# SLOVENSKI STANDARD
# SIST EN 13594:2015

**01-oktober-2015**

**Nadomešča:**
**SIST EN 13594:2002**

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**Varovalne rokavice za poklicne voznike motornih koles - Zahteve in preskusne metode**

Protective gloves for professional motorcycle riders - Requirements and test methods

Schutzhandschuhe für Motorradfahrer - Anforderungen und Prüfverfahren

Gants de protection pour motocyclistes - Exigences et méthodes d'essai

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| 43.140 | Motorna kolesa in mopedi | Motor cycles and mopeds |

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EUROPEAN STANDARD

NORME EUROPÉENNE

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# EN 13594

August 2015

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English Version

# Protective gloves for motorcycle riders - Requirements and test methods

Gants de protection pour motocyclistes - Exigences et méthodes d'essai

Schutzhandschuhe für Motorradfahrer - Anforderungen und Prüfverfahren

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## European foreword

This document (EN 13594:2015) 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of an identical text or by endorsement, at the latest by February 2016 and conflicting national standards shall be withdrawn at the latest by August 2017.

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 13594:2002.

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.

The main technical changes with respect to EN 13594:2002 are listed below:

a) the restriction to professional motorcycle riders has been removed;

b) the definition of professional motorcycle rider has been deleted;

c) a second performance level has been introduced;

d) definitions concerning knuckle protection, fourchettes and wrist line have been added;

e) the artificial wrist for restraint test has been modified;

f) requirements on dye fastness have been removed;

g) former Annex A on motorcyclists’ injuries and selection of protective gloves has been deleted.

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# Introduction

Motorcyclists' gloves are intended to give protection against ambient conditions without unduly reducing the users' dexterity in operating the motorcycle's controls and switches. In addition, the gloves are intended to give mechanical protection to the hands and wrists in accidents. The particular hazards common to motorcycle accidents are impacts with the motorcycle, conflicting vehicles, road furniture, and/or the road surface.

The selection of the gloves by a rider depends on a variety of factors, such as the motorcycling discipline, the weather conditions, the frequency of putting on and taking off the gloves, and the duration that the gloves are typically worn. In order to encourage the adoption of certified protection by the highest possible number of users, two performance levels are specified for gloves. These are level 1 for gloves designed to give protection while having low ergonomic penalties associated with their use and level 2 for gloves providing increased protection with respect to level 1. There may be, however, weight and restriction penalties associated with level 2 protection.

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# 1 Scope

This European Standard applies to protective gloves for motorcycle on-road use. It specifies the requirements for sizing, ergonomics, innocuousness, mechanical properties, impact protection, marking and information for users. It also describes the appropriate test methods.

# 2 Normative references

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

EN 388, *Protective gloves against mechanical risks*

EN 420, *Protective gloves - General requirements and test methods*

EN 1621-1, *Motorcyclists' protective clothing against mechanical impact - Part 1: Motorcyclists' limb joint impact protectors - Requirements and test methods*

ISO 6344-2, *Coated abrasives - Grain size analysis - Part 2: Determination of grain size distribution of macrogrits P12 to P220*

# 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 388 and EN 420 and the following apply.

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**3.1**
**zone of knuckle protection**
zone of the glove that is intended to provide additional specific protection to the knuckles; this zone is subject to specific testing for impact resistance

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Note 1 to entry: The knuckles are the 4 projections of the metacarpo-phalangeal joints on the back of the hand.

**3.2**
**protective layer**
any material (i.e. not necessarily the outer layer) in a single piece or multiple pieces and/or layers that, joined together by seams or other means, make up the continuous and mechanically strong structure of the glove from the fingertip to the top of the cuff

**3.3**
**fourchettes**
part of the gloves connecting front and back side in the interspaces between the four fingers excluding the thumb

**3.4**
**wrist line**
line coinciding with the first crease which occurs closest to the base of the palm

# 4 Requirements

## 4.1 General

All gloves shall meet the requirements of 4.2 to 4.4.

A level 1 glove shall meet all level 1 requirements of 4.5 to 4.10 and, where relevant, of 4.11.

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A level 2 glove shall meet all level 2 requirements of 4.5 to 4.11.

### 4.2 Innocuousness

Gloves shall meet all of the innocuousness requirements laid down in EN 420.

### 4.3 Hard inclusions

Hard sharp edges or sharp points shall not be present as a part of the interior or exterior of the glove. Metallic, ceramic, plastic or similar hard materials present as studs, staples, rivets, plates, or similar structures, used to form part of the protective layer of the glove shall not present a hazard to the hand. Examination shall be carried out in accordance with 6.3.

### 4.4 Ergonomic requirements

When tested in accordance with the method described in Annex A, the assessor shall be able to carry out all the defined movements without any significant problem or hazard being encountered.

### 4.5 Sizing and cuff length

Motorcyclists gloves shall comply with the sizing system as defined in EN 420 or other suitable sizing system as described in the user's information. When worn by an assessor with appropriate hand size, the cuff length measured from the wrist line of the assessor shall be in conformity with Table 1.

**Table 1 — Minimum cuff length**

| | |
|---|---|
| Level 1 | ≥ 15 mm |
| Level 2 | ≥ 50 mm |

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### 4.6 Restraint

An adjustable restraint system shall be incorporated into the wrist or cuff.

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When tested in accordance with 6.5, the restraint system shall meet the requirements of Table 2.

**Table 2 — Minimum restraint force**

| | |
|---|---|
| Level 1 | ≥ 25 N |
| Level 2 | ≥ 50 N |

### 4.7 Tear strength

When tested in accordance with 6.6, the protective layer shall meet the requirements of Table 3.

**Table 3 — Minimum requirements of tear strength**

| **Tear strength (protective layer)** | **Level 1** | **Level 2** |
|---|---|---|
| **Palm and palm side of fingers** | ≥ 25 N | ≥ 35 N |
| **Cuff, back and back side of fingers** | ≥ 18 N | ≥ 30 N |
| **Fourchettes** | ≥ 18 N | ≥ 25 N |

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## 4.8 Seam strength

When tested in accordance with 6.7 and Annex B, all seams or joints between pieces of material forming the protective layer shall meet the requirements of Table 4.

Seams attaching decorative overlays to the protective layer are not subject to this requirement.

**Table 4 — Minimum requirements of seam strength**

| Seam strength (protective layer) | Level 1 | Level 2 |
|---|---|---|
| **Main assembly seams** | ≥ 6 N/mm | ≥ 10 N/mm |
| **Fourchettes** | ≥ 4 N/mm | ≥ 7 N/mm |

## 4.9 Cut resistance

Testing all layers together in accordance with the relevant method of EN 388, the minimum index of cut resistance shall meet the requirements of Table 5.

This requirement does not apply to the fourchettes.

**Table 5 — Minimum requirements of cut resistance**

| Index of cut resistance (all layers together) | Level 1 | Level 2 |
|---|---|---|
| **Palm face** | ≥ 1,2 | ≥ 1,8 |
| **Back face** | not required | ≥ 1,2 |

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## 4.10 Impact abrasion resistance

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When tested in accordance with 6.8, the mean abrasion time and any single abrasion time shall meet the relevant requirements of Table 6.

**Table 6 — Minimum requirements of resistance to impact abrasion (in seconds)**

| Impact abrasion resistance (palm face / all layers) | Level 1 | Level 2 |
|---|---|---|
| **single abrasion time** | ≥ 3,0 s | ≥ 6,0 s |
| **mean abrasion time** | ≥ 4,0 s | ≥ 8,0 s |

## 4.11 impact protection of knuckles

The following requirements for impact attenuation are optional for level 1 gloves; they are mandatory for level 2 gloves and for all gloves designed and constructed to attenuate impact energy in the knuckle area. The correct position of the protection of the four knuckles shall be assessed in accordance with 6.9 and Table A.1, question 7.

When tested in accordance with 6.9 with an impact energy of 5 J, the mean peak of transmitted force and each single test result shall meet the requirements of Table 7.

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**Table 7 — Minimum requirements of impact attenuation**

| Impact attenuation resistance (knuckle protection / all layers) | Level 1 (optional) | Level 2 (mandatory) |
|---|---|---|
| **single result** | ≤ 9,0 kN | ≤ 5,0 kN |
| **Mean transmitted force** | ≤ 7,0 kN | ≤ 4,0 kN |

In addition, no part of the glove shall crack or shatter producing sharp edges, and the soft split leather (substance 0,8 mm ± 0,1 mm) between the test piece and the anvil shall not be torn or holed.

# 5 Test Equipment

## 5.1 General

Measuring instruments, unless otherwise specified, shall be accurate to ± 2 % of the pass/fail level of the characteristic being measured. Unless otherwise specified, a tolerance of ± 3 % applies to the indicated dimensions. The testing equipment shall comply with the specifications given by this standard or the normative references cited in it.

## 5.2 Glove restraint testing wrist

The test wrists shall be made of aluminium with polished surfaces. Each test wrist shall consist of a cylindrical body with a hook or other means of attachment at one end and a “mushroom” shaped extension at the other end (see Figure 1) The dimensions are given in Table 8.

If necessary, smaller or bigger test wrists may be used, provided their dimensions maintain the same relative proportions as given in Table 8.

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Dimensions in millimetres

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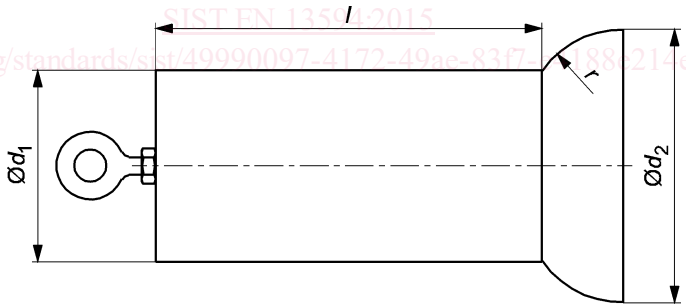



**Figure 1 — Glove restraint testing cone**

**Table 8 — Dimensions of test wrist in mm**

| Test wrist n° | Cylindrical part diameter $d_1$ | Widest part diameter $d_2$ | Length l |
|---|---|---|---|
| 1 | 44 ± 1 | 58 ± 1 | 80 ± 4 |
| 2 | 50 ± 1 | 66 ± 1 | 86 ± 4 |
| 3 | 56 ± 1 | 74 ± 1 | 92 ± 4 |
| 4 | 62 ± 1 | 82 ± 1 | 98 ± 4 |
| 5 | 68 ± 1 | 90 ± 1 | 104 ± 4 |
| 6 | 74 ± 1 | 98 ± 1 | 110 ± 4 |
| The radius r of the rounded “mushroom” head shall be half of $d_2$. | | | |

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### 5.3 Impact test apparatus

The apparatus and instrumentation shall be as specified in EN 1621-1 for impact testing, except that the mass of the striker shall be 2,5 kg ± 0,01 kg, the striker shall have a flat face that is 80 mm ± 2 mm in diameter, and the top surface of the anvil shall have a radius of convex dome curvature of 100 mm ± 1 mm.

## 6 Test Procedures

### 6.1 Test samples and test pieces

As far as compatible with the size range of the model under examination, samples to be tested shall be of different sizes and test pieces shall be taken from different sizes.

Whenever possible, test pieces shall be taken from whole gloves; where this is not possible, samples of equivalent materials and assemblies as the glove to be tested may be used.

### 6.2 Conditioning glove samples and test pieces

Only when possible cleaning is claimed, the cleaning method indicated in the manufacturer's information for use shall be applied to the samples as a pre-treatment to testing; the number of treatments shall meet the maximum number of treatments indicated by the manufacturer. In absence of such indication the cleaning cycle (each cycle including complete drying) shall be carried out 5 times. Pre-treatments are not required where the user's information recommends only trivial surface cleaning (e.g. wiping with a damp sponge), which is not considered to affect the performance of the gloves.

Unless otherwise specified in the particular test procedure, gloves and test pieces shall be conditioned in an atmosphere of 23 °C ± 2 °C and 50 % ± 5 % relative humidity for a minimum period of 24 h before testing except for the procedure in Annex A (ergonomic testing). Testing shall be carried out in the conditioning environment or shall be started within 10 min after removal of the test pieces from that environment.

### 6.3 Hard inclusions

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The gloves shall be examined visually and by carrying out the ergonomic exercises of Table A.1 to detect any hard or sharp edges, seams, buckles or other items that might injure the user or other persons. The gloves shall be examined for hard inclusions such as studs, rivets and staples. The results of the examinations shall meet the requirements in 4.3 and shall be recorded in the test report.

### 6.4 Sizing, length examination of cuff, position of knuckle protection

Gloves shall fit in accordance with relevant instructions supplied by the manufacturers. The cuff length shall meet the requirements of Table 1. Measurement is carried out, with the adjustment system being fastened, from the anatomical wrist line (palm side) of an assessor of appropriate hand size to the end of the cuff. (See also 3.4.)

If knuckle protection is present, its appropriate position covering all of the four knuckles on the hand back shall be assessed in accordance with Table A.1, question 7. The results of the examinations shall be recorded in the test report.

### 6.5 Restraint

Two samples of different sizes of the glove model shall be tested. The whole glove is fitted onto the testing wrist (see 5.2) which best fits to its size. The larger part ("mushroom" shape) of the testing wrist lies inside the glove. The restraint system of the glove shall be securely fastened around the cylindrical section of the test wrist. A clamp is attached to the digits 2 to 5 of the glove sample, or wires or laces are threaded through those digits, or another equivalent clamping system is used to attach the digits to a single fixation point. The other fixation point is connected to the end of the cylindrical part of the test wrist; both fixation points are then pulled