



# SLOVENSKI STANDARD

## SIST EN 1957:2001

01-februar-2001

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**Pohištvo za domačo uporabo - Postelje in posteljni vložki - Preskusne metode za ugotavljanje funkcionalnih značilnosti**

Domestic furniture - Beds and mattresses - Test methods for the determination of functional characteristics

Wohnmöbel - Betten und Matratzen - Prüfverfahren zur Bestimmung der funktionellen Eigenschaften

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Meubles a usage domestique - Lits et matelas - Méthodes d'essai pour la détermination des caractéristiques fonctionnelles

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**Ta slovenski standard je istoveten z: EN 1957:2000**

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**ICS:**

97.140

Pohištvo

Furniture

**SIST EN 1957:2001**

**en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

EN 1957

May 2000

ICS 97.140

English version

## Domestic furniture - Beds and mattresses - Test methods for the determination of functional characteristics

Meubles à usage domestique - Lits et matelas - Méthodes d'essai pour la détermination des caractéristiques fonctionnelles

Wohnmöbel - Betten und Matratzen - Prüfverfahren zur Bestimmung der funktionellen Eigenschaften

This European Standard was approved by CEN on 8 April 2000.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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COMITÉ EUROPÉEN DE NORMALISATION  
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**Foreword**

This European Standard has been prepared by Technical Committee CEN/TC 207 "Furniture", the secretariat of which is held by IBN.

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 2000, and conflicting national standards shall be withdrawn at the latest by November 2000.

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.

## 1 Scope

This European standard specifies test methods for the determination of the durability and hardness of mattresses and all types of fully erected domestic beds with mattresses (and mattress pads when they form a unit with the mattress). It does not apply to water beds, air beds and children cots.

It includes a method for the determination of the firmness rating of a mattress or a bed correlating to the subjective assessment made by people (see Annex A). It must be emphasized that the firmness rating cannot be used to demonstrate comfort and/or quality of a mattress or a complete bed.

Ageing and degradation caused by air, light, humidity and temperature are not included. The test results are only valid for the article tested. When test results are intended to be applied to other similar articles, the test specimen shall be representative of them.

## 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 1334	Domestic furniture - Beds and mattresses - Methods of measurement and recommended tolerances
EN 1725:1998	Domestic furniture - Beds and mattresses - Safety requirements and test methods
ISO 1101	Technical drawings - Geometrical tolerancing - Tolerancing of form, orientation, location and run out - Generalities, definitions, symbols, indications on drawings
ISO 8295	Plastics - Film and sheeting - Determination of the coefficients of friction

## 3 Definitions

For the purposes of this standard, the following definitions apply :

- 3.1 Test unit** : A test unit consists of a mattress or bed or mattress/bed combination.
- 3.2 Durability test** : Test simulating the repeated application of loads and/or movement of components occurring during long-term use and assessing the strength of the article under such conditions.  
The durability test is a procedure mainly intended to evaluate the change of the properties of the test unit caused by repeated loadings.
- 3.3 Load/deflection curve**: Load/deflection curves are obtained by pressing a load pad into the test unit and measuring the associated value of indentation and force simultaneously.
- 3.4 Hardness value ( $H$ )** : The hardness value is determined from load/deflection measurement.
- 3.4 Firmness rating ( $H_s$ )** : the firmness rating is used to express the subjective assessment by persons. It is determined from the hardness value upon results from empiric studies.
- 3.5 Height loss**: The height loss expresses the change in the height of a test unit caused by the durability test.

## 4 General test conditions

### 4.1 Preliminary preparation

Immediately before the tests are commenced, the test unit shall be conditioned for at least one week in a standardized climate ( $23^{\circ} \pm 2^{\circ}\text{C}$  /  $(50 \pm 5) \% \text{RH}$ ). Subsequent conditioning shall also take place in this climate.

Tests shall be carried out in indoor condition which shall be recorded in the test report.

During conditioning and handling, mattresses shall be kept flat and unloaded.

In the case of designs not catered for in the test procedures, the test shall be carried out as far as possible as described and the deviations shall be stated in the test report.

Complete beds shall be tested as delivered. Knock-down type beds shall be assembled according to the instruction supplied with the test unit. If the test unit can be assembled or combined in different ways, the most adverse combination shall be used for the test. Knock-down fittings shall be tightened before testing.

If necessary, mattress pads shall be prevented from moving during testing by a suitable means, e.g. adhesive tape or pins.

In cases where bed bases are adjustable in hardness, the setting during the test shall be recorded in the test report.

If the production information states that the mattress has a soft side and a firm side, both sides shall be tested using separate mattresses.

### 4.2 Tolerances

Unless otherwise stated :

- all forces shall have an accuracy of  $\pm 5 \%$  of the nominal force ;
- all masses an accuracy of  $\pm 0,5 \%$  of the nominal mass ;
- all dimensions an accuracy of  $\pm 1 \text{ mm}$  of the nominal dimension.

The tolerance for position of loading pads shall be  $\pm 5 \text{ mm}$ .

### 4.3 Sequence of testing

All tests shall be carried out on the same test unit and in the following sequence :

- a) Conditioning, at least one week (see 4.1)
- b) Measurement of unit height beginning within 5 min. from moving the mattress from the standardized climate
- c) Durability test : 100 cycles (see 7.2)
- d) Conditioning, at least 5 hours (see 4.1)
- e) Measurement of unit height (see 8.1) at 100 cycles and hardness measurement (see 7.3 and 8.2) beginning within 5 min from moving the mattress from the standardized climate (see 4.1)
- f) Durability test : 29 900 cycles

- g) Conditioning (see 4.1)<sup>1)</sup>
- h) Determination of hardness (see 8.2) and height loss between 100 cycles and after the test (see 8.1)<sup>1)</sup>
- i) Bed edge test (see clause 9)
  - 1) durability test at 100 cycles
  - 2) measurement of unit height at 100 cycles (see 8.1)
  - 3) durability test on bed edge : 4 900 cycles
  - 4) measurement of unit height and height loss (see 8.1)

## 5 Test apparatus

### 5.1 Floor surface

Rigid, horizontal and flat.

### 5.2 Stops

Stops shall be used to prevent a complete bed or bed frame from sliding but not tilting and shall be no higher than 12 mm except in cases where the design of the bed necessitates the use of higher stops, in which case the lowest that will prevent the bed from moving, shall be used.

### 5.3 Standard test bed base for mattresses (durability test)

Rigid, horizontal, flat and smooth.

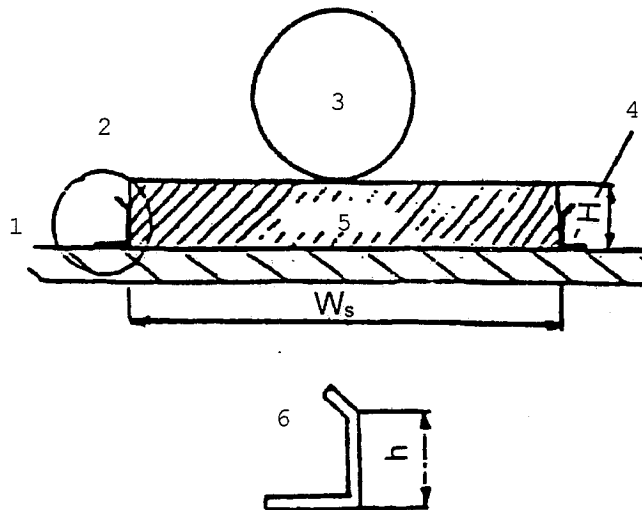
### 5.4 Side support profile

If the mattress is not prevented from moving during the durability test by the bed structure, it shall be prevented from moving by two side support profiles as illustrated in figure 1. The internal distance between the supports ( $W_s$ ) shall be equal to the width of the mattress measured according to EN 1334,  $\pm$  2 mm. The height of the support profiles ( $h$ ) shall not exceed one third of the mattress thickness ( $H$ ), measured according to EN 1334. The length of the support profiles shall be at least equal to the length of the test unit.

If necessary, mattress pads shall be fixed during the tests by a suitable manner.

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<sup>1)</sup> Intermediate measurements may be carried out under these conditions.

**Key**

1 side support profile  
2 section A  
3 roller

4 side support profile  
5 mattress  
6 section A

**Figure 1 - Side support profile**  
(standards.iteh.ai)

**5.5 Standard table/test board (measuring)**

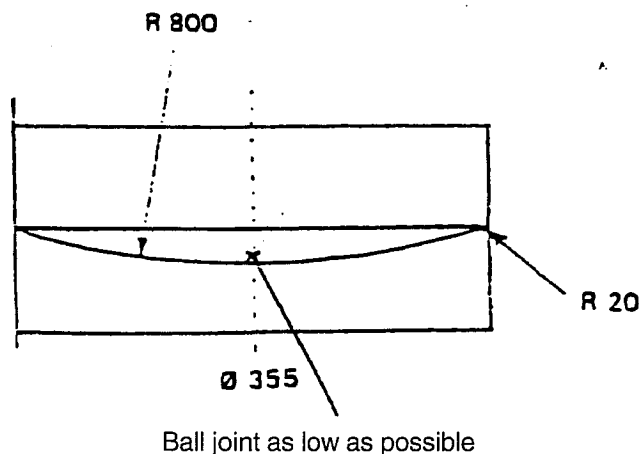
Horizontal, flat and smooth surface, large enough to fully support the mattress in any measuring position. At the loading position, the deflection shall not exceed 1 mm under 1000 N load. The overall flatness tolerance of the test board shall be 2 mm/1000 mm.

**5.6 Loading pad**

Rigid circular object 355 mm in diameter the face of which has a convex spherical curvature of 800 mm radius with a 20 mm front edge radius (see figure 2).

The loading pad shall have a smooth surface and shall be mounted to the loading system of the test machine (5.7) by a ball joint as close as possible to the indenter surface (see figure 2).

dimensions in millimeters



**Figure 2 - Loading pad**



### 5.7 Equipment for recording the load/deflection curves

The equipment for recording the load/deflection curves shall be a loading pad (5.6) and a testing machine capable of applying a vertical downward load up to 1000 N.

The travel speed for both loading and unloading shall be  $(90 \pm 5)$  mm/minute.

Load and height with reference to a fixed datum shall be measured.

The accuracy of the height measuring system shall be  $\pm 0,5$  mm.

The accuracy of the load measuring system shall be  $\pm 1$  % of the max load (1000 N).

The equipment shall be so that horizontal forces do not influence the measurement.

### 5.8 Equipment for the durability test

The equipment consists of a roller with dimensions and a shape illustrated at figure 3 and a mechanism capable of relative horizontal movement of the roller on the unit surface.

The barrel surface of the roller is limited by a form tolerance according to ISO 1101 of  $\pm 2$  mm. The roller surface shall be hard, smooth (the friction coefficient shall be between 0,2 and 0,5 measured according to ISO 8295) and without scratches or other surface defects.

The total rolling system shall apply a load of  $(1400 \pm 7)$  N measured in the static condition.

The roller shall have a rotation moment of inertia of  $0,5 \text{ kgm}^2 \pm 10\%$ . The roller shall be free to pivot along its longitudinal and lateral axis relative to the horizontal.

The roller shall be capable of following the surface of the mattress, and it shall be free to move up and down to follow the mattress surface.

Note The rotation moment of inertia of the solid roller shall be  $1/2 \text{ density} \times \pi r^4 l$  where  $r$  is the radius of the roller at any given point.

The forces on the roller shall act horizontally (see 7.2) at the centre point. The motion shall be approximately synosoidal (within  $\pm 10$  %) and symmetrical along the longitudinal symmetry axis of the unit. The frequency shall be  $(16 \pm 2)$  cycles per minute.

dimensions in millimeters

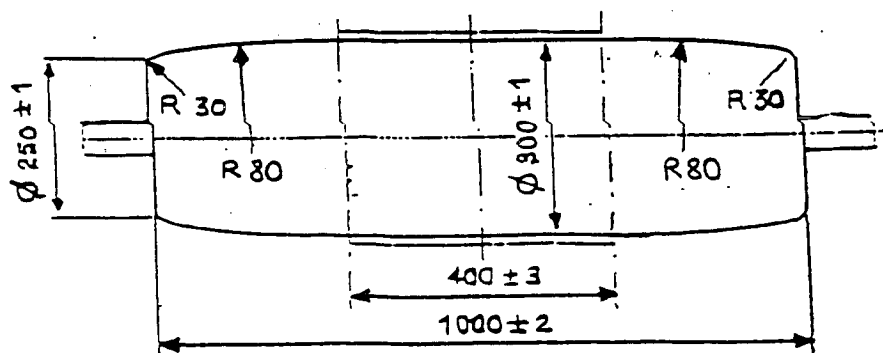


Figure 3 - Roller