



# SLOVENSKI STANDARD SIST EN 12503-4:2016

01-julij-2016

Nadomešča:  
SIST EN 12503-4:2013

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**Športne blazine - 4. del: Ugotavljanje ublažitve udarca**

Sports mats - Part 4: Determination of shock absorption

Sportmatten - Teil 4: Bestimmung der Dämpfungseigenschaften

Tapis de sport - Partie 4 : Détermination des caractéristiques d'amortissement au choc

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**ICS:**

97.220.30 Oprema za dvoranske športe Indoor sports equipment

**SIST EN 12503-4:2016**

**en,fr,de**

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EUROPEAN STANDARD

EN 12503-4

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2016

ICS 97.220.30

Supersedes EN 12503-4:2013

English Version

## Sports mats - Part 4: Determination of shock absorption

Tapis de sport - Partie 4: Détermination des caractéristiques d'amortissement au choc

Sportmatten - Teil 4: Bestimmung der Dämpfungseigenschaften

This European Standard was approved by CEN on 25 March 2016.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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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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## European foreword

This document (EN 12503-4:2016) has been prepared by Technical Committee CEN/TC 136 “Sports, playground and other recreational facilities and equipment”, 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of an identical text or by endorsement, at the latest by November 2016, and conflicting national standards shall be withdrawn at the latest by November 2016.

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 12503-4:2013.

In relation to EN 12503-4:2013, the following main changes have been made:

- a) Normative references updated;
- b) Requirement and test method for high-jump and pole vault mats precised (Type 9, 10 and 11).

EN 12503, *Sports mats* consists of the following parts:

- *Part 1: Gymnastic mats, safety requirements*
- *Part 2: Pole vault and high jump mats, safety requirements*
- *Part 3: Judo mats, safety requirements*
- *Part 4: Determination of shock absorption*
- *Part 5: Determination of the base friction*
- *Part 6: Determination of the top friction*
- *Part 7: Determination of static stiffness*

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.

## EN 12503-4:2016 (E)

## 1 Scope

This European Standard specifies a method of test for the determination of shock absorption characteristics of sports mats types 1 to 8 of EN 12503-1:2013, 9 to 11 of EN 12503-2:2016 and 12 of EN 12503-3:2001.

## 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 12390-3, *Testing hardened concrete — Part 3: Compressive strength of test specimens*

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

## 3 Principle

An indenter is dropped onto the top surface of the mat and the deceleration during the impact monitored. The deceleration profile is processed to yield specified shock absorption parameters.

## 4 Apparatus

### 4.1 Indentors

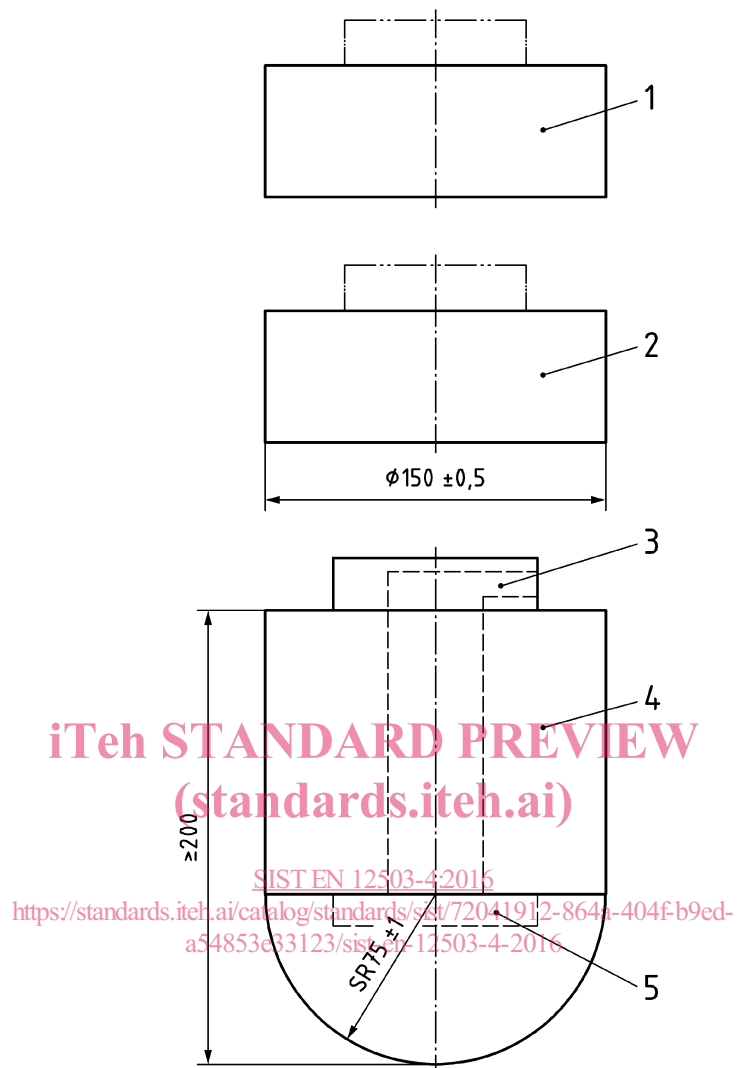
Metal indentors in accordance with the essential dimensions and masses are given in Table 1 and Figure 1 and Figure 2.

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**Table 1 — Indentors**

Type of mat	Diameter mm	Mass kg
1	150 ± 0,5	10 ± 0,1
2	150 ± 0,5	10 ± 0,1
3	150 ± 0,5	10 ± 0,1
4	150 ± 0,5	20 ± 0,2
5	150 ± 0,5	20 ± 0,2
6	150 ± 0,5	20 ± 0,2
7	150 ± 0,5	30 ± 0,3
8	150 ± 0,5	30 ± 0,3
9	150 ± 0,5	30 ± 0,3
10	150 ± 0,5	30 ± 0,3
11	150 ± 0,5	30 ± 0,3
12	43 ± 0,2 78 ± 0,2 116 ± 0,2	8 ± 0,05

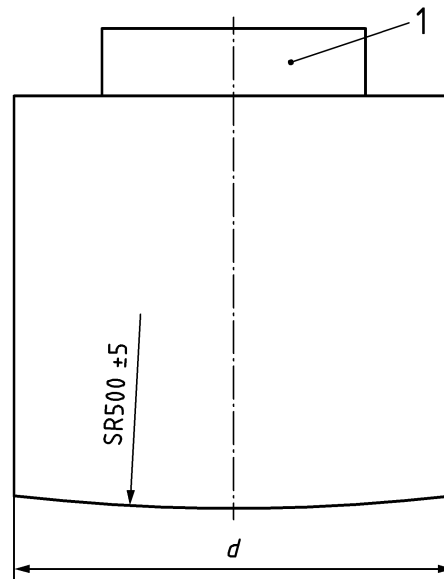
Dimensions in millimetres

**Key**

- 1 additional mass ( $10 \pm 0,1$ ) kg
- 2 additional mass ( $10 \pm 0,1$ ) kg
- 3 cable port
- 4 mass ( $10 \pm 0,1$ ) kg
- 5 space for accelerometer
- SR spherical radius

**Figure 1 — Indentors**

Dimensions in millimetres

**Key**

- 1 accelerometer  
 $d$  diameter (see Table 1)  
 SR spherical radius

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Figure 2 — Indentors for judo mats

**4.2 Release mechanism**

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Means of releasing the indenter to permit it to fall smoothly, vertically.

**4.3 Accelerometer**

An accelerometer rigidly mounted on the indenter as indicated in Figure 1 and Figure 2.

**4.4 Data capture and processing**

Instrumentation to record, display and process the accelerometer signals to produce the required shock absorption parameters, having a channel frequency class, including the accelerometer, of 1 000 in accordance with ISO 6487 and sampling frequency of not less than 10 kHz.

**4.5 Thickness measurement**

Means of measuring the thickness of the mat to an accuracy of ( $\pm 5$ ) mm (for types 9 to 11).

**5 Test piece**

**5.1** For mats type 1 to 8 and type 12 the test piece is a whole mat laid on a smooth, solid concrete floor measuring at least 1 m  $\times$  1 m. For mats of type 9 to 11 the test piece is a complete mat ready for use. The mat may be supported on a raised platform in use, but this not part of test specified in this standard.

**5.2** For mats type 1 to 8 and type 12 the laboratory test floor shall be fully supported concrete (i.e. not a suspended floor) with a minimum thickness of 100 mm. The compressive strength of the concrete shall be not less than 40 MPa when tested in accordance with EN 12390-3.



Mats of type 9 to 11 can be tested on their designated ground. The mat may be supported on a raised platform in use, but this not part of test specified in this standard.

## 6 Conditioning and test temperature

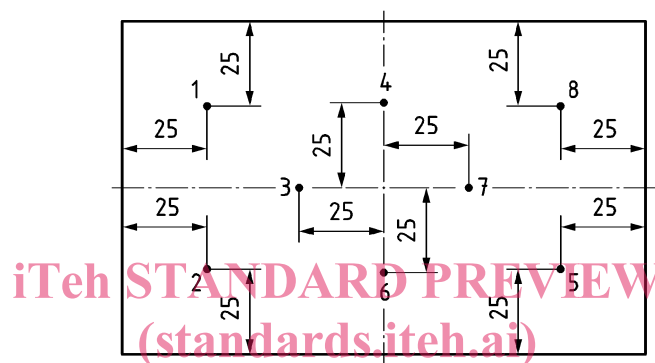
Condition the test piece for a minimum of 24 h at  $(21 \pm 3) ^\circ\text{C}$  immediately before the test and carry out the test at the same temperature.

## 7 Procedure

### 7.1 Procedure A (types 1 to 11)

Carry out tests on mats types 1 to 8 at the eight locations indicated in Figure 3.

Dimensions in centimetres



**Figure 3 — Procedure A (types 1 to 8) – Test location and number of tests**

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Carry out tests on mats types 9 and 10 at the eight locations indicated in Figure 4.