact and skin abrasion

3.2

elbow protector

device worn on the elbow that is intended to reduce the risk of injuries of the elbow caused by impact and skin abrasion

4 Classification

The classification of knee and elbow protectors shall be based on two weight ranges as follows:

- a) Class A: Users of body mass up to 50 kg;
- b) Class B: Users of body mass above 50 kg.

The different performance requirements are described in Clause 5.

5 Safety requirements

5.1 General

5.1.1 Knee and elbow protectors shall be so designed that in the foreseeable conditions of use for which they are intended the user can perform the typical movements without being hindered. See test method in 6.3.

5.1.2 Knee and elbow protectors shall be free of sharp edges, corners and burrs that might injure the user. See test method in 6.4.

5.2 Innocuousness

Construction materials or their derivatives shall not harm those coming into contact with them.

The manufacturer shall list in the information supplied by the manufacturer the substances used for the main components of the product.

NOTE Information on the identification and classification of such substances can be found in the Directive 67/548/EEC (classification, packaging and labelling of dangerous substances) [1] as well as in the Regulation (EC) no.1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)[2].

5.3 Sizing

Knee and elbow protectors shall be indicated with a size according to the principles described in Clause 6 of EN 340:2003. See test method in 6.1.

5.4 Adjusting/restraint systems

5.4.1 If knee and elbow protectors have parts which can be adjusted by the user or which can be removed for the purpose of change they shall be so designed that they can be easily adjusted, assembled and removed without a tool. The width of the straps shall be at least 40 mm. Restraint devices shall be so designed that they do not constrict limbs, e.g. by rolling straps. See test method in 6.1.

5.4.2 Knee and elbow protectors shall remain in the areas they are designed to protect during all typical movements or during an impact.

When tested according to 6.5, the movement of the central point of a protector shall not be greater than specified in Table 1.

Table 1 — Maximum movements of knee and elbow protectors

Protector	Maximum movement	
	Class A mm	Class B mm
Elbow protector	40	50
Knee protector	50	60

5.5 Impact performance

When tested according to 6.6, all test results shall not exceed the values specified in Table 2.

Table 2 — Impact performance requirements of knee and elbow protectors

Protector	Class A		Class B		Max. peak force kN
	<i>r</i> mm	<i>E</i> J	<i>R</i> Mm	<i>E</i> J	
Elbow protector	12,5	1	17,5	1,5	4
Knee protector	25,0	2,5	35,0	4	6
<i>r</i> is the radius of curvature of the anvil <i>E</i> is the impact energy					

See test method in 6.6.

6 Test methods

6.1 General

If no specific methods are specified compliance with the requirements of this European Standard shall be examined by measurement, visual inspection and tactile examination.

For the tests new protectors shall be used.

Measuring instruments unless otherwise specified shall be accurate to $\pm 2\%$ of the pass/fail level of the characteristic being measured.

For each of the required sequences of measurements performed in accordance with this European Standard a corresponding estimate of the uncertainty of the final result shall be determined. The uncertainty of measurement shall be expressed in the form $\pm X$. It shall be used in determining whether a "Pass" performance has been achieved. If the final result minus X is below the pass level when the requirement, that a certain value shall be exceeded, the sample shall be deemed to have failed.

NOTE It is anticipated that values of uncertainty of measurement will be usually between 2% and 5% of the measured value for force and length measurements.

6.2 Sampling and conditioning of the test samples

Two pairs of protectors of each size manufactured shall be provided for testing.

Where only one size of a protector is manufactured 4 pairs of that protector shall be provided for testing.

The test samples shall be supplied to the test house with the information regarding the body dimensions of the intended user.

Before testing, all protectors shall be cleaned 3 times according to the information supplied by the manufacturer. This shall be recorded in the test report.

The test samples shall be conditioned for at least 24 h at an atmosphere with a temperature of $(20 \pm 2)^\circ\text{C}$ and a relative humidity of $(65 \pm 5)\%$. Testing shall be carried out in the conditioning environment or within 10 min of removal from the environment.

6.3 Ergonomics

One knee protector and one elbow protector of each size shall be put on and adjusted by a subject of appropriate dimensions of the intended user according to the information supplied by the manufacturer. The subject shall report if the typical movements in playing indoor sports can be carried out without restriction or severe discomfort. The results shall be included in the test report.

6.4 Edges, seams and buckles

Inspect one knee protector and one elbow protector respectively of each size visually and by hand to locate any hard or sharp edges, seams or buckles that might injure the user or another player during normal use. The results shall be included in the test report.

6.5 Restraint

The test shall be carried out for each size of the protector.

The protector shall be put on a subject or dummy of dimensions of the intended user according to the information supplied by the manufacturer respectively. Fasten the protector securely according to the manufacturer's instructions. Subjects shall not wear clothing under the protector for this test. The dummy used shall have an artificial skin of "chamois" leather at least 1 mm thick. The leather shall be stuck to the dummy so that it cannot slide on the dummy surface during the test. A reference point near the centre of the outside of the protector shall be marked.

The subject shall be required to grip a support with his/her hand or to stand still so that the limb under the protector does not move during the test. The dummy shall be fixed to a firm support. The limbs shall be maintained in a natural position during the test. Clamp a spring balance or similar device reading to at least 60 N in turn to the upper and lower edges of the protector. Apply the force given in Table 3 over a period of (20 ± 2) s and maintain for (20 ± 2) s in a direction parallel to the limb, directly down the limb and directly up the limb. Measure the maximum movement of the central point of the protector to an accuracy of ± 5 mm after the release of the force. Three tests shall be made in each direction. Re-position and adjust the protector as necessary between the tests. The largest movement recorded shall be used to determine the result of the whole test to be included in the test report.

Table 3 — Forces to be used in restraint testing

Kind of protector	Range of body mass	
	Class A N	Class B N
Elbow protectors	35	50
Knee protectors	35	50

6.6 Impact performance

6.6.1 General

The test shall be carried out for each size of the protector.

6.6.2 Test area

The test area shall be marked on the protector by using a template in accordance with Table 4.