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INTERNATIONAL STANDARD

ISO 7175-2

Second edition
1997-08-01

Children's cots and folding cots for domestic use —

Part 2:
Test methods

Lits fixes et lits pliants pour enfants à usage domestique —

Partie 2: Méthodes d'essai

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 7175-2 was prepared by Technical Committee ISO/TC 136, *Furniture*, Subcommittee SC 5, *Domestic furniture*.

This second edition cancels and replaces the first edition (ISO 7175-2:1988) which has been technically revised.

ISO 7175 consists of the following parts, under the general title *Children's cots and folding cots for domestic use:*

— *Part 1: Safety requirements*

— *Part 2: Test methods*

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Children's cots and folding cots for domestic use —

Part 2:
Test methods

1 Scope

This part of ISO 7175 specifies test methods that assess the safety of children's cots and folding cots for domestic use.

It is applicable to cots and folding cots with an internal length between 900 mm and 1 400 mm that are designed to prevent the child from climbing out. It does not cover rocking and swinging cots.

The tests are designed to be applied to a cot that is fully assembled and ready for use.

NOTE — The test results are only valid for the article tested. When the test results are intended to be applied to other similar articles, the test specimen should be representative of the production model.

In the case of designs not catered for in the test procedures, the test should be carried out as far as possible as described, and a list made of the deviations from the test procedure.

2 Normative references

The following standards contain provisions, which, through reference in this text, constitute provisions of this part of ISO 7175. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 7175 are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 48:1994, *Vulcanized rubbers — Determination of hardness (Hardness between 30 and 85 IRHD).*

ISO 2439:—[1], *Flexible cellular polymeric materials — Determination of hardness (indentation technique).*

ISO 7175-1:1997, *Children's cots and folding cots for domestic use — Part 1: Safety requirements.*

3 General

All forces shall have an accuracy of ± 5 %, all masses an accuracy of ± 0,5 % and all dimensions an accuracy of ± 0,5 mm.

Before any of the tests described in this part of ISO 7175 are commenced, the cot shall be old enough to ensure that it has developed its full strength. At least 4 weeks in normal indoor conditions shall have elapsed between manufacture and testing in the case of glued joints.

1) To be published. (Revision of ISO 2439:1980)

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Before testing, any fabrics used for folding cots shall be cleaned or washed twice following the manufacturer's instructions.

Immediately before testing, the cot shall be stored for at least 1 week in a standardized atmosphere at a temperature of (23 ± 2)°C and a relative humidity of (50 ± 5)%.

The cot shall be tested as delivered. If of a knock-down type, it shall be assembled in accordance with instructions supplied with the cot. If the cot can be assembled or combined in different ways, the most adverse combinations shall be used for each test. The test shall be carried out as listed on the same specimen.

Knock-down fittings shall be tightened before testing and shall not be retightened throughout the testing procedure.

4 Test equipment

Unless specified otherwise, test forces may be applied by any suitable device, because results are dependent only upon correctly applied forces and loads, and not upon the apparatus.

4.1 Slide gauge, comprising a cone made of plastics or other hard, smooth material mounted on a force-measuring device (see figure 1). There shall be six cones having diameters 7 mm, 25 mm, 45 mm, 60 mm, 65 mm and 85 mm.

4.2 Bottom impacter, with a total mass of 10 kg, of hardwood or equivalent material, with dimensions in accordance with figure 2.

4.3 Test mattress, comprising a flexible polyether foam sheet with a thickness of 50 mm, a bulk density of (30 ± 2) kg/m^3 and an indentation hardness index of (170 ± 20) N in accordance with A40 of ISO 2439. It shall have an area of at least 400 mm × 800 mm, but not larger than the mattress base of the cot under test. The test mattress shall have a cotton cover with the following characteristics:

— weave in plain: 1/1;

— mass per unit area: 100 g/m^2 to 120 g/m^2;

— set warp and weft: 20 to 30 threads per centimetre;

— finishing: desized, washed, no finishing agents;

— cover make-up: tight fit, but with no restriction on the foam.

4.4 Force-measuring device, for example a spring balance.

4.5 Side impacter, comprising a cylindrical pendulum (see figure 3) made of steel and with the head of the pendulum surrounded by a 10 mm thick layer of rubber of hardness 76 IRHD to 78 IRHD in accordance with ISO 48. The centre of gravity shall be 250 mm from the centre of the pivoting point A. The point of impact shall be 300 mm from the pivoting point. The total mass shall be 2 kg.

4.6 Test load, comprising a mass of 20 kg distributed over an area of approximately 150 mm × 150 mm. The mass may consist of more than one part.

4.7 Loading pad, comprising a rigid cylindrical object, 100 mm in diameter, having a smooth hard surface and rounded edges with radius of 12 mm.

4.8 Stops, intended to prevent the article from sliding but not tilting. They shall be no higher than 12 mm except in cases where the design of the cot necessitates the use of higher stops, in which case the lowest that will prevent the cot from sliding shall be used.

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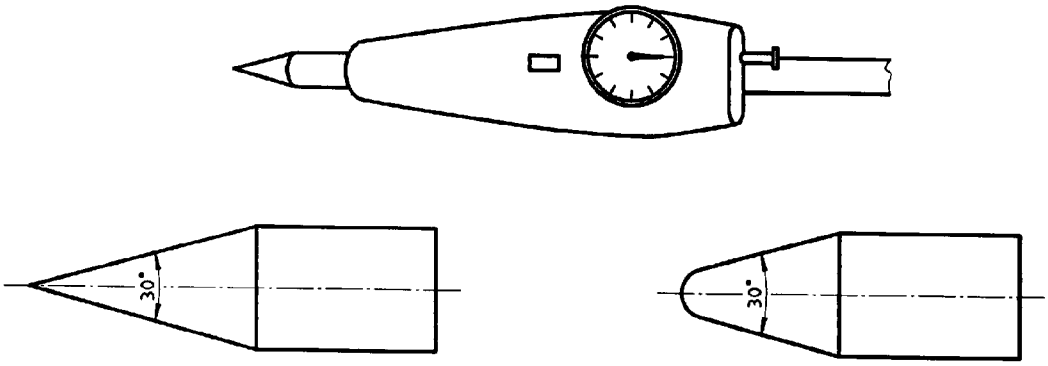

Figure 1 — Examples of measuring cones

Dimensions in millimetres

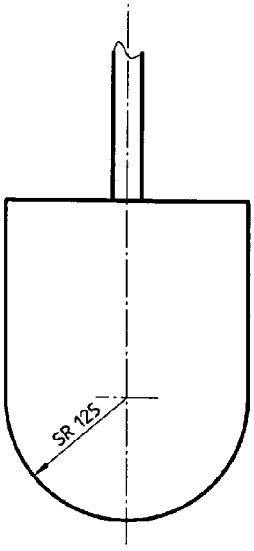

Figure 2 — Bottom impacter

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Dimensions in millimetres

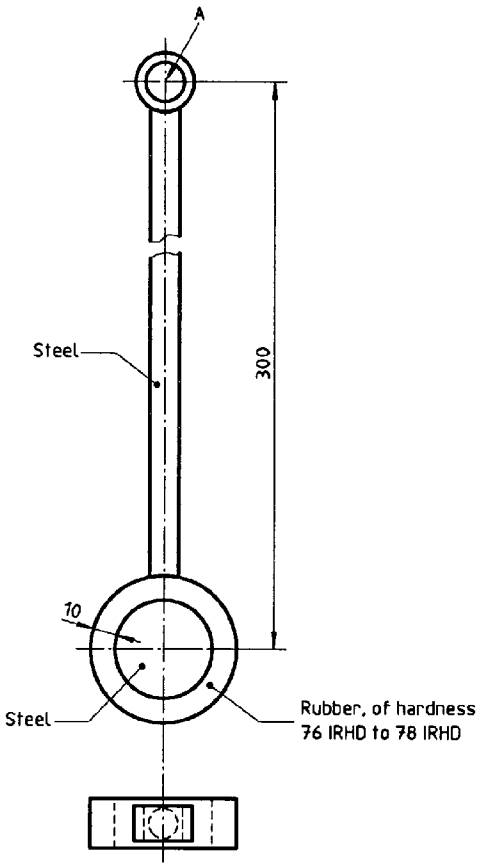

Figure 3 — Side impacter

4.9 Floor surface, horizontal, rigid and flat.

4.10 Test chains, comprising ball chains with a ball diameter of 3,2 mm and a distance between ball centres of 4,0 mm (see figure 4), fixed to a sphere of mass 2,5 kg with a diameter of 115 mm, and

a) forming a loop in accordance with figure 5; and

b) fixed at one end in accordance with figure 6 a) to a device made of stainless steel and with a total mass of (50 ± 1) g.

4.11 Cylinder, to assess small components, having main dimensions in accordance with figure 7.

4.12 Weight, having a mass of 10 kg, and a cross-section of 100 mm × 30 mm.

Dimensions in millimetres

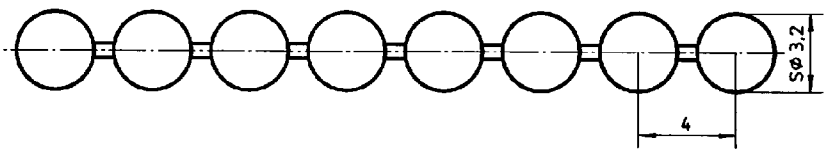

Figure 4 — Ball chain

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Dimensions in millimetres

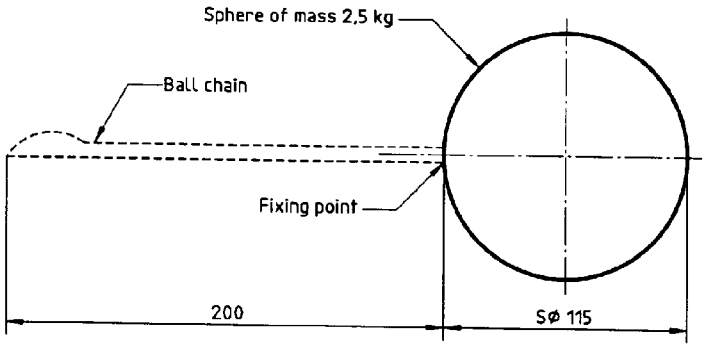
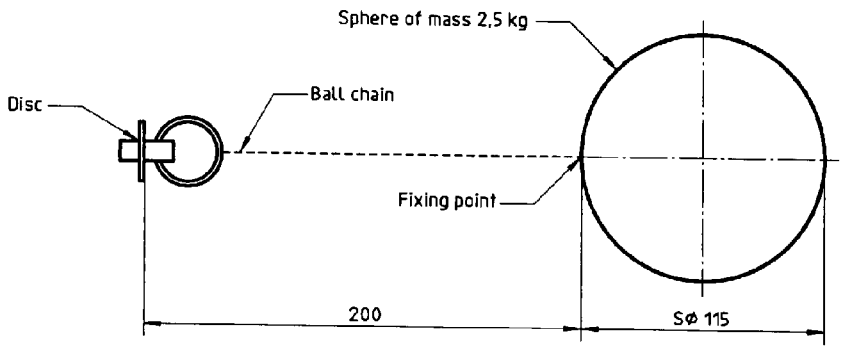
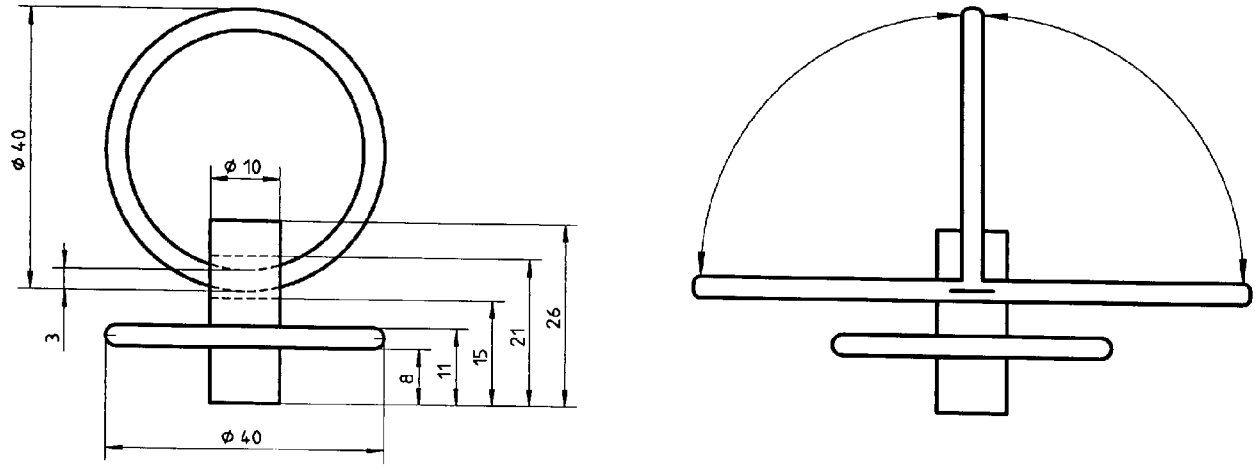


Figure 5 — Test chain with loop

Dimensions in millimetres



a) Test chain with disc



b) Disc

Figure 6 — Ball chain with disc

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Dimensions in millimetres

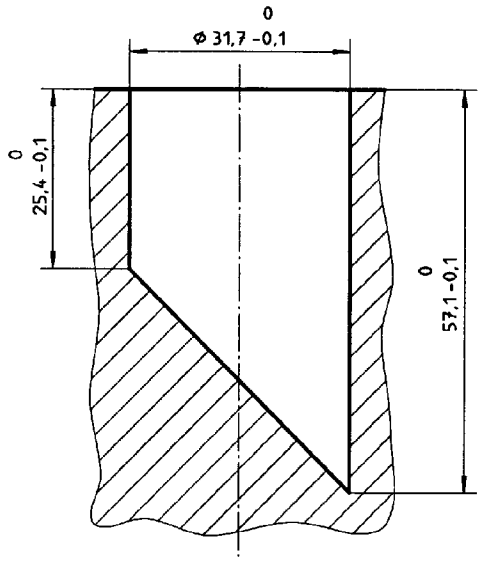

Figure 7 — Cylinder

5 Procedures

5.1 Assembly and inspection before test

Assemble the cot in accordance with the manufacturer's instructions. Prior to the test, inspect the cot visually for defects.

Tighten all knock-down fittings.

5.2 Inspection of workmanship

Inspect the cot to determine whether exposed edges, screws, bolts, zips and other fittings are rounded or chamfered and free of burrs and sharp edges.

5.3 Measurements

5.3.1 Measurement of height of sides

Measure the internal height of the sides from the cot base at its lowest position, without mattress, or the smallest distance from parts of the sides on which the child can stand.

5.3.2 Measurement of holes and the distance between slats of cot base, side slats, mesh width and clearance between cot base and sides and ends

Measure the clearance under load as given in table 1, between the slats of the cot base, the side slats, the wires of the mesh and between the cot base and sides and ends, respectively, when not under load.

Press the slide gauge (4.1) with a force, as given in table 1, between the wires of the mesh, the slats of the cot base, the side slats and between the cot base and the sides and ends.

After removal of the force, measure the maximum inner width of the mesh holes.

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Table 1 — Cone diameters and applied forces

Gaps	Cone diameter mm	Force, N	
		ISO 7175-1:1997, 4.3	ISO 7175-1:1997, 4.4
Wire mesh of sides and ends	7	—	30
Cot base/sides, ends	25	30	—
Diameter of holes, clearance between structural members	45	—	0
Slats of cot base	60	30	—
Diameter of holes, clearance between structural members	65	—	30
Wire mesh of cot base	85	90	—

5.3.3 Checking of protruding parts, gaps and openings

Place the cot base in its lowest position. Parts of cot sides and ends more than 1 400 mm above the cot base are considered not to be accessible.

Using one hand only, apply the loop of the test chain [4.10 a)] around the protruding part from the inside of the cot and allow the sphere to hang freely. Repeat the test three times.

Record whether or not the loop gets caught under the load of the sphere at any place.

Then, still using one hand only, move the test chain [4.10 b)] around the cot holding the sphere in such way that the chain, close to the fixing point, touches the uppermost part of the sides and ends of the cot. At any place where the chain can get caught, lower the sphere until either the disc gets caught and the sphere hangs freely or the disc slides over the edge.

Where feasible, put the disc through accessible openings and lower the sphere in the above manner.

Repeat the test at least three times.

Record whether or not the disc gets caught under the load of the sphere at any place.

5.4 Detachable parts

NOTE — Components are considered detachable if children can grip them with their teeth or fingers.

Apply a tensile force to the component to be tested through a clamp or by other suitable means.

Apply a force of

— 50 N where the largest accessible dimension is less than or equal to 6 mm;

— 90 N where the largest accessible dimension is greater than 6 mm.

Apply the force gradually over 5 s and maintain for 10 s.

If the component has become detached, check whether the component fits wholly within the cylinder (4.11).

5.5 Strength of the cot base (impact test)

Place the test mattress (4.3) flat on the cot base. Drop the bottom impacter (4.2) 1 000 times, at not more than 30 times per minute, through a distance of 150 mm above the cot base, onto the test mattress at each of the selected positions of impact. The impacter shall fall freely.

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NOTE — A guide rail (to guide the impacter) is recommended.

Remove the test mattress (4.3) and check if parts of the cot base are broken or if the cot base has loosened from its fastening.

The impact shall not hit the mattress at the same place when alternating between the impact points. The test mattress shall not be used for more than five specimens.

The points of impact shall be points **a** to **f** as shown in figure 8, which are defined as

a: any corner;

b: any place where the bottom appears weakest, or (if no specific weak spot can be selected) in the corner diagonally opposite **a**;

c: the centre of one side;

d: the centre of one end;

e: the centre of the bed base; and additionally,

f: with the base at its highest position if the cot base can have more than one height position, and if its support construction is not the same for the different positions, but then only at the two diagonal corners that have not been tested.

The horizontal distance between the side of the impacter and the inner surface of the frame shall be no more than 50 mm at points **a**, **c**, **d** and **f** in figure 8.

Dimensions in millimetres

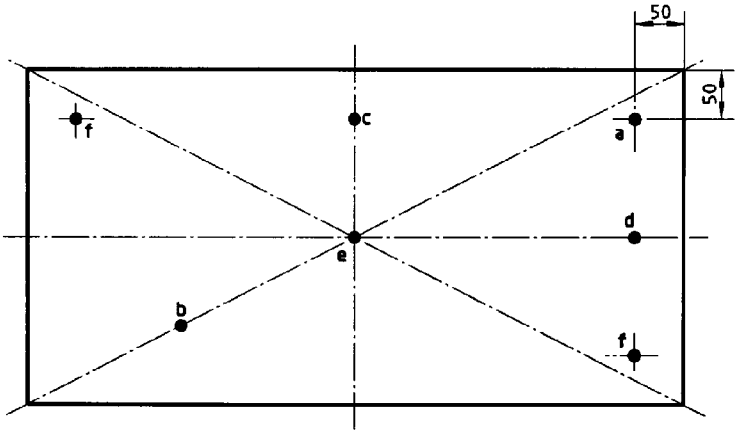

Figure 8 — Impact points

5.6 Strength of side slats (bending test)

Position the cot on the floor with all the legs secured by stops (4.8). Prevent the cot from tilting.

Use an appropriate force-measuring device (4.4).

Apply a force of 250 N in turn to one side slat positioned in the middle and one at the end of each side. The force shall act horizontally in the directions of the longitudinal and transverse axis of the cot. It shall be applied midway between the top and the bottom of the slat. The load duration shall be 30 s.

Record any break or deformation of slats or any other damage.

After removal of the force, measure the permanent deformation of each side slat.

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5.7 Strength of sides or side slats (impact test)

Position the cot on the floor with all legs secured by stops (4.8). Prevent the cot from tilting.

Place the side impacter (4.5) so that the impact acts on the side slat or side, from both the outside and inside directions, at a height of 200 mm below the top edge of the side (see figure 9).

Dimensions in millimetres

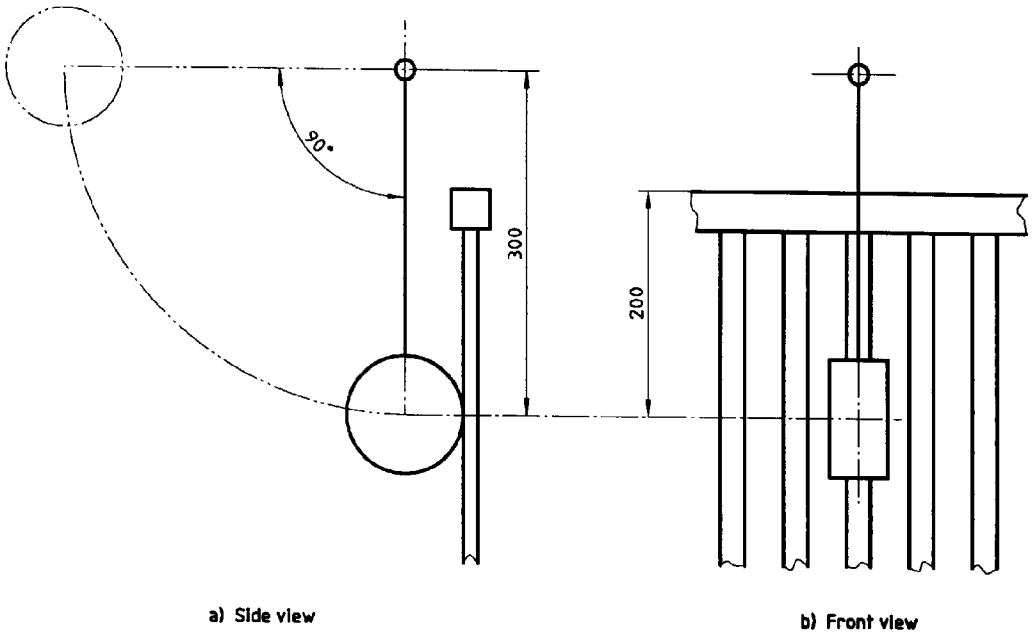

Figure 9 — Side impact test

One slat shall be hit from the outside, the next from the inside, and so forth. Carry out the test first from the outside and subsequently from the inside.

When testing cots with solid sides, the impacts shall act on ten evenly distributed places on the long sides and four evenly distributed places on the end sides, with the direction of impact alternating from inside to outside the cot.

Allow the impacter to swing freely from a horizontal position onto the side slat or side. Repeat ten times, then place the impacter at the next slat or next point of impact. Continue the test until all slats or all previously determined impact points have been tested.

Position the impacter to hit the side frames as high and as close to the corner post as possible (see figure 10). Allow the impacter to swing freely from an angle of 60° from the vertical. Carry out this procedure at each side member in each corner of the cot, making five impacts from inside the cot and five impacts from outside the cot at each position.

Record any break or deformation of slats or any other damage.

After removal of the force, measure the permanent deformation of each side slat.

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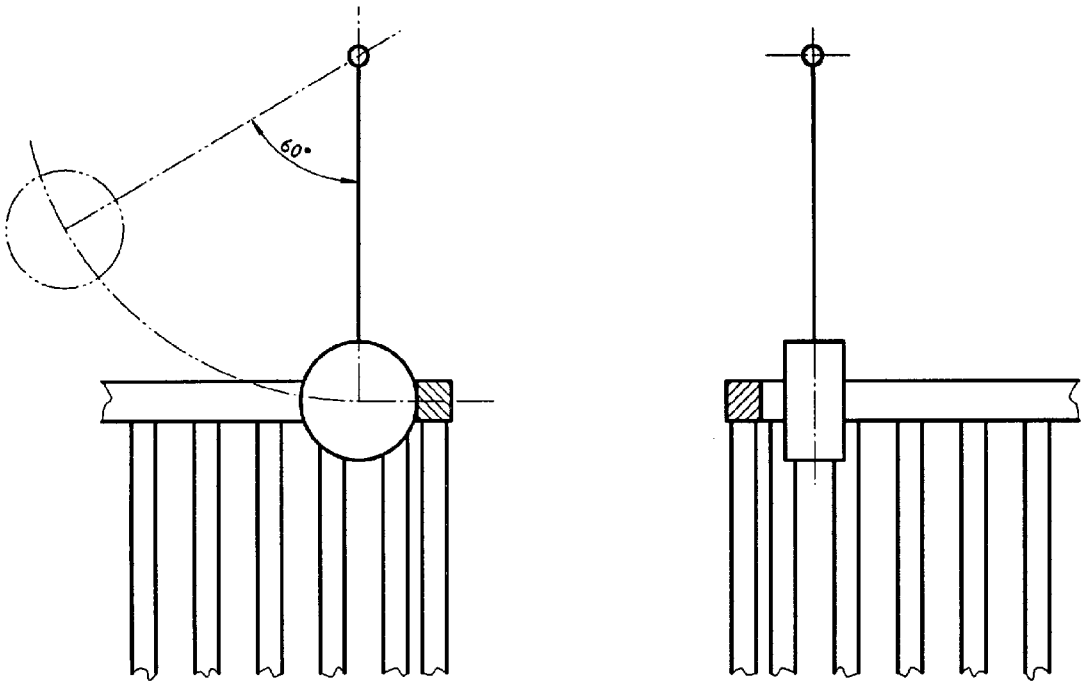

Figure 10 — Corner impact test

5.8 Strength of frame and fastenings

5.8.1 Vertical static load test

Apply a vertical downwards force F_{sv} of 300 N as shown in figure 11 to the top of the cot side ten times. During each application, maintain the force for at least 10 s.

All sides and ends of different construction shall be tested.

Record any fracture or deformation or any other damage.

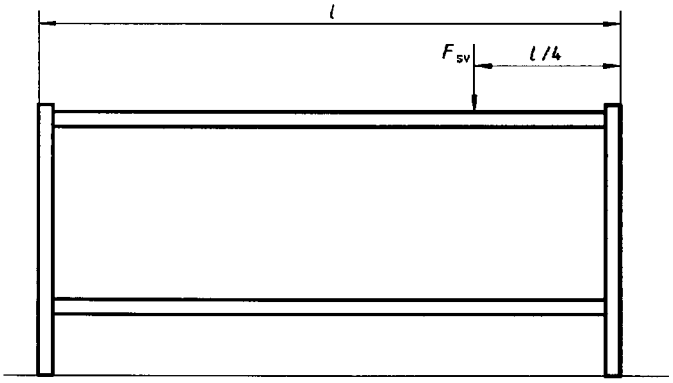

Figure 11 — Vertical static load test

5.8.2 Strength of frame and fastenings (fatigue test)

Position the cot on the floor with all the legs secured by stops (4.8).

Position the test load (4.6) at the centre of the bottom of the cot.

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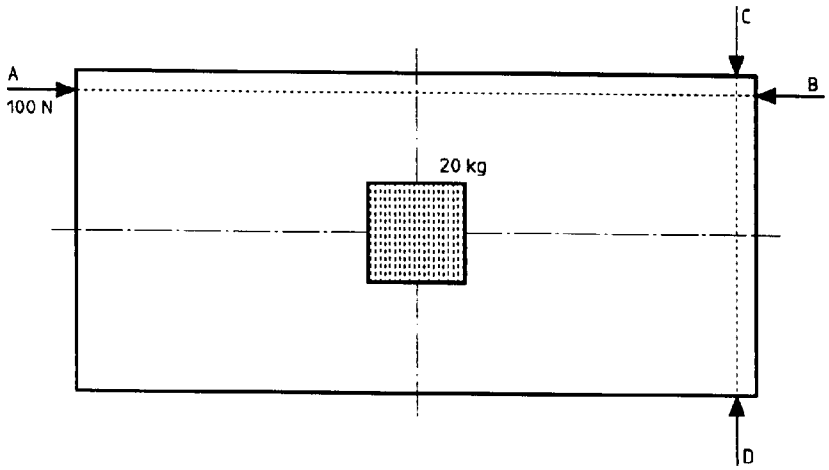
Apply forces of 100 N by means of loading pads (4.7) and a device that can press the cot in four directions horizontally, with two of the forces in the longitudinal direction and two in the lateral direction (AB/CD) opposite each other [see figure 12 a)]. The forces shall act for 2 000 cycles on each point in turn in the order A, B, C, D or A-B followed by C-D (which equals one cycle) and each time the force shall increase from 0 to 100 N and back to 0 in not less than 1 s.

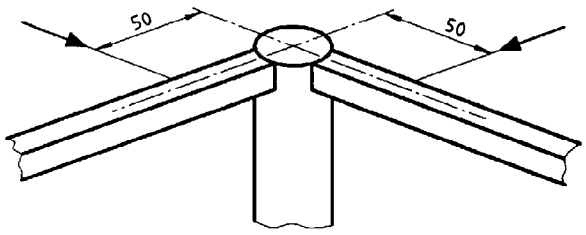
The points for applying the forces (A, B, C, D) shall be located 50 mm from the intersection point of the centrelines of the side members, at the highest point at that position [see figure 12 b)].

Record any damage, loosening or detachment of fittings or fastening devices.

Dimensions in millimetres



a)



b)

Figure 12 — Fatigue test

5.9 Stability test

The cot shall be tested without a mattress unless the mattress is an integrated, fixed part of the cot.

Position the cot on the floor with the legs against the stops (4.8). The tilting tendencies shall not be restrained.

In the case of cots with castors, place the castors in the most unfavourable position.

Fix the cot base at its highest position.

Apply the weight (4.12) on the inside at the centre of the upper edge of the cot side (see figure 13). Then apply a force of 30 N horizontally outwards.

Record whether more than one of the opposite legs lift away from the floor.

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Dimensions in millimetres

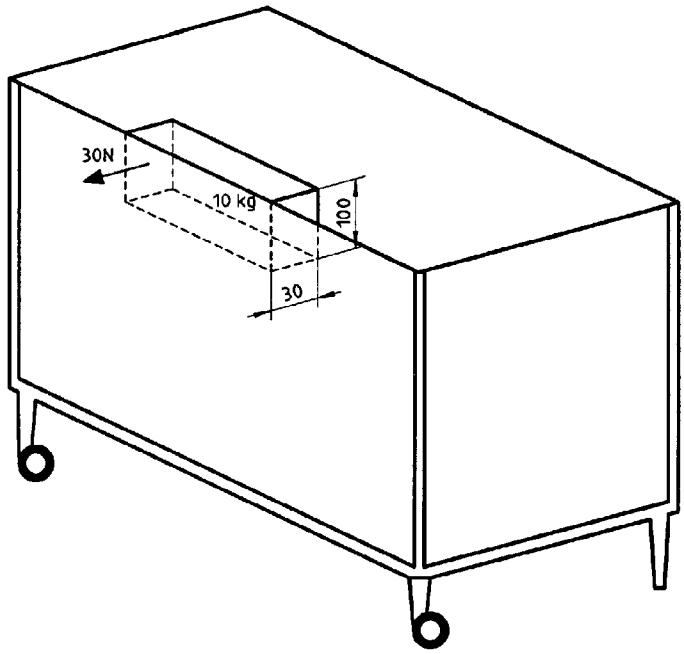

Figure 13 — Horizontal stability

5.10 Test of locking mechanism

5.10.1 Static test

Erect the cot in accordance with the manufacturer's instructions.

Position the cot on the floor with the legs against stops (4.8). The tilting tendencies shall not be restrained.

Apply a force of 200 N in the most onerous direction(s), trying to fold the cot. The force shall be applied five times for 2 min each.

5.10.2 Dynamic test

Operate (close and open) the locking mechanism 300 times.

Measure the force needed for the operation. In the case of revolving elements, measure the tangential force.

5.11 Castors or wheel locks

Put the castors or wheel locks in the locked position. Check by inspection and by moving the cot around whether the locks prevent the castors or wheels from rolling or if they can become unlocked.

6 Test report

The test report shall include at least the following information:

a) a reference to this part of ISO 7175;

b) a description of the cot tested (relevant data);

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c) description of the delivery condition of the unit;

d) test results in accordance with 5.1 to 5.11;

e) compliance with the requirements of ISO 7175-1

f) details of any deviations from this part of ISO 7175;

g) name and address of the test facility;

h) date of the test.

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