SLOVENSKI STANDARD
SIST EN 14120:2003

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Varovalna obleka – Ščitniki zapestja, dlani, kolena in komolca za uporabnike opreme za športe na koleščkih – Zahteve in preskusne metode

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

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

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

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13.340.40	Varovanje dlani in rok	Hand and arm protection
13.340.50	Varovanje nog in stopal	Leg and foot protection
97.220.40	Oprema za športe na prostem in vodne športe	Outdoor and water sports equipment

SIST EN 14120:2003 **en**

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EUROPEAN STANDARD

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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

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

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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of an identical text or by endorsement, at the latest by October 2003, and conflicting national standards shall be withdrawn at the latest by October 2003.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.

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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.

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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.*

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3 Terms and definitions

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

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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

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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.

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5 Requirements

5.1 General

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

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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.

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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

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5.6 Abrasion resistance

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

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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

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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

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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.

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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