



SLOVENSKI STANDARD
SIST EN 12503-4:2002

01-september-2002

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

Ta slovenski standard je istoveten z: EN 12503-4:2001

[SIST EN 12503-4:2002](https://standards.iteh.ai/catalog/standards/sist/e0b811ad-1afa-4954-9021-5432d80e13a7/sist-en-12503-4-2002)

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ICS:

97.220.30 Oprema za dvoranske športe Indoor sports equipment

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en

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12503-4

April 2001

ICS 97.220.30

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 21 January 2001.

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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 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

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 136 "Sports, playground and other recreational 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of an identical text or by endorsement, at the latest by October 2001, and conflicting national standards shall be withdrawn at the latest by October 2001.

This standard EN 12503 "Sports mats" consists of:

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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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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 12503-1:2001, 9 to 11 of EN 12503-2:2001 and 12 of EN 12503-3:2001.

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 12503-1:2001

Sports mats – Part 1: Gymnastic mats, safety requirements

EN 12503-2:2001

Sports mats – Part 2: Pole vault and high jump mats, safety requirements

EN 12503-3:2001

Sports mats – Part 3: Judo mats, safety requirements

ISO 6487

Road Vehicles – Measurement techniques in impact tests – Instrumentation

3 Principle

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A striker 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.

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4 Apparatus

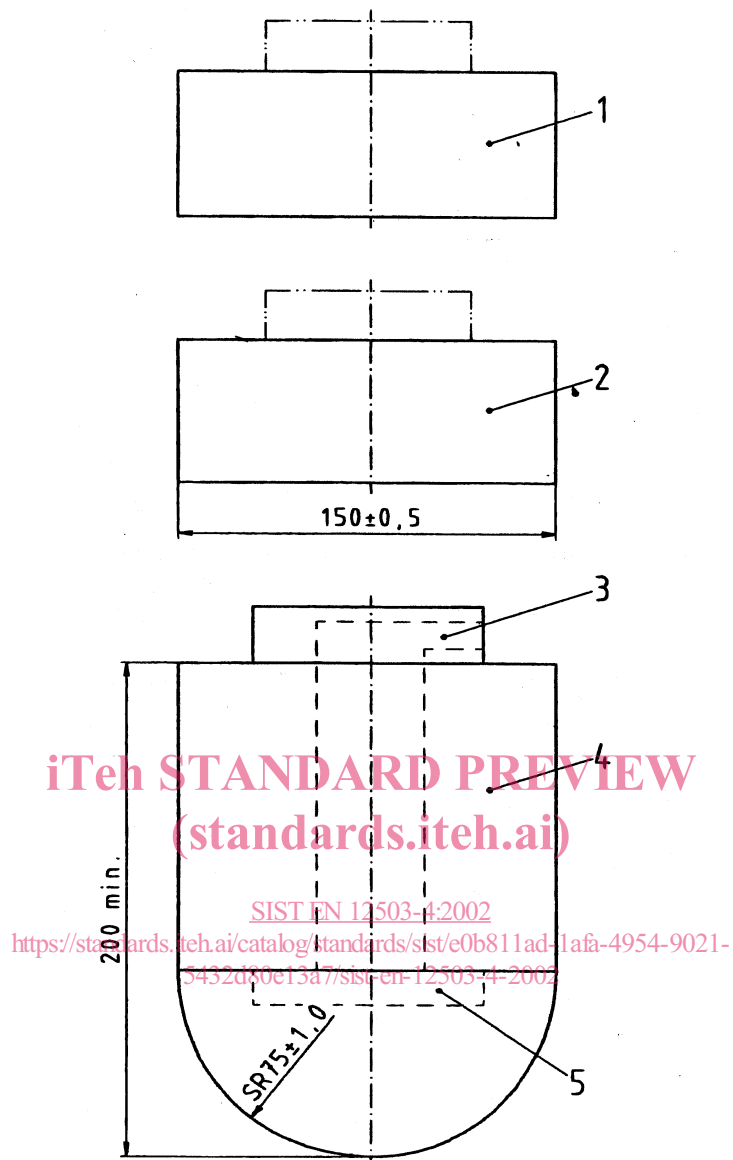
4.1 Indentors

Metal indentors in accordance with the essential dimensions and masses given in table 1 and figures 1 and 2.

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

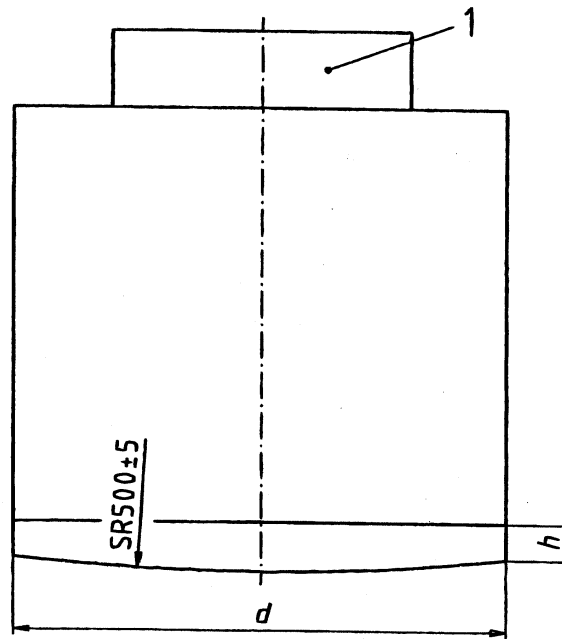
Dimensions in millimetres

**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

Figure 1- Indentors for gymnastics mats

Dimensions in millimetres

**Key**

1 Accelerometer

Total mass of indenter ($8 \pm 0,5$) kg

Figure 2 - Indentors for judo mats
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4.2 Release mechanism

Means of releasing the striker permitting the impactor to fall smoothly, vertically.

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4.3 Accelerometer

An accelerometer rigidly mounted on the indenter as indicated in figures 1 and 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 1000 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 (± 5) mm (for types 9 to 11).

5 Test piece

The test piece is a whole mat laid on a smooth, solid concrete floor (at least 1 m × 1 m).

6 Conditioning and test temperature

Condition the test piece for a minimum of 24 h at (21 ± 3) °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.

Carry out tests on mats types 9 to 11 in the centre of the mat.

Dimensions in centimetres

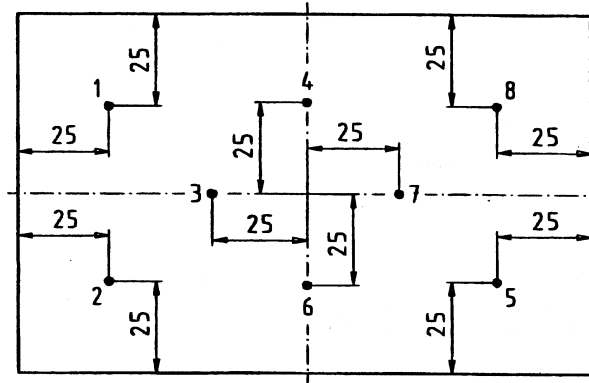


Figure 3 - Procedure A (types 1 to 11)
Test location and number of tests

The fall height shall be as detailed in table 2.

Table 2 - Test fall heights

Dimensions in millimetres

Type of mat	Fall height
1	150 ± 1,0
2	300 ± 1,0
3	400 ± 1,0
4	800 ± 1,0
5	800 ± 1,0
6	800 ± 1,0
7	800 ± 1,0
8	800 ± 1,0
9	1 200 ± 1,0
10	1 200 ± 1,0
11	1 200 ± 1,0

For tests on types 1 and 2 mats, a metal frame with dimensions of 450 mm x 350 mm and a minimum mass of 5,0 kg shall be placed centrally on the test piece during the tests to ensure that the test piece is flat.

For tests on types 9, 10, 11 mats, determine the thickness of the mat centrally along each side and calculate the mean thickness.

Raise the striker to the required height and lock into position.

Release the striker and allow it to fall vertically onto the test piece.

Record the signal from the accelerometer throughout the impact.

Display the recorded signal and examine the traces to ensure that they contain no spurious peaks etc.

Process the data to obtain the following parameters:

- peak deceleration during the impact (g);
- deflection of the surface (in mm) for mat types 1 to 8, percentage deflection of the surface (in %) for mat types 9 to 12;
- resilience of the tested surface, in %.

NOTE 1 The velocity and deflection during impact is obtained by successive integration.

NOTE 2 Resilience is calculated from the ratio of the squares of the velocities after and before impact, expressed as a percentage.

Carry out 10 tests at each test location. Carry out the tests at each location at intervals of 1 min to 2 min.

7.2 Procedure B (type 12)

7.2.1 Homogeneity test

Carry out the tests at the eight locations indicated in figure 4.

Carry out the tests using the 78 mm diameter indenter from a fall height of 400 mm.

Raise the striker to the required height and lock into position.

Release the striker and allow it to fall vertically onto the test piece.

Record the signal from the accelerometer throughout the impact.

Display the recorded signal and examine the traces to ensure that they contain no spurious peaks, etc.

Process the data to obtain the peak deceleration value (g).

Carry out five tests at each test location.

Carry out the tests at each location at intervals of 1 min to 2 min.

Dimensions in centimetres

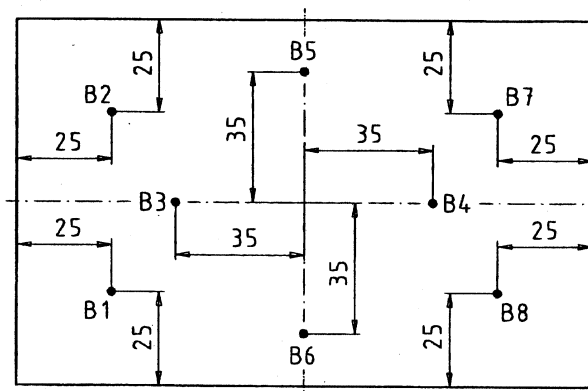


Figure 4 - Procedure B (type 12)
Test location and number of tests

7.2.2 Shock absorption test

Carry out the tests at the eight locations shown in figure 3.