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**Children's furniture — Mattresses for
cots and cribs — Safety requirements
and test methods**

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 136, *Furniture*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Children's furniture — Mattresses for cots and cribs — Safety requirements and test methods

1 Scope

This document specifies safety requirements and test methods for mattresses, including mattress bases and mattress toppers, used in children's cots, cribs and suspended baby beds, for domestic and non-domestic use.

This document does not apply to mattresses for carry cots and pram bodies, inflatable mattresses, water mattresses and mattresses used for medical purposes.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2439, *Flexible cellular polymeric materials — Determination of hardness (indentation technique)*

ISO 8124-1, *Safety of toys — Part 1: Safety aspects related to mechanical and physical properties*

ISO 8124-2:2014, *Safety of toys — Part 2: Flammability*

EN 71-3:2019, *Safety of toys — Part 3: Migration of certain elements*

ISO 13936-2, *Textiles — Determination of the slippage resistance of yarns at a seam in woven fabrics — Part 2: Fixed load method*

EN 597-1, *Furniture - Assessment of the ignitability of mattresses and upholstered bed bases — Part 1: Ignition source smouldering cigarette*

EN 1334:1996, *Domestic furniture - Beds and mattresses - Methods of measurement and recommended tolerances*

EN 1730:2012, *Furniture – Tables – Test methods for the determination of stability, strength and durability*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

3.1

mattress topper

thin product that comprises a cover and filling(s) designed to be used on top of a mattress

3.2

mattress base

cot base and mattress combined in one component

3.3

woven fabric

fabric produced by interlacing (by weaving on a loom or weaving machine) a set of warp threads and a set of weft threads normally at right angles to each other

[SOURCE: ISO 3572:1976, 2.1]

3.4

nonwoven fabric

engineered fibrous assembly, primarily planar, which has been given a designed level of structural integrity by physical and/or chemical means, excluding weaving, knitting or papermaking

[SOURCE: ISO 9092:2019, 3.1.1]

3.5

knitted fabric

fabric in which at least one system of threads is formed into knitted loops and the knitted loops are intermeshed into stitches

[SOURCE: ISO 8388:1998, 3.0.1]

4 General test conditions

4.1 Preliminary preparation

The mattress shall be tested as delivered.

Unless otherwise specified, the tests shall be carried out on the same sample.

Unless otherwise specified by the manufacturer, the mattress shall be stored in indoor ambient conditions for at least 24 h immediately prior to testing.

The tests shall be carried out at indoor ambient conditions. However, if during a test the temperature is outside the range 15 °C to 25 °C, the maximum and/or minimum temperature shall be recorded in the test report.

4.2 Application of forces

The test forces in durability and static load tests shall be applied sufficiently slowly to ensure that negligible dynamic load is applied. The forces in durability tests shall be applied sufficiently slowly to ensure that kinetic heating does not occur.

Unless otherwise stated, static forces shall be maintained for (10 ± 2) s and durability forces shall be maintained for (2 ± 1) s.

The forces may be replaced by masses. The relationship $10 \text{ N} = 1 \text{ kg}$ shall be used.

4.3 Tolerances

Unless otherwise stated, the following tolerances shall apply:

- Forces: ± 5 % of the nominal force;
- Masses: $\pm 0,5$ % of the nominal mass;
- Dimensions: ± 1 mm of the nominal dimension;
- Positioning of loading pads: ± 5 mm;

NOTE For the purposes of uncertainty measurement, test results are not considered to be adversely affected when the above tolerances are met.

5 Test equipment

5.1 Measuring table

The measuring table shall be a horizontal, flat and smooth surface with dimensions sufficient to fully support the mattress in any measuring position. The maximum deflection shall not exceed 1 mm when a force of 1 000 N is applied to the table when tested in accordance with EN 1730:2012, 6.3.

5.2 Stops

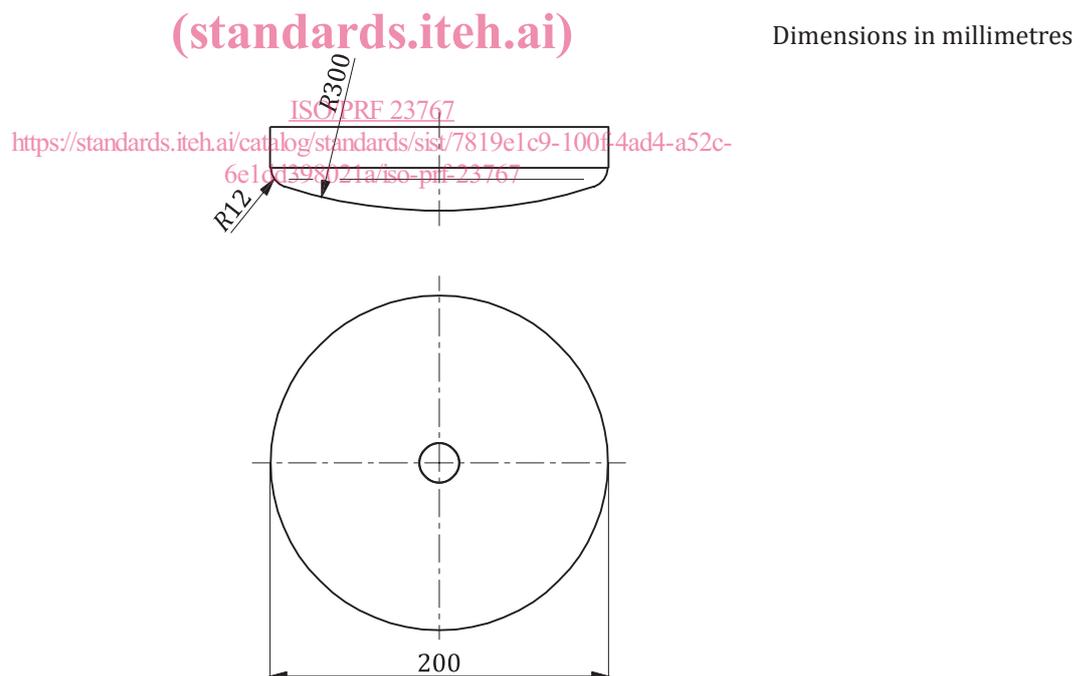
Stops shall be used to prevent the mattress from sliding by a mean that does not affect the test result.

5.3 Square aluminium alloy tube

The aluminium alloy tube shall be 40 mm in width × 40 mm in height × 2 mm in thickness, approximately 2 m long, with a mass of $(1,65 \pm 0,0125)$ kg.

5.4 Loading pad

The loading pad shall be a rigid circular object 200 mm in diameter, the face of which has a convex spherical curvature with a radius of 300 mm with a 12 mm edge radius (see [Figure 1](#)).



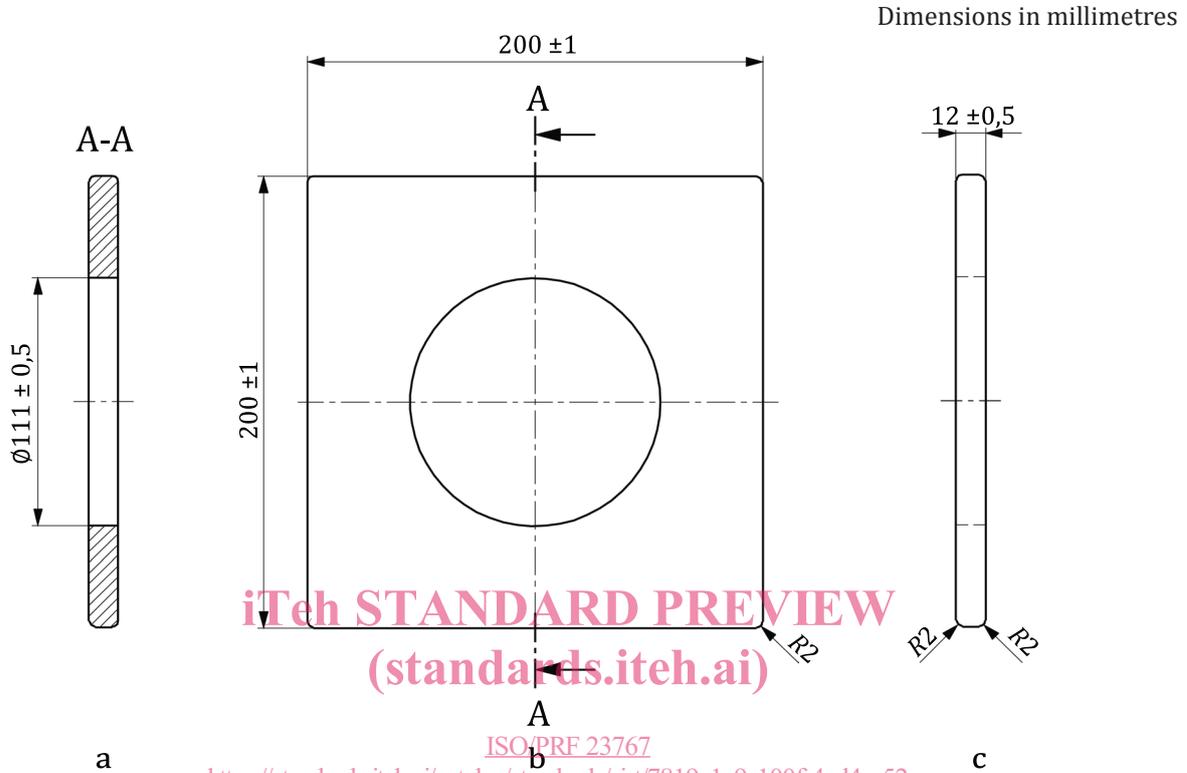
Key

R radius

Figure 1 — Loading pad

5.5 Test template for determination of the indentation depth

The test template shall be made from hard smooth material with the dimensions shown in Figure 2. It shall have a total mass of $(0,26 \pm 0,01)$ kg. The edges of the template shall be rounded with a radius of $(2 \pm 0,5)$ mm and it shall have a hole in its centre with a diameter of $(111 \pm 0,5)$ mm, see Figure 2.



- Key**
- a intersection view
 - b top view
 - c side view
 - R radius

Figure 2 — Test template for determination of firmness

5.6 Spherical load for determination of the indentation depth

The spherical load shall have a diameter of $115^{+0,5}_0$ mm and a mass of $(2,5 \pm 0,0125)$ kg.

5.7 Test foam

The text foam shall be a layer of flexible PU foam, corresponding to the dimensions of the mattress topper to be tested, having a thickness of 100 mm, a density of $(25 \pm 2,5)$ kg/m³ and a hardness of (120 ± 12) N in accordance with Method A ($A_{(40\%/30s)}$) in ISO 2439.

5.8 Small parts cylinder

The cylinder shall have the dimensions as shown in Figure 3.

Dimensions in millimetres

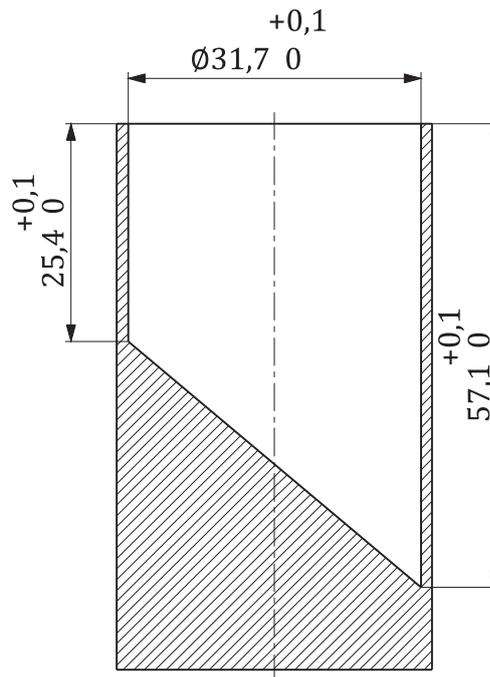


Figure 3 — Small parts cylinder

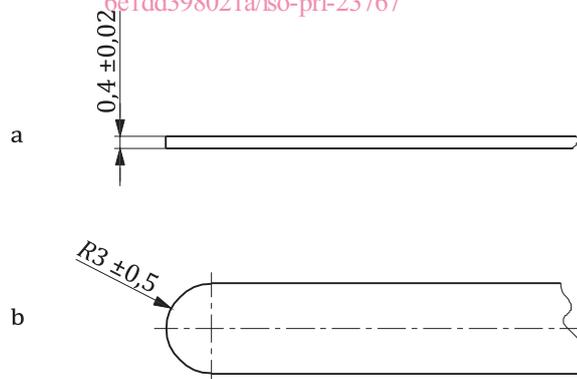
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5.9 Feeler gauge

The feeler gauge shall have the dimensions shown in Figure 4.

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Dimensions in millimetres



Key

- a side view
- b top view
- R radius

Figure 4 — Feeler gauge

5.10 Cone

The cone shall have an angle of $30^\circ \pm 0,5^\circ$ with a diameter of $60_0^{+0,1}$ mm with conical ends, see Figure 5.

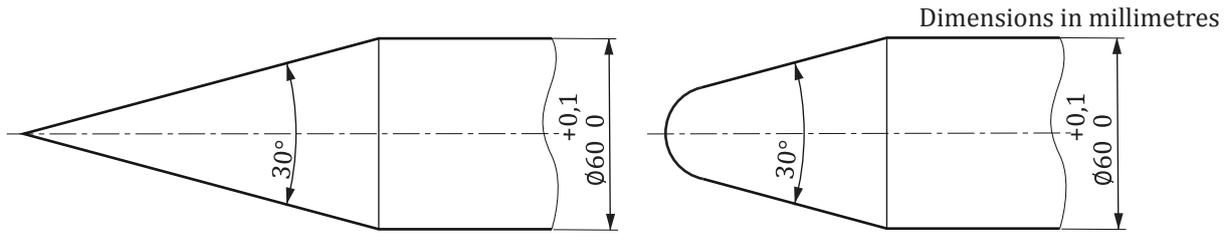


Figure 5 — Examples of cones

5.11 Probe

The cylindrical probe shall have a diameter of $12^{+0,1}_0$ mm, see Figure 6.

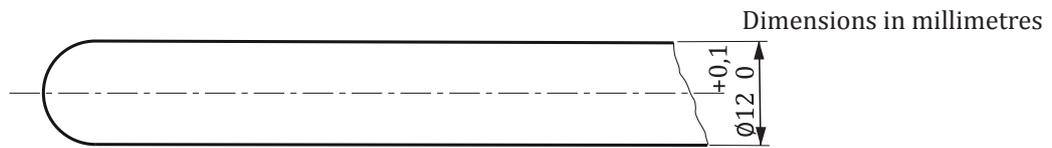


Figure 6 — Cylindrical Probe

6 Chemical hazards iTeh STANDARD PREVIEW (standards.iteh.ai)

Verification shall be provided that the migration of heavy metals from materials on the cover of the sleeping surface does not exceed the limits (Category III) in EN 71-3:2019, Table 2.

The migration shall be determined using the methods specified in EN 71-3:2019, Table 2.

Suggestions on colour fastness test methods are given in Annex B.

7 Fire and thermal hazards (see A.3)

A separate sample can be used.

When tested in accordance with ISO 8124-2:2014, 5.4, there shall be no surface flash, and the rate of spread of flame of textiles, coated textiles or plastic coverings shall not exceed 50 mm/s.

When tested in accordance with EN 597-1, there shall be no progressive smouldering ignition or flaming ignition.

NOTE In certain cases, national regulations can apply.

8 Mechanical hazards

8.1 Entrapment hazards from gaps and openings (see A.4.2)

8.1.1 Entrapment hazards between the mattress and the sides

This measurement shall be carried out before the whole test procedure.

In order to prevent entrapment hazards from gaps and openings, the tolerances on dimensions of the mattress shall be the nominal value of width and length (+25/-0) mm.

This shall be measured in accordance with EN 1334:1996, 6.1.

8.1.2 Body entrapment hazards

8.1.2.1 Requirements

To avoid entrapment of the body, there shall be no gap between components of the mattress. This requirement is fulfilled if the 60 mm cone (5.10) does not pass through the components when tested in accordance with 8.1.2.2.

8.1.2.2 Test method

Push the 60 mm cone (5.10) between components of the mattress with a 30 N force.

8.1.3 Entanglement hazards (see A.4.3)

8.1.3.1 Requirements

The restraint system is excluded from the following requirements.

Cords, ribbons and similar parts shall have a maximum free length of 220 mm when tested in accordance with 8.1.3.2.

Where cords, ribbons and similar parts are attached to the mattress together or within 80 mm of each other, all single cords shall have a maximum free length of 220 mm and the combined length from one loose end to the end of another loose end shall be maximum of 360 mm.

Loops shall have a maximum peripheral dimension of 360 mm when tested in accordance with 8.1.3.2.

8.1.3.2 Test method

The length of a cord, ribbon or similar part shall be measured from the fixing point on the mattress to the free end of the cord, ribbon or similar part under a 25 N tensile force.

The peripheral dimension of a loop shall be measured from the fixing point on the mattress of one end to the fixing point of the other end under a 25 N tensile force.

8.2 External suffocation hazards (see A.4.4)

8.2.1 Labels and decals on the mattress

8.2.1.1 Requirements

When tested in according to 8.2.1.2, labels and decals shall not become detached or be loosened from the product.

8.2.1.2 Test method

Using a force of (25 ± 2) N, insert the feeler gauge (5.9) between the label or decal and the mattress at any angle between 0° and 10° from the mattress surface.

Repeat for a further 29 times at the same position so that the feeler gauge is pushed between the label or decal and the mattress for a total of 30 times.

8.2.2 Plastic packaging

Plastic bags and plastic sheeting used for packaging shall conform to one of the following requirements:

- a) bags made of flexible plastics with an opening perimeter greater than 360 mm used for external or internal packaging or plastic sheeting used for packaging shall have an average sheet thickness of