BRITISH STANDARD

BS EN
14120:2003

Protective clothing — Wrist, palm, knee and elbow protectors for users of roller sports equipment — Requirements and test methods

The European Standard EN 14120:2003 has the status of a British Standard

ICS 13.340.10

BSI
British Standards

National foreword

This British Standard is the official English language version of EN 14120:2003.

The UK participation in its preparation was entrusted by Technical Committee PH/3, Protective clothing, to Subcommittee PH/3/11, Protective equipment for sports players, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/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 Catalogue* under the section entitled "International Standards Correspondence Index", or by using the "Search" facility of the *BSI Electronic Catalogue* or of British Standards Online.

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EUROPEAN STANDARD

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EN 14120

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English version

Protective clothing - Wrist, palm, knee and elbow protectors for users of roller sports equipment - Requirements and test methods

Vêtements de protection - Dispositifs de protection des poignets, paumes, genoux et coudes pour les utilisateurs d'équipements de sports à roulettes - Exigences et méthodes d'essai

Schutzkleidung - Handgelenk-, Handflächen-, Knie- und Ellenbogenschützer für Benutzer von Rollsportgeräten - Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 13 February 2003.

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 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 Management Centre 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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
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Contents

Foreword

This document (EN 14120:2003) 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 October 2003, and conflicting national standards shall be withdrawn at the latest by October 2003.

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 A is informative.

This document includes a Bibliography.

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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

Roller sports are all the pastimes and competitions in which roller sports equipment is used. This equipment includes for example roller skates, inline skates and skateboards.

The users range from small children to adults of all ages.

The main threat to most roller sports equipment users is an impact with the surface and with obstacles which may cause physical injuries.

Wrist, palm, knee and elbow protectors for users of roller sports equipment are intended to protect the wearer against abrasion, bruises and fractures.

Protectors will not necessarily prevent all injuries in roller sports accidents.

1 Scope

This European Standard specifies the requirements and test methods for ergonomics, innocuousness, comfort, restraint, strength, abrasion, impact performance as well as provisions for marking and instructions supplied by the manufacturer for wrist, palm, knee and elbow protectors (hereinafter referred to as protectors) for all users of roller sports equipment.

It does not apply to protectors used in roller sports hockey.

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 (including amendments).

EN 1082-1, *Protective clothing — Gloves and arm guards protecting against cuts and stabs by hand knives — Part 1: Chain mail gloves and arm guards.*

EN 13595-2, *Protective clothing for professional motorcycle riders — Jackets, trousers and one-piece or divided suits — Part 2: Test method for determination of impact abrasion resistance.*

ISO 6344-2, *Coated abrasives — Grain size analysis — Part 2: Determination of grain size distribution of macrogrits P 12 to P 220.*

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply:

3.1
wrist protector
wrist guard
device worn on the wrist and extending onto the lower forearm and the hand, that is intended to reduce the risk of injuries caused by abrasion, and to provide some stabilisation of the wrist joint

3.2
palm protector
device worn on the palm of the hand that is intended to reduce the risk of injuries caused by impact and abrasion

3.3
knee protector
knee pad
device worn on the knee that is intended to reduce the risk of injuries caused by impact and abrasion

3.4
elbow protector
elbow pad
device worn on the elbow that is intended to reduce the risk of injuries caused by impact and abrasion

3.5
roller sports equipment
devices that may be attached to each foot or to both feet, or may be stood on without attachment, and have freely turning wheels, and are not motor driven

3.6
acrobatic roller sports
use of roller sports equipment on natural or artificial obstacles to execute acrobatic figures

3.7
normal roller sports
use of roller sports equipment to make progress without acrobatic manoeuvres

3.8
abrasion resistant layer
component(s) of a protector that is (are) intended to reduce the risk of injuries from sliding impacts with hard surfaces

3.9
chamois leather
leather made from the flesh split of sheepskin or lambskin, or from sheepskin or lambskin from which the grain has been removed by frizing, and tanned by processes involving oxidation of marine oils in the skin, using either solely such oils (full-oil chamois) or first an aldehyde and then such oils (combination chamois)

4 Performance levels

4.1 Level 1

Protectors intended to be suitable for normal roller sports.

4.2 Level 2

Protectors intended to be suitable for use in acrobatic roller sports.

5 Requirements

5.1 General

Performance requirements shall be based on 3 ranges of body mass as follows:

a) range A: Users of up to 25 kg body mass;

b) range B: Users of body mass more than 25 kg to 50 kg;

c) range C: Users of body mass above 50 kg.

Combined protectors such as palm and wrist protectors shall meet the requirements for each protector.

5.2 Ergonomics

Protectors shall be so designed and manufactured that in the foreseeable conditions of use for which they are intended the user can perform the roller sports normally and unhindered whilst enjoying protection at the specified limit.

5.3 Innocuousness

Protectors shall be safe to use and fit for their purpose. They shall be designed and manufactured to provide protection when used according to the manufacturer's instructions, without endangering the user or others. There shall not be hard or sharp edges, seams, buckles or other items on the surfaces of the products that could harm the user or others during normal use. Examination shall be made according to 6.3.

Construction materials and incorporated substances, shall not harm those coming into contact with them.

The manufacturer shall list in the information supplied with the protectors the main composition of the protectors and shall label any protector containing substances or preparations generally known to be hazardous. Information about determining the chemical innocuousness of protectors is given in annex A.

5.4 Sizing

Protectors shall be marked with a size. The size shall be designated by the range of body mass of the intended users, see 5.1.

5.5 Restraint

Protectors shall not be easily displaced from the areas they are designed to protect during normal movements and when subjected to impacts. When tested in accordance with 6.4 the central point of a protector shall not move more than the appropriate value in Table 1.

Table 1 — Maximum movements of protectors permitted during testing

Dimensions in millimetres

Kind of protector	Maximum movement		
	Range of body mass		
	A	B	C
Elbow protector	20	40	50
Knee protector	30	50	60
Wrist protector	20	20	20
Palm protector	20	20	20

5.6 Abrasion resistance

When tested in accordance with 6.5 the abrasion resistant layer of the protector shall not be perforated.

5.7 Impact strength

When tested in accordance with 6.6 the abrasion resistant layer of the knee, elbow, wrist or palm protector shall not break or split.

5.8 Impact performance for knee, palm and elbow protectors

A protector complies with this standard if the mean value of the peak force does not exceed the values in Table 2 when tested in accordance with 6.7.

Table 2 — Impact performance requirements for knee, palm and elbow protectors

Kind of protector	Protectors level 1						Protectors level 2						Maximum peak force kN
	Range of body mass						Range of body mass						
	A		B		C		A		B		C		
	r	*e*	*r*	*e*	*r*	*e*	*r*	*e*	*r*	*e*	*r*	*e*	
	mm	J	mm	J	mm	J	mm	J	mm	J	mm	J	
Knee protectors	25	3	35	8	50	12	25	15	35	20	50	25	6
Elbow protectors	12,5	1	17,5	4	25	6	12,5	7,5	17,5	10	25	15	4
Palm protectors	100	3	100	4	100	5	100	6	100	8	100	10	3

r is the radius of curvature of the anvil

e is the impact energy

5.9 Specific requirements for wrist protectors

5.9.1 Adjustment

The restraint system shall be continuously adjustable.

Testing in accordance with 6.1.

5.9.2 Stiffness

Wrist protectors shall be sufficiently stiff that when tested according to 6.8 the extension of the artificial wrist joint is between 40° and 55°.

NOTE Extension of the wrist joint is the bending of the hand backwards from a position in a straight line with the forearm.

5.9.3 Dimensions of stiffness elements

Wrist protectors shall have stiffening elements that exceed the dimensions in Table 3. The reference point for measurements shall be the plane of the wrist of an appropriate size of subject, who has put on the protector. The position of the plane of the wrist of the subject shall be determined according to EN 1082-1.

Table 3 — Minimum dimensions of stiffness elements in wrist protectors

Dimensions in millimetres

Location of stiffness elements	Range of body mass		
	A	B	C
Length from the wrist up to the arm	30	40	50
Length from the wrist towards the finger tip	40	50	60
Width in the palmar region	15	20	25

Testing in accordance with 6.1.

6 Testing

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 ± 2 % of the pass/fail level of the characteristic being measured.

For each of the required sequences of measurements performed in accordance with this standard a corresponding estimate of the uncertainty of the final result shall be determined. The uncertainty of measurement shall be expressed in the form ± 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 supplied by the manufacturer according to clause 8.

Condition the test samples for at least 24 h at an atmosphere with a temperature of (20 ± 2) °C and a relative humidity of (65 ± 5) %. Testing shall be carried out in the conditioning environment or within 10 min of removal from the environment.

6.3 Innocuousness

The protector shall be examined visually and by hand to locate any hard or sharp edges, seams, buckles, or other items that might injure the user or others during normal use. Documents supplied by the manufacturer shall be examined to determine whether the claim that the materials are suitable for use in protectors is justified. Testing to ensure that the requirement is met shall be carried out if the documents examined are not adequate. The information supplied by the manufacturer (see clause 8) shall be examined for a list of the substances used in the main components of the protector. The results of the examination shall be recorded.

6.4 Restraint

The protector shall be put on by a suitable subject or shall be placed on a suitable dummy, and securely fastened 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 their 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 physiological position during the test. A spring balance or similar device reading to at least 60 N shall be clamped in turn to the upper and lower edges of the protector. The force given in Table 4 shall be applied over a period of (20 ± 10) s and maintained for (20 ± 10) s. The force shall be applied in a direction parallel to the axis of the limb, directly down the limb and directly up the limb. Three tests shall be made in each direction. The protector shall be re-positioned and adjusted as necessary between tests. The maximum movement of the central point of the protector shall be measured to an accuracy of ± 5 mm. The largest movement recorded shall be used to determine the result of the whole test.

Table 4 — Forces to be used in restraint testing

Dimensions in Newton

Kind of protector	Range of body mass					
	A		B		C	
	Protectors		Protectors		Protectors	
	Level 1	Level 2	Level 1	Level 2	Level 1	Level 2
Elbow protectors	20	40	30	50	40	50
Knee protectors	20	40	30	50	40	50
Wrist protectors	30	30	40	40	50	50
Palm protectors	30	30	40	40	50	50

6.5 Abrasion resistance

6.5.1 General

Either the method described in 6.5.2 or that in 6.5.3 shall be used.

6.5.2 Moving belt method

Protectors shall be tested in an apparatus conforming to the principles described in EN 13595-2. The abrasive belt shall be of aluminium oxide of size OP 60 grit in accordance with ISO 6344-2. The canvas abrasion time of the belt measured according to EN 13595-2 shall be between 2,0 s and 3,0 s.

The protector shall be securely mounted on a specimen holder with a cylindrical anvil (25 ± 2) mm in diameter with a hemispherical end that will press the protector against the belt with a force of (49 ± 2) N. Attachment of the protector may be achieved with heavy duty adhesive tape or by another means. Movement of the protector during abrasion shall be less 10 mm with respect to the specimen holder.

The machine shall be controlled so that the belt speed is between 1 m/s and 2 m/s. The protector shall be allowed to fall onto the moving belt from a height of (5 ± 2) mm. Level 1 protectors shall be lifted off the belt after (16 ± 1) m of abrasion. Level 2 protectors shall be lifted off the belt after (64 ± 4) m of abrasion.

Two protectors in each size shall be tested and examined for perforation of the abrasion resistant layer.

6.5.3 Test carriage method

Protectors shall be tested with an apparatus (see Figure 1) consisting of a test carriage that is pulled along a length of abrasive paper. This paper shall have a grit of aluminium oxide of size OP 50.

New abrasive paper shall be used for each test.

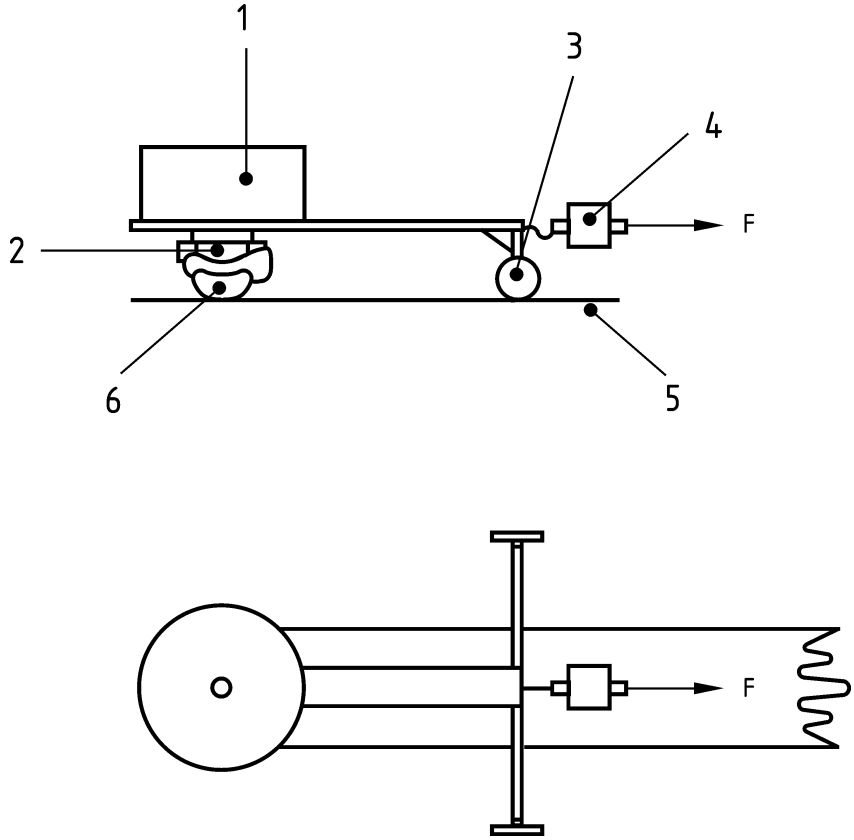
The carriage shall be provided with a specimen holder with a cylindrical anvil with a diameter of (25 ± 2) mm and with a hemispherical end that will press the protector against the belt with a force of (250 ± 50) N.

Attachment to the protector may be achieved with heavy duty adhesive tape or by another means. Movement of the protector during abrasion shall be less 10 mm with respect to the specimen holder.

The carriage shall be pulled along the abrasive paper at a velocity of ($0,2 \pm 0,05$) m/s.

Level 1 protectors shall be abraded for 3 000 mm and level 2 protectors for 6 000 mm.

Two protectors in each size shall be tested and examined for perforation of the abrasion resistant layer.



Key
1 Mass (25 kg)
2 Anvil
3 Low friction wheel
4 Load cell
5 Abrasive paper
6 Protector
F Force to pull carriage along the abrasive paper

Figure 1 — Principle of the test carriage method

6.6 Impact strength

6.6.1 Apparatus

Impact strength shall be tested in impacts with a mass of (5 000 ± 25) g.

The apparatus shall consist of the following:

a) pendulum test rig or a free fall guided-mass test rig.

b) steel anvils for testing knee and elbow protectors that shall be hemispherical in shape and shall have the dimensions given in Table 2.

c) steel anvil for testing wrist and palm protectors shall have a flat surface that is larger than the protector.

d) striking face on the impact mass that is circular with a diameter of (80 ± 2) mm. The corner of the striking face with its vertical side shall have a radius of curvature of (0,5 ± 0,1) mm. The striker and the impact mass shall be made of steel.

6.6.2 Procedure

The apparatus shall be adjusted so that the impact energy is in accordance with Table 5.

Table 5 — Impact energy for testing knee, elbow, wrist and palm protectors

Values in Joule

Kind of protector	Protectors level 1			Protectors level 2		
	Range of body mass			Range of body mass		
	A	B	C	A	B	C
Knee protector	25 ± 2	45 ± 2	65 ± 2	30 ± 2	50 ± 2	70 ± 2
Elbow protector	20 ± 2	40 ± 2	60 ± 2	20 ± 2	40 ± 2	60 ± 2
Wrist and palm protector	30 ± 2	40 ± 2	50 ± 2	30 ± 2	40 ± 2	50 ± 2

Two protectors in each size shall be tested with single impacts.

6.7 Impact performance

6.7.1 Test area

The test area shall be marked on the protector using a template in accordance with Table 6.

Table 6 — Diameters of the test area template

Dimensions in millimetres

Kind of protectors	Range of body mass		
	A	B	C
Elbow protectors	40 ± 0,5	60 ± 0,5	80 ± 0,5
Knee protectors	60 ± 0,5	75 ± 0,5	90 ± 0,5
Palm protectors	30 ± 0,5	40 ± 0,5	50 ± 0,5

Templates shall be prepared from stiff but flexible material cut to the dimensions of the test areas given in Table 6.

Templates shall be centred on the points marked on the protectors as follows.

Fit the protector to a person of an appropriate size. With their knee or elbow bent at an angle of 90° mark the centre of the protector with respect to the joint covered. An accuracy of ± 5 mm shall be sought.

The test area shall be marked with an accuracy of ± 1,5 mm suing the edge of the template.

On a person of an appropriate size for the protector, establish the position of the plane of their wrist joint according to EN 1082-1.

Draw a transverse line on their palm 30 mm, 40 mm or 50 mm from this plane for ranges of body mass A, B or C protectors respectively.

Draw a longitudinal line down the centre of their palm. Fit a palm protector to the person according to manufacturer's instructions.

Place the template on the protector so that its centre lies above the intersection of the two lines. Draw a line on the protector around the template.

6.7.2 Apparatus

Testing shall be carried out in an apparatus in which a guided mass falls onto a test specimen on an anvil. The centre of gravity of the falling mass shall be above the centre of the anvil.

The falling mass shall have a mass of (2,5 ± 0,025) kg and a striking face of at least 40 mm × 40 mm. It shall be made of polished steel.

A means of measuring the velocity of the falling mass prior to impact shall be provided to enable the impact energy to be verified.

The surface of the anvil shall be hemispherical with a diameter given in Table 2 and with a height of at least 200 mm.

The anvil for use in testing palm protectors shall have a radius of 100 mm and a dome surface with a radius of curvature of 100 mm.

The anvil shall be connected by a piezoelectric load cell to a mass of at least 1 000 kg. The load cell shall be preloaded in accordance with the information supplied by the manufacturer.

The anvil shall be so mounted that during the impact test the total force between the anvil and the solid base of the device is conducted through the sensitive axis of a load cell. The recording system shall show a continuous force with time, or shall have a peak force detection capability. Digital sampling systems shall have a minimum rate of 10 kHz. The complete system shall be able to measure forces up to 50 kN with an accuracy of 0,1 kN between 1 kN and 10 kN.

6.7.3 Procedure

The protector shall be placed on the appropriate anvil and held down with a force of 5 N to 10 N.

NOTE A system of elastic straps has been found suitable.

The protector shall be moved on the anvil so that each chosen test position is impacted. Test positions shall be at least 30 mm apart. Test positions shall include points within the marked test area that it is anticipated will be particularly weak. For each type of protector four impacts shall be made on the type of construction present over the majority of the area of the protector, and two impacts shall be made on presumed weak areas. Two impacts shall be made on each protector tested. The mean value of the peak forces recorded shall be calculated.

6.8 Stiffness of wrist protectors

6.8.1 Principle

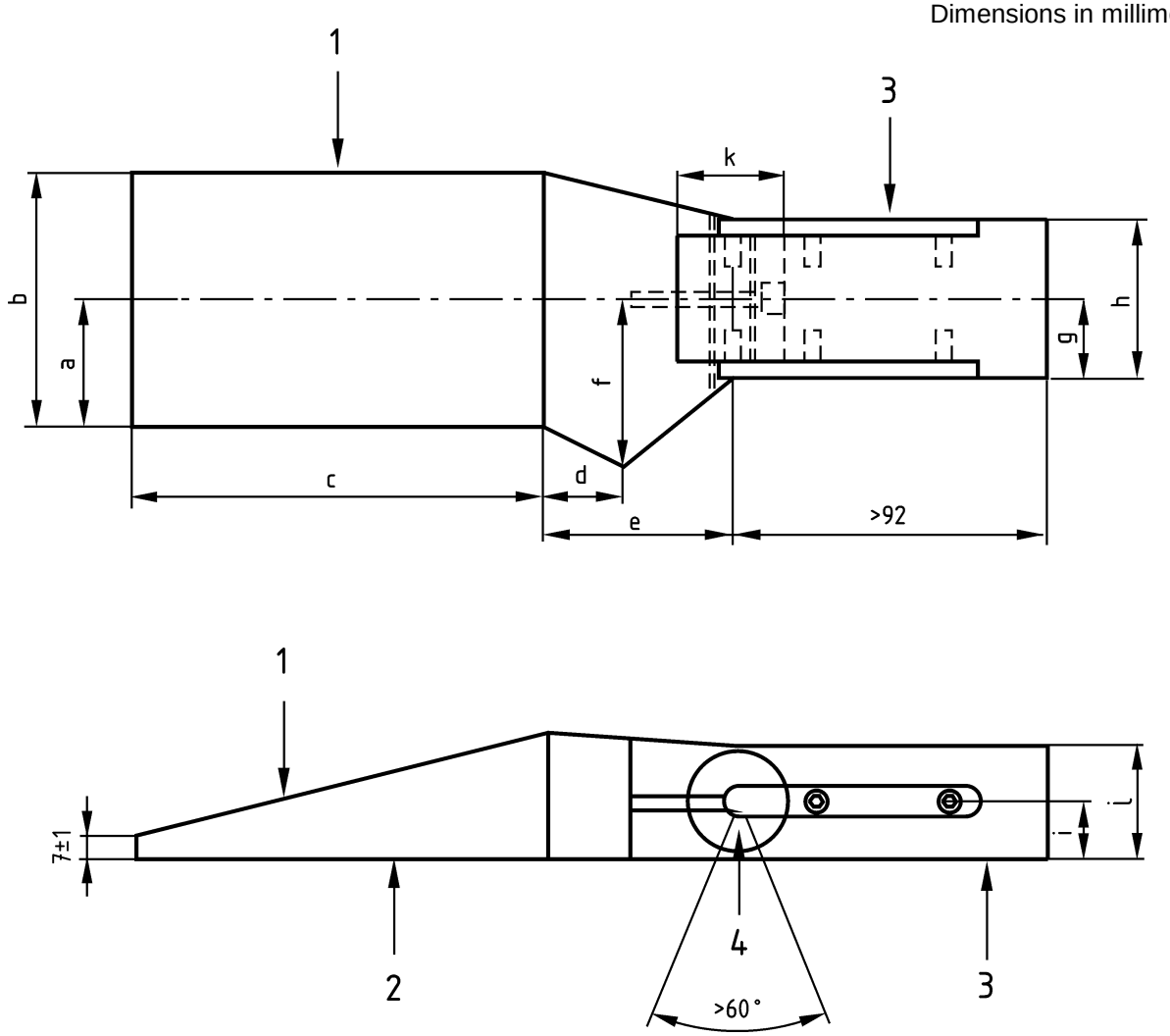
Wrist protectors shall be fitted to appropriate sizes of wrist and hand prosthesis. A force is applied and the angle through which the wrist of the prosthesis moves is observed.

6.8.2 Apparatus

The hand, wrist and joint dimensions are given in Figure 2 and Table 7. Hand and wrist parts shall be made of wood or any light and stiff suitable material. The joint shall be a cylinder made of a low friction coefficient material such as polyamide or Polytetrafluorethylene. This cylinder shall be screwed to the hand. The wrist is attached to the axis of the cylinder by means of two rods.

The corners of the prosthesis representing the surfaces of the forearm, wrist, palm and fingers shall be rounded with a radius of (10 ± 1) mm. The sides of the fingers shall be smoothly rounded with radii of less than 10 mm where they are less than 20 mm thick.

Dimensions in millimetres



Key
1 Palm side
2 Back side of the palm
3 Wrist
4 Joint (low friction coefficient cylinder)

Figure 2 — Hand prosthesis

Table 7 — Dimensions of the hand prosthesis

Dimensions in millimetres

Range of body mass	Dimensions shown in Figure 2										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
A	32,5 ± 0,5	65 ± 1	105 ± 1	20 ± 1	48 ± 1	43 ± 1	40 ± 1	20 ± 0,5	28 ± 1	14 ± 0,5	26 ± 0,5
B	36,5 ± 0,5	73 ± 1	118 ± 1	22 ± 1	54 ± 1	48 ± 1	45 ± 1	22 ± 0,5	32 ± 1	16 ± 0,5	30 ± 0,5
C	40,5 ± 0,5	81 ± 1	131 ± 1	25 ± 1	60 ± 1	54 ± 1	50 ± 1	25 ± 0,5	35 ± 1	18 ± 0,5	33 ± 0,5

6.8.3 Procedure

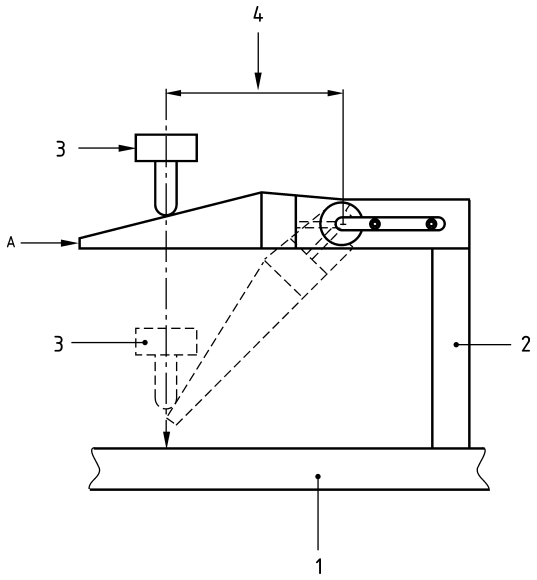
The wrist protector shall be firmly adjusted to the appropriate size of prosthesis. The force to reach the moment at the wrist according to Table 8 shall be applied, see also Figure 3.

Table 8 — Moment at the wrist joint of the force to be applied

Values in Newtonmetres

	Range		
	A	**B**	**C**
Moment of force	2	3	3

The angle the wrist moves through shall be observed to determine whether it is more than 40° and less than 55°.



Key
1 Base of dynamometer
2 Column
3 Force
4 Distance between wrist rotation axis and cell displacement axis

A Starting position

Figure 3 — Principle of stiffness testing

7 Marking

Protectors shall be durably and clearly marked with the following:

a) name or trademark of the manufacturer or his authorised representative within the European Union;

b) designation of the protector, commercial name or code that uniquely identifies the protector;

c) size of the protector (see also 5.4);

d) number of this standard and the performance level;

e) clear indication whether the protector is for left or right fitting, if appropriate;

f) international care label symbols;

g) year of manufacture (date or code);

h) the following pictogram, instructing the user to see the information supplied by the manufacturer.

8 Information supplied by the manufacturer

Protectors shall be supplied with information and instructions for fitting and use to promote their safe and effective use. The information shall be precise and comprehensible and in the official language(s) of the country or region in which the equipment is to be placed on the market. At least the following information and instructions shall be given:

a) all the information specified in clause 7;

b) full address of the manufacturer or importer;

c) instructions on how to select protectors of the correct performance level and an explanation of the performance levels of the protectors specified in this standard;

d) instructions on how to choose the correct size of protector and check its fit;

e) details of the size of protectors and the body dimensions to which they relate;

f) instructions on how to adjust the protectors;

g) warning about any changes in environmental conditions, such as temperature, that would significantly reduce the performance of the protector;

h) warning that no protector can offer full protection against injuries;

i) warning about any contamination, alteration to the protector, or misuse that would dangerously reduce the performance of the protector;

j) list of the substances in the main components of the protector;

k) instructions for caring for and cleaning the protector;

l) instructions concerning the expected service life of the protector, inspections to carry out, repairs that may be made, and advice on when discard the protector because it might no longer perform adequately.

Annex A
(informative)

Information about determining the chemical innocuousness of protectors

A.1 General

This informative annex is provided for the assistance and information of manufacturers and test houses in the application of the innocuousness requirements.

The basic requirements are that protectors should not adversely affect the health of the user. This can be assumed to be likely if it is shown that the constituent materials are chemically suitable, and that they will not in the foreseeable conditions of normal use release or degrade to release substances generally known to be toxic, carcinogenic, mutagenic, allergenic or otherwise harmful.

NOTE Information on the classification and identification of harmful substances can be found e.g. in the Directives 67/548/EEC (classification, packaging, labelling of dangerous substances) and 76/769/EEC (restriction on use of dangerous substances) and amendments.

A.2 Evidence of innocuousness

Any of the following types of document can be presented as evidence that a product is innocuous:

a) manufacturer's technical file;

b) materials specifications from the material producers, and certificates of conformity;

c) safety data sheets relating to the materials;

d) certificates or reports relating to the suitability of the materials for use with food, in medical devices, or other relevant applications;

e) certificates or reports relating to toxicological, allergenic, carcinogenic or mutagenic investigations on the materials;

f) other documents submitted by the manufacturer:

The examination of the documents should determine whether the claim that the materials are suitable for use in the protectors is justified. Particular attention should be paid to the presence of plasticisers, unreacted components, heavy metals or, impurities, and the chemical identity of pigments and dyes, some of which are harmful.

A.3 Possible specific innocuousness testing

In the absence of satisfactory documentary evidence, testing can be necessary to ensure materials in protectors meets the requirements for innocuousness in European Directives. The following can be relevant:

a) the chromium VI content of leather should comply with the requirement in EN 420;

b) all metallic materials which could come permanently into contact with the skin (e. g. studs, fittings and buckles) should have an emission of nickel of less than 0,5 µg/cm^2 per week. The test method to be used is the one in EN 1811;

c) the pH value of protective clothing material should be greater than 3,5 and less than 9,5. The test method for leather to be used is the one in ISO 4045 and for other materials the one in ISO 3071;

d) the colour fastness to perspiration of protective clothing material should be determined in accordance with ISO 105-A02 and should be at least grade 3 to 4 of the Grey scale for the colour change of the specimen. The test should be conducted in accordance with ISO-105-E04.

e) substances such as azo-dyes which release carcinogenic amines as defined by Directive 67/548/EEc and its amendments, should not be detectable by appropriate methods.

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 89/686/EEC.

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:

EU-Directive 89/686/EEC, Annex II		Clause of this standard
1.1	Design principles	5.1 to 5.9
1.1.1	Ergonomics	5.2
1.1.2.1	Highest level of protection possible	5.6 to 5.9
1.1.2.2	Classes of protection appropriate to different levels of risk	4
1.2	Innocuousness of PPE	5.3
1.2.1	Absence of risks and other nuisance factors	5
1.2.1.1	Suitable constituent material	5.3
1.2.1.2	Satisfactory surface condition of all PPE parts in contact with the user	5.2, 5.3
1.2.1.3	Maximum permissible user impediment	5.1
1.3	Comfort and efficiency	5.4, 7
1.3.1	Adaptation of PPE to users morphology	5.1, 5.4, 5.5
1.3.2	Lightness and strength	5.7 to 5.9
1.4	Information supplied by the manufacturer	8
2.1	PPE incorporating adjustment systems	5.5
2.2	PPE enclosing the parts of the body to be protected	5.3
2.4	PPE subject to ageing	8
2.9	PPE incorporating components which can be adjusted or removed by user	5.5
2.12	PPE bearing one or more identification or recognition marks directly or indirectly relating to health and safety	7
3.1	Protection against mechanical impact	5.7 to 5.9
3.1.1	Impact caused by falling or projecting objects and collision of parts of the body with an obstacle	5.6 to 5.9
3.3	Protection against physical injury	5.6 to 5.9

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

Bibliography

EN 420, *General Requirements for gloves.*

EN 1811, *Reference test method for release of nickel from products intended to come into direct and prolonged contact with the skin.*

ISO 105-A02, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour.*

ISO 105-E04*, Textiles — Tests for colour fastness — Part E04: Colour fastness to perspiration.*

ISO 3071, *Textiles — Determination of pH of the aqueous extract.*

EN ISO 4045, *Leather - Determination of pH (ISO 4045:1977).*

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