

# SLOVENSKI STANDARD

## SIST EN 1621-2:2014

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Nadomešča:

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**Varovalne obleke za motoriste pred mehanskimi vplivi - 2. del: Ščitniki hrbta za motoriste - Zahteve in preskusne metode**

Motorcyclists' protective clothing against mechanical impact - Part 2: Motorcyclists' back protectors - Requirements and test methods

**iTeh STANDARD PREVIEW**

Motorradfahrer-Schutzkleidung gegen mechanische Belastung - Teil 2: Rückenprotektoren - Anforderungen und Prüfverfahren

[SIST EN 1621-2:2014](https://standards.itih.ai/catalog/standards/sist/64c14b4b-d926-429d-a4cb-6404ca6a973f/sist-en-1621-2-2014)

Vêtements de protection contre les chocs mécaniques pour motocyclistes - Partie 2 : Protecteurs dorsaux - Exigences et méthodes d'essai

**Ta slovenski standard je istoveten z: EN 1621-2:2014**

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**ICS:**

13.340.10	Varovalna obleka	Protective clothing
43.140	Motorna kolesa in mopedi	Motor cycles and mopeds

**SIST EN 1621-2:2014**

**en,fr,de**

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EUROPEAN STANDARD

EN 1621-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2014

ICS 13.340.10

Supersedes EN 1621-2:2003

English Version

## Motorcyclists' protective clothing against mechanical impact - Part 2: Motorcyclists' back protectors - Requirements and test methods

Vêtements de protection contre les chocs mécaniques pour  
motocyclistes - Partie 2 : Protecteurs dorsaux - Exigences  
et méthodes d'essai

Motorradfahrer-Schutzkleidung gegen mechanische  
Belastung - Teil 2: Rückenprotektoren - Anforderungen und  
Prüfverfahren

This European Standard was approved by CEN on 26 October 2013.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## Foreword

This document (EN 1621-2:2014) 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of an identical text or by endorsement, at the latest by July 2014, and conflicting national standards shall be withdrawn at the latest by July 2014.

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 1621-2:2003.

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 89/686/EEC, see informative Annex ZA, which is an integral part of this document.

The main technical changes with respect to the 2003 edition are listed below:

- a new shape of protector has been added, the central back protector;
- requirements concerning innocuousness have been added;
- requirements concerning the wet impact test (mandatory) and the high and low temperature impact tests (optional) have been added;
- the waist to shoulder length shall be specified as a range.

EN 1621 consists of the following parts, under the general title *Motorcyclists' protective clothing against mechanical impact*:

- *Part 1: Motorcyclists' limb joint impact protectors — Requirements and test methods*
- *Part 2: Motorcyclists' back protectors — Requirements and test methods* (the present document)
- *Part 3: Requirements and test methods for chest protectors*<sup>1)</sup>
- *Part 4: Motorcyclists' inflatable protectors — Requirements and test methods*

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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1) Under development.

## Introduction

Motorcyclist's back protectors are devices worn within or on top of other protective clothing, covering at least a portion of the back as corresponding to one of the three shapes of protectors described in the standard.

The performance requirements have been chosen as a best practical compromise between protection, comfort, and ergonomic requirements. Protectors that are too stiff or heavy will not be worn. The test methods are designed to provide information on protection against impacts against edges such as kerb stones. The force levels in the tests do not compare directly with the forces to which riders are exposed in accidents, but experiences have shown that products meeting the requirements of this European Standard reduce the incidence and severity of injuries.

This standard accommodates three different typologies of back protector, which are offered to encourage the adoption of certified protection within the different disciplines of motorcycling and the type of rider. These are namely full back, central back and lower back (lumbar) protector, the definition of which are provided in Clause 3.

Two performance levels are specified for motorcyclist's back protectors against impacts. These are level 1 for protectors designed to give protection whilst having low ergonomic penalties associated with its use and level 2 for protectors providing an 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 specifies the minimum coverage to be provided by motorcyclists' back protectors worn by riders in normal traffic situations. The standard contains the requirements for the performance of the protectors under impact and details of the test methods. Requirements for sizing, ergonomic requirements, and requirements for innocuousness, labelling and the provision of information are included.

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

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

## 3 Terms and definitions

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

### 3.1

#### full back protector

FB

protective device worn on the back intended to reduce the severity of injuries caused by impacts to the central back and scapula area

### 3.2

#### central back protector

CB

protective device worn on the back intended to reduce the severity of injuries caused by impacts to central back area

### 3.3

#### lower back protector

lumbar protector

LB

protective device worn on the back intended to reduce the severity of injuries caused by impacts to the lumbar region

### 3.4

#### zone of protection

specific area of the protective device that is intended to provide protection

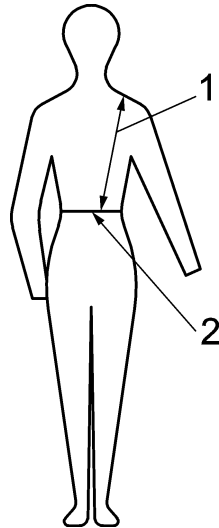
### 3.5

#### waist to shoulder length

length measured on the back from the waist line to the junction of the shoulder to the neck at the highest point (see Figure 1)

Note 1 to entry: The sizing system of back protectors is based on the user's waist to shoulder length, as no consistent relationship to the body height exists. The dimension is intended to be measured on the body with a tape measure.

## EN 1621-2:2014 (E)

**Key**

- 1 waist to shoulder length  
2 waist line

**Figure 1 — Body dimensions**

**3.6 waist line**  
on a subject standing upright, the line in the plane of the waist, 50 mm above the supra-crystal plane which is at the level of the highest points of the iliac crests

Note 1 to entry: The dimension of 50 mm is an example which refers to a subject of height 1,78 m; it needs to be scaled pro rata with the height of the actual subject (see following sample data):

Body height (m)	1,56	1,60	1,64	1,68	1,72	1,78	1,82	1,88	1,92	1,96
Distance above iliac crest (mm)	44	45	46	47	48	50	51	53	54	55

**4 Requirements****4.1 General**

Motorcyclists' back protectors shall meet an overall requirement that they are safe to use, comfortable to wear and fit for their purpose.

Back protectors shall be provided with means of restraint and/or adjustments capable to ensure that the protector is maintained in position during use. This requirement is not applicable for protectors to be inserted or incorporated into garments. Testing shall be carried out according to 5.2.

**4.2 Innocuousness**

The innocuousness shall comply with the requirements of EN 1621-1.

**4.3 Minimum dimensions of zones of protection**

Motorcyclists' back protectors shall have a minimum zone of protection related to the waist to shoulder measure of the largest user indicated by the marking. The minimum dimensions of the zone of protection shall be determined from Table 1, for the upper value of the size range (see 4.6).



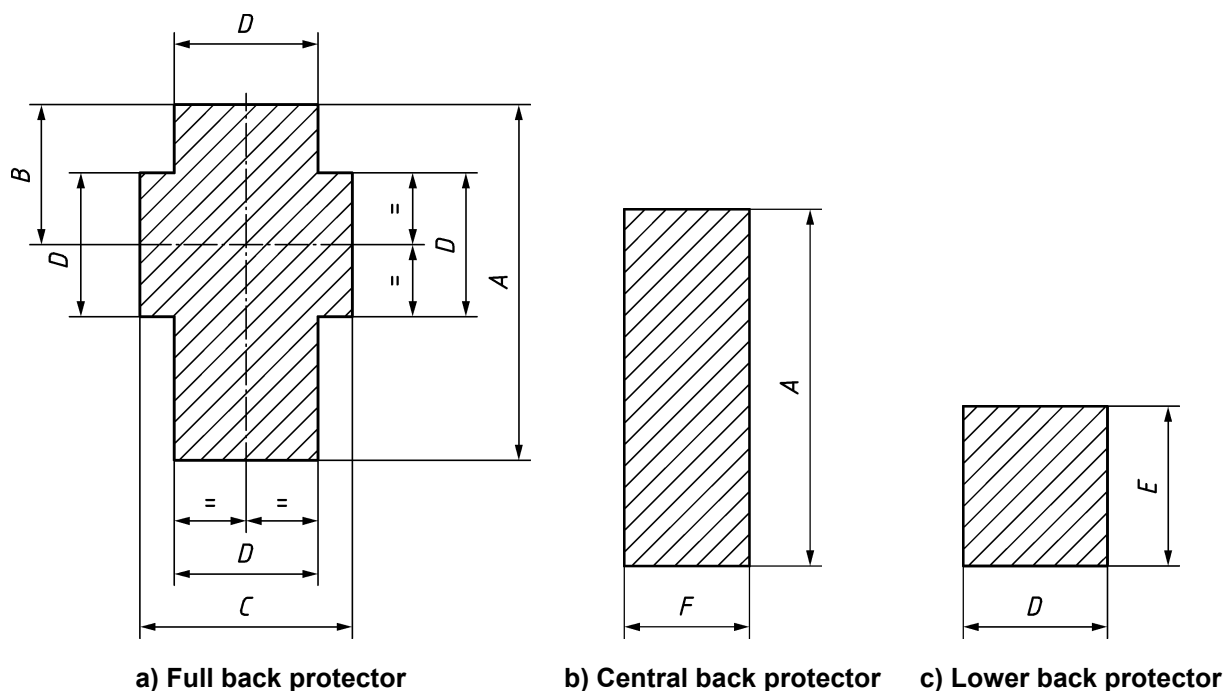


Figure 2 — Minimum dimensions of zones of protection

Table 1 — Dimensions of minimum zone of protection for back protector

Dimensions in Figure 2					
A	B	C	D	E	F
72 %	29 %	44 %	29 %	32 %	25 %
NOTE All dimensions refer to the waist to shoulder length (100 %) of the biggest user.					

The dimensions and position of the zone of protection, relative to the coverage provided by the whole product, shall be given in the information supplied by the manufacturer (see Clause 7).

NOTE The minimum dimensions of the zones of protection are usually marked on the specimens during the testing procedures.

#### 4.4 Impact attenuation

When impact protection is tested in accordance with 5.1.6.1 (ambient impact test), 5.1.6.2 (wet impact test) and, if required, 5.1.6.3 (high temperature impact test) and/or 5.1.6.4 (low temperature impact test), the transmitted force shall conform to the values in Table 2. Level 1 or 2 cannot be awarded unless such level is achieved under all of the claimed test conditions.

Table 2 — Performance levels

Level 1	Level 2
mean value: $\leq 18$ kN single strike: $\leq 24$ kN	mean value: $\leq 9$ kN single strike: $\leq 12$ kN

After each test, there shall be no fragmentation of the sample and no sharp edges shall be formed. However, formation of cracks and loss of soft debris is permissible.

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## 4.5 Ergonomic requirements

When examined and tested in accordance with 5.2, back protectors shall be found satisfactory for the use intended for motorcycle as indicated in the information supplied by the manufacturer. The centre line of the protective area shall be in line with the vertebra; the lower back protector shall cover the lumbar region of the back. The requirements are fulfilled if all answers to 5.2.2 are "Yes".

## 4.6 Sizing and size marking

Motorcyclists' back protectors shall be marked with their sizing using a pictogram (see Figure 6) in accordance with Figure 1.

The waist to shoulder length, expressed in centimetres, shall be specified as a range up to max. 5 cm.

Testing is done according to 5.2.

## 5 Test methods and equipment

## 5.1 Impact attenuation

## 5.1.1 Equipment

## 5.1.1.1 Dropping apparatus

The apparatus shall be such that a mass ("falling weight") can 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 weight shall lie over the centre of the anvil.

## 5.1.1.2 Bar impactor

A bar impactor which shall be rectangular with a length,  $h_1$ , equal to  $(160 \pm 2)$  mm, a width,  $h_2$ , at the top, equal to  $(50 \pm 1)$  mm and with a cylindrical face with a radius,  $R$ , equal to  $(12,5 \pm 0,1)$  mm shall be provided, see Figure 3. The mass of the impactor and guided mass shall be  $(5\ 000 \pm 50)$  g and its kinetic energy on impact shall be  $(50 \pm 1,5)$  J.

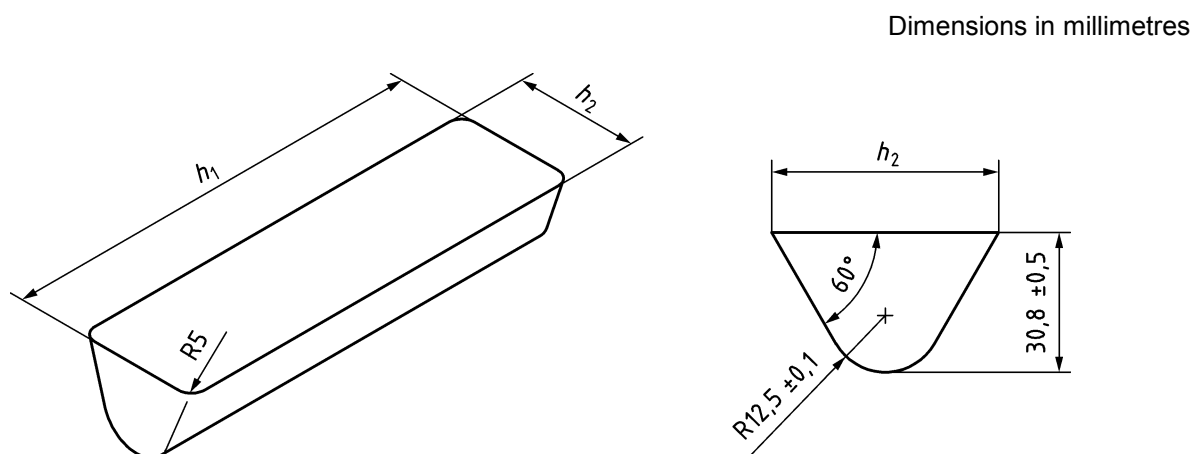
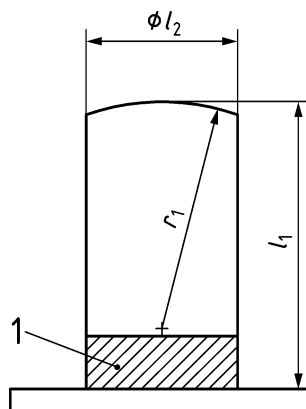


Figure 3 — Bar impactor

## 5.1.1.3 Anvil

The anvil shall be made of polished steel with the following dimensions  $l_1$  equal to  $(190 \pm 20)$  mm,  $l_2$  equal to  $(100 \pm 2)$  mm and  $r_1$  equal to  $(150 \pm 5)$  mm, see Figure 4.

The anvil shall be attached through a piezoelectric load cell or equivalent force transducer to a mass of at least 500 kg. The load cell or force transducer shall be preloaded to the manufacturer's instructions, if applicable.



#### Key

1 load cell

Figure 4 — Anvil

#### 5.1.1.4 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 high speed force transducer (for instance piezoelectric quartz instruments) in line with its sensitive axis. The force transducer shall have frequency response of at least 7 kHz, a calibrated range of not less than 70 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) 1.000 of ISO 6487.

#### 5.1.1.5 Tolerance and uncertainty

Measuring instruments or their independent working components, unless otherwise specified, shall have an error limit of  $\pm 2\%$  of the pass/fail level of the characteristic being measured.

For each of the required sequences of measurements performed in accordance with this standard a corresponding estimate of the uncertainty of the final result shall be determined. On request, this uncertainty ( $U_m$ ) shall be given in the test report in the form  $U_m = \pm X$ . It shall be used in determining whether a "Pass" performance has been achieved. If the final result plus  $U_m$  is above the maximum Pass level, the sample shall be deemed to have failed.

#### 5.1.2 Templates

The dimensions of the minimum zone of protection of the back protector shall comply with Table 1. Templates (see Figure 2) shall be prepared from a non-fraying (e.g. coated) fabric of a quality which basically maintains its shape and dimensions during all use. The templates shall be accurately prepared (tolerances  $\pm 2$  mm). The templates shall be used to mark the perimeter of the minimum zone of protection onto the outside of the back protector with a suitable marker. Inside such marked area, the two weakest points out of the apparently weak points, or points which appear to offer reduced protection, shall also be marked.