

Domestic furniture — Tables — Test methods for determination of strength, durability and stability

The European Standard EN 1730:2000 has the status of a
British Standard

ICS 97.140

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National foreword

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 15 and a back cover.

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This British Standard, having been prepared under the direction of the Consumer Products and Services Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 August 2000

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ISBN 0 580 34849 0

Amendments issued since publication

Amd. No.	Date	Comments

EUROPEAN STANDARD

EN 1730

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2000

ICS 97.140

English version

Domestic furniture - Tables - Test methods for determination of strength, durability and stability

Mobilier domestique - Tables - Méthodes d'essai pour la détermination de la résistance, de la durabilité et de la stabilité

Möbel für den Wohnbereich - Tische - Prüfverfahren zur Bestimmung der Festigkeit, Dauerhaltbarkeit und Standsicherheit

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Ref. No. EN 1730:2000 E

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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of an identical text or by endorsement, at the latest by November 2000, and conflicting national standards shall be withdrawn at the latest by November 2000.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 determining the strength, durability and stability of all types of domestic tables without regard to materials, design/construction or manufacturing processes.

The tests are designed to be applied to an article of furniture that is fully assembled and ready for use. Not all tests are necessarily applicable to all types of tables.

This European Standard does not apply to outdoor tables and changing tables, for which specific standards exist.

Test methods for the assessment of ageing and degradation are not included.

This standard does not include any requirements. Safety requirements can be found in prENV 12521:1999.

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).

- | | |
|----------|--|
| ISO 48 | Rubber, vulcanized or thermoplastic - Determination of hardness (hardness between 10 IRHD and 100 IRHD). |
| ISO 2439 | Flexible cellular polymeric materials – Determination of hardness (indentation technique). |
| EN 1727 | Domestic furniture - Storage furniture - Safety requirements and test methods |

3 Definitions

For the purpose of this European Standard, the following definitions apply:

3.1 static tests: Tests consisting of heavy loads being applied a few times to ensure that the furniture has sufficient strength under the highest levels of loading that might reasonably be expected to occur.

3.2 impact tests: Tests to assess the strength of the article under shock loading that occasionally occur.

3.3 fatigue tests: Tests simulating the repeated application of loads or movement of components occurring during normal long-term use.

3.4 structure: The load bearing parts of furniture such as the frame, top and legs.

3.5 stability: Ability to withstand forces that tend to cause the article to overturn.

3.6 ancillary surface: A surface additional to the main surface intended for occasional use as part of the table top. e.g. flaps or extension leaves.

4 General test conditions

4.1 Preliminary preparation

Before any of the tests are commenced, the item shall be old enough to ensure that it has developed its full strength.

The test unit shall be tested as delivered. Knock-down furniture shall be assembled according to the instructions supplied with it. If the test unit can be assembled or combined in different ways, the most adverse combination shall be used for each test.

Knock-down fittings shall be tightened before testing if applicable. Further tightening shall not take place unless this is specifically required by the manufacturer.

The test unit shall be stored in indoor ambient conditions for at least one week immediately prior to testing. Any deviation from this procedure shall be recorded in the report.

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

4.2 Application of forces

The forces in fatigue and static load tests shall be applied sufficiently slowly to ensure that dynamics forces are negligible.

The forces in fatigue tests shall be applied sufficiently slowly to ensure that heating does not occur.

Unless otherwise stated, static loads shall be maintained for (10 ± 2) seconds and fatigue test loads shall be maintained for (2 ± 1) seconds.

4.3 Tolerances

For tolerances, unless otherwise stated:

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

The tolerance for position of loading pads shall be ± 5 mm.

5 Test equipment and apparatus

Unless otherwise stated, the tests may be applied by any suitable device because the results are not dependent upon the apparatus.

5.1 Vertical force application device

A device capable of applying either a fixed vertical force, or a gradually increasing vertical force. The device shall not hinder the free movement of the article.

5.2 Horizontal force application device

A device capable of applying a gradually increasing horizontal force to an article at the height of its top. The device shall be capable of applying the force at the required angle of inclination of the horizontal (see 6.2) and shall not hinder the free movement of the article.

5.3 Vertical impactor (see Figure 1)

5.3.1 Cylindrical body, approximately 200 mm in diameter, separated from the striking surface by helical compression springs and free to move relative to it on a line perpendicular to the plane of the central area of the striking surface.

The body and associated parts minus the springs shall have a mass of $(17 \pm 0,1)$ kg and the whole apparatus, including body, springs and striking surface, shall have a mass of $(25 \pm 0,1)$ kg.

5.3.2 Springs. Such that the combined spring system has a nominal spring rate of $(6,9 \pm 1)$ N/mm and the total frictional resistance of the moving parts shall be between 0,25 N and 0,45 N.

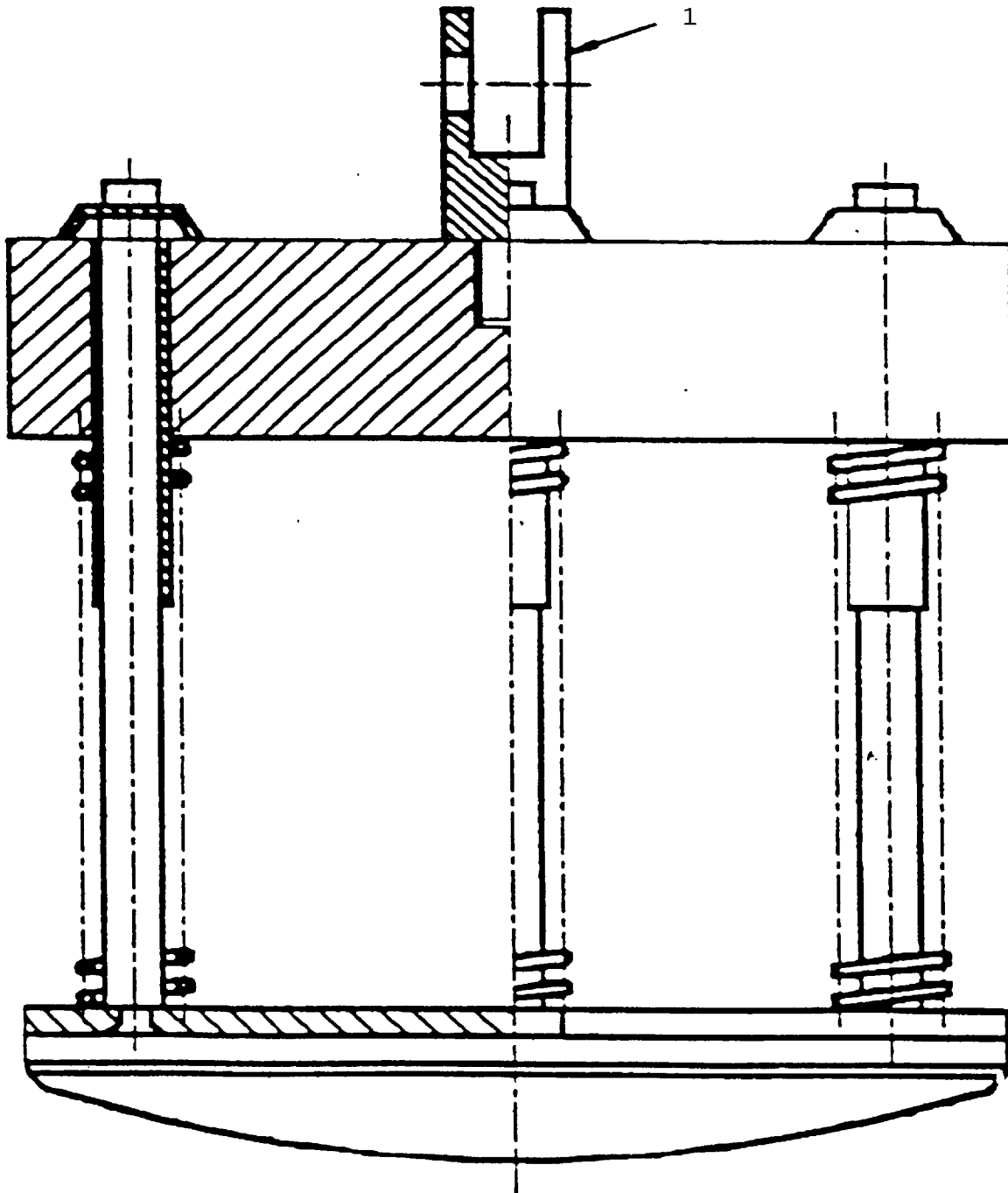
The spring system shall be compressed to initial load of (1040 ± 5) N (measured statically) and the amount of spring compression movement available from the initial compression point to point where the springs become fully closed shall not be less than 60 mm.

5.3.3 Striking surface, shall be a rigid circular object, 200 mm in diameter, the face of which has a convex spherical curvature of 300 mm radius with a 12 mm front edge radius.

5.4 Floor

Horizontal, flat and rigid with a smooth surface.

For the drop test (6.9) a rubber mat 2 mm thick, with hardness (85 ± 5) IRHD according to ISO 48 shall cover a concrete floor.



Key

1 Joint of lifting device not inhibiting free fall

Figure 1 - Impactor

5.5 Stops

To prevent the article from sliding but not from overturning. Stops shall not be higher than 12 mm except in cases where the design of the article necessitates the use of higher stops, in which case the lowest stop that will prevent the article from sliding shall be used.

5.6 Loading pad

Rigid cylindrical object, 100 mm in diameter, with a flat face and a 12 mm edge radius.

5.7 Foam for impact tests

Two 25 mm thick layers of polyether foam with a hardness index according to ISO 2439, method A, of (1100 ± 100) N. They shall be positioned between the loading pad and the test unit.

For use of the foam with the impactor test, see 6.6.

6 Test procedures

In the case of design not catered for in the test procedures, the test shall be carried out as far as possible as described, and deviations from the test procedure recorded in the test report.

6.1 Drawer loads

The volume of drawers shall be taken as the area of the drawer bottom multiplied by the clear height. The clear height is the distance between the top of the drawer bottom and the lower edge of the front of the drawer above or the structure of the unit.

Drawers with a clear height of 110 mm or less shall be loaded with $0,35 \text{ kg/dm}^3$ volume; all other drawers shall be loaded with $0,20 \text{ kg/dm}^3$ volume.

6.2 Horizontal static load test

Position the table on the test surface, in its normal position of use.

Restrain the base of the table by placing stops (5.5) around each leg/base (in all directions) on one short side (figure 2a).

Load all drawers, if there are any, as specified in 6.1 and maintain the drawers closed.

Apply the force for the number of cycles specified in the requirement document by means of the horizontal force application device (5.2) alternately at the centre of each short side (figure 2a).

If the table tends to overturn, incline the test force downwards gradually until the table is just prevented from overturning (see 6.2.1).

One application at point A and one at point B represents one cycle.

If the table is non-symmetrical about its transverse centre line, carry out the test first with the stops positioned at one end and then repeat with the stops at the opposite end.

Move the stops to the long side (Figure 2b)

Repeat the test as described before with the force applied in the centre of the long sides (figure 2b).

One application at point C and one at point D represents one cycle.

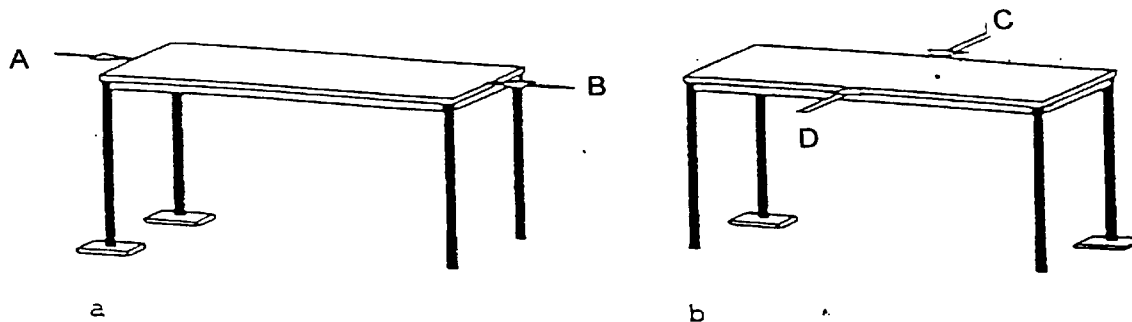


Figure 2 - Positions of forces and stops in horizontal static load tests.

6.2.1 Recommended procedure for horizontal static load test

The principle of the horizontal static load test is that the specified load shall be applied horizontally if the table does not tend to tip. If, however, the table does tip the load shall be inclined downwards until the table is just prevented from tipping.

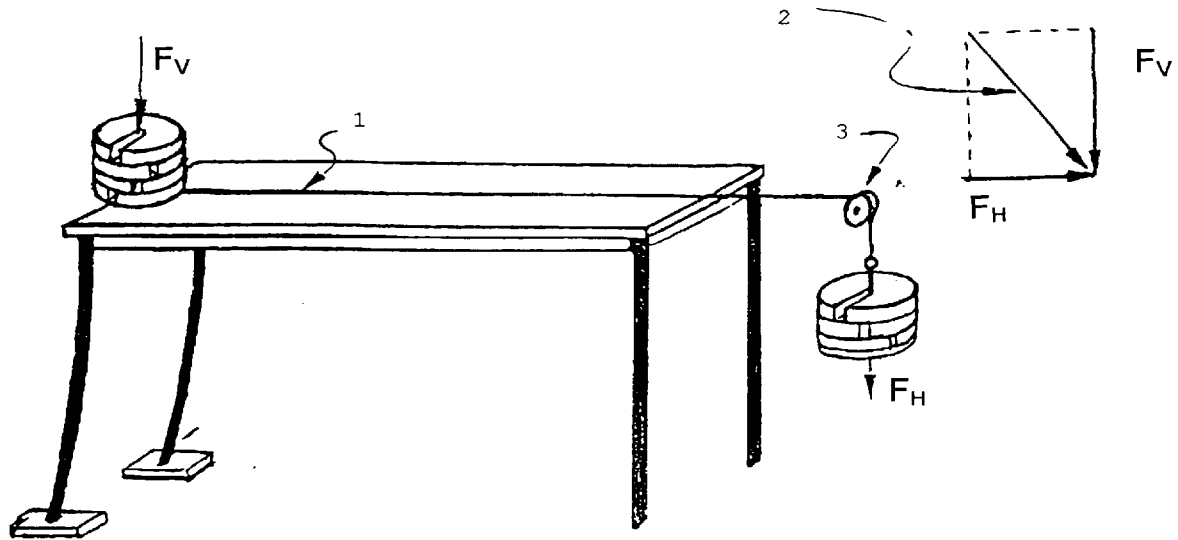
One simple, accurate and reliable method of doing this is to divide the test force into a horizontal and vertical component as follows:

Attach a light string to the table edge at the loading point by means of a small hook and pass the string over the table top and over a pulley positioned so that this part of the string is horizontal. The remainder of the string shall hang vertically and support a loading pan whose weight shall be taken into consideration in the following test procedure.

Place a stack of masses with a total weight equivalent to the horizontal force specified in the requirement document so that the centre of gravity of the stack is just above the edge of the table (figure 3).

Masses shall be taken from the vertical stack and placed in the loading pan until the distribution of weights is such that the table is just about to tip. At this point the mass left in the stack on the table top is the vertical component of the test force and the mass in the loading pan is the horizontal component of the test force (see figure 3).

Carry out the test by lifting and lowering the mass in the loading pan and repeat the test in the opposite direction.



Key

- 1 String
- 2 Inclined resultant load
- 3 Pulley

Figure 3 – Inclination of horizontal static load

6.3 Vertical static load test

Apply a vertical downward force for the number of cycles specified in the requirement document using the loading pad (5.6) anywhere on the top that is likely to cause a failure, but not less than 100 mm from any edge. If there are several such positions repeat the test at those positions.

Repeat the test on each ancillary table top. If the article tends to overturn, load the main table top sufficiently to prevent overturning.

If deflection measurements are required maintain the last load for up to 30 seconds in order to measure the maximum deflection, d , as shown in Figure 4.

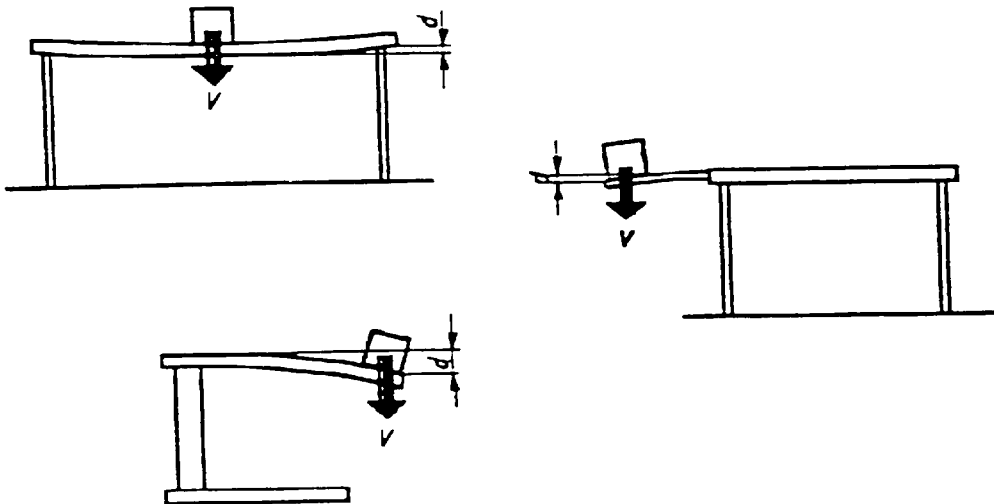


Figure 4 – Vertical static load test

6.4 Horizontal fatigue test

Restrain the base of the table by placing stops around each leg/base (in all directions) (see Figure 5).

Place a mass of 50 kg on the geometric centre of the table top. Determine the horizontal force required to tip the table when applied at the points specified using, e.g. masses, string and a pulley. Apply two alternating horizontal forces at the height of the top surface by means of two loading pads (5.6), one at one end of the table 50 mm from one corner, a, (see Figure 5) and one at the opposite end, b, (see Figure 5).

Repeat the procedure at the other corner positions, c and d, (see Figure 5). Carry out the test with the forces and number of cycles specified in the requirement document.

If the table tends to overturn in one direction of loading at a load less than that specified, reduce the horizontal force to the value determined at the beginning of the test process. Perform the test using this reduced force in that direction only. Record the value of any reduced force used.

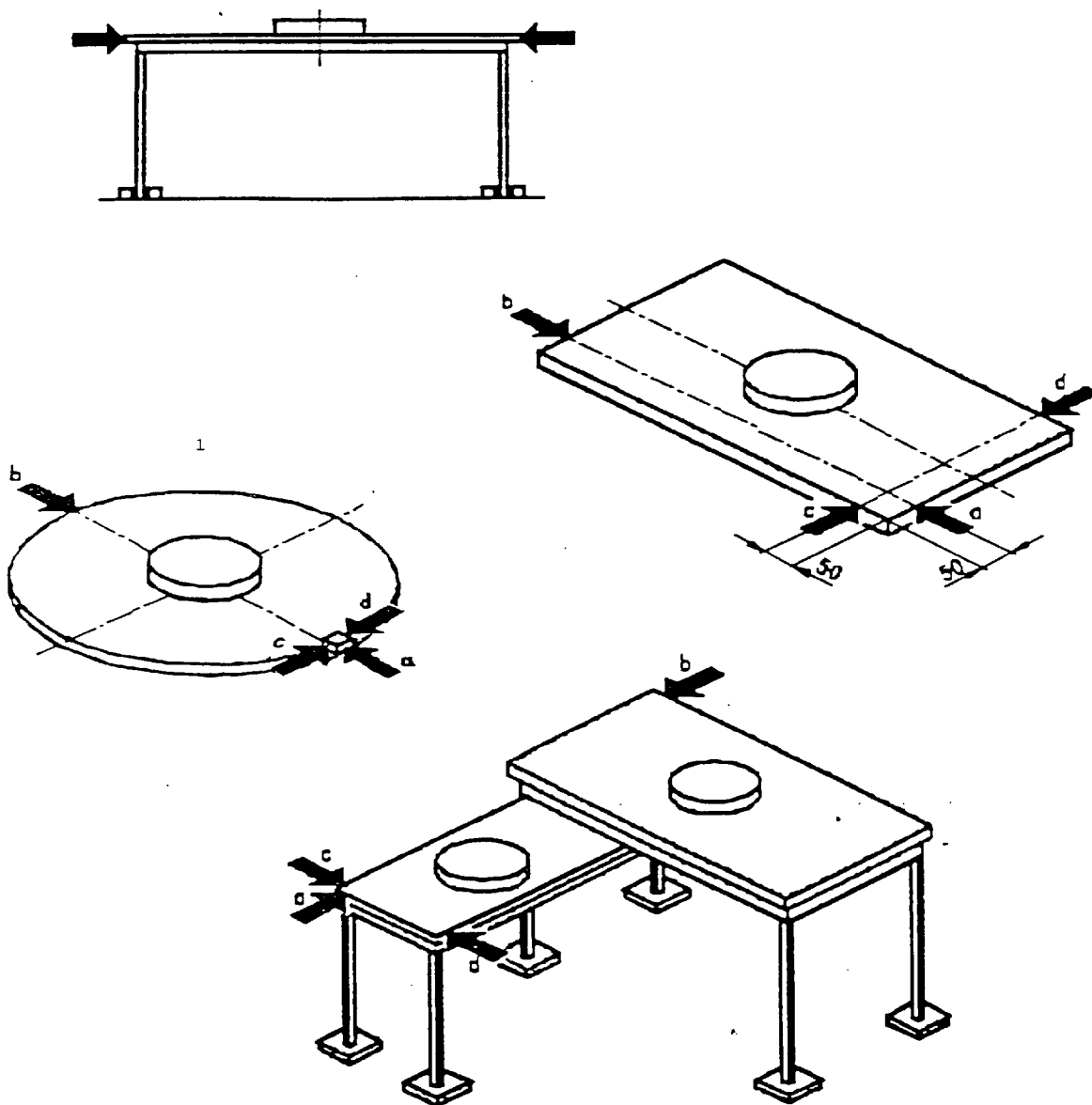
The test may be carried out in a one stage cycle a, c, b, d or in a two stage cycle a, b followed by c, d.

For a table top attached to another table top at one end, carry out an additional test as shown in Figure 5.

If measurements of the horizontal movement are required, this shall be measured at the beginning and end of the test, when the load is changed from one end to the opposite end.

For tables having a circular or square top with a rectangular base or leg design direction a, b and c, d shall be determined in relation to the base or legs.

For tables with a triangular base or three legs, direction a, b shall be perpendicular to one side of the base or to the line joining two legs and passing throughout the third corner of the base or the third leg. Direction c, d shall be parallel to one side of the base or the line joining two legs.



Key

1 Round, oval and elliptical tables

Figure 5 – Horizontal fatigue test

6.5 Vertical fatigue test

Apply the vertical force specified in the requirement document by means of the loading pad (5.6), on the table top at the most adverse position, 100 mm from the table top edge. If the article tends to overturn, load the main table top sufficiently to prevent overturn.

Carry out the test for the number of cycles specified in the requirement document.

Repeat the test on each ancillary table top, e.g. flaps or leaves, using the force specified in the requirement document.

6.6 Vertical impact test

Place one layer of foam (5.7) on the table top.

The height of drop shall be measured from the position where the impactor is resting on the surface of that layer of foam. Place a second layer of foam (5.7) between the striking surface and the table top.

Allow the vertical impactor (5.3) to fall freely from the height specified in the requirement document onto the foam surface at the following positions:

- as close as possible to one point of support of the top but not less than 100 mm from any edge;
- 100 mm from the edge of the top as far away from the supports as possible;
- 100 mm from the edges at one corner.

6.7 Stability under vertical load.

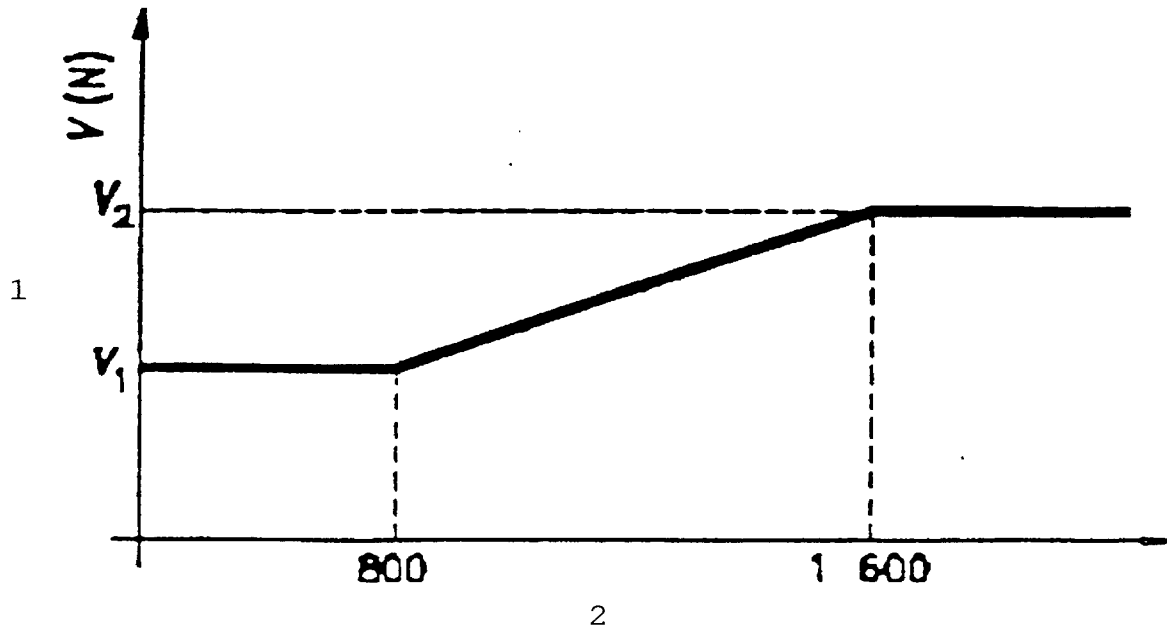
Measure the longest dimensions of the table top in the direction most likely to cause overturning.

If the table is fitted with drawers, they shall not be loaded during this test.

Apply the specified vertical load (V), determined from figure 6. The vertical load shall be applied 50 mm from the outer edge of the table top (see Figure 7) on that side where the load is most likely to cause overturning as far away from the supports as possible.

Note Reference is made to EN 1727 for additional test methods for tables if they have storage capability.

All dimensions are in millimetres



Key

- 1 Vertical force
- 2 Longest dimension of the table top in the overturning direction

Figure 6 – Determination of vertical stability load

All dimensions are in millimetres

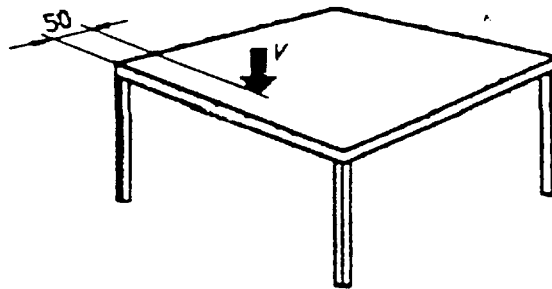


Figure 7 – Vertical stability test

6.8 Drop test

Measure the force required to lift either end of the table with the other end resting on the floor.

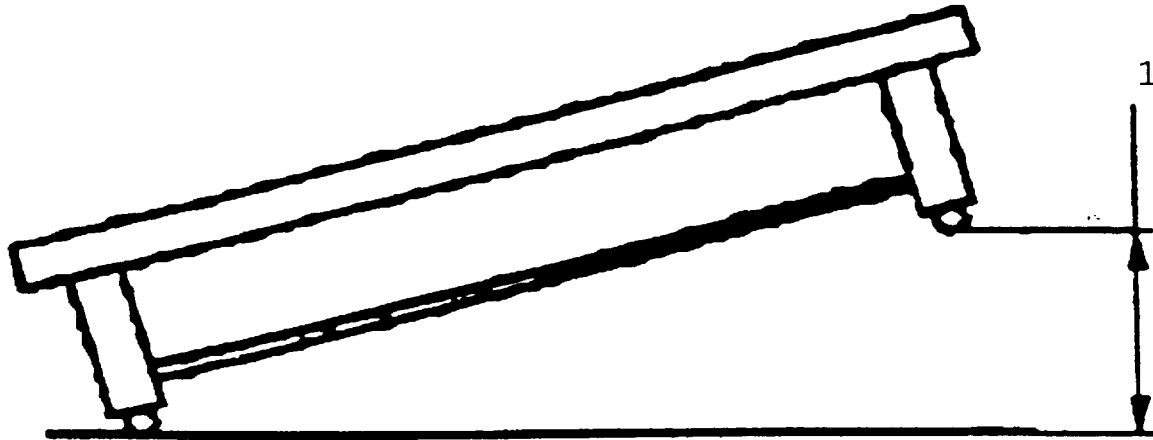
Lift the table at one end so that the feet/castors are in the horizontal plane. Allow it to fall freely from the height specified in the requirement document so that the feet or castors strike the floor (5.4).

Carry out the test for the number of cycles specified in the requirement document.

If required, repeat the test on the other end of the table.

If the table overbalances when the legs are lifted to the specified height, allow the table to fall from the greatest height at which it will fall back to its normal position.

Note The specification of the drop height should take into account the height, weight and intended use of the table.



Key

1 Height of fall

Figure 8 – Drop test

7 Test report

The test report shall include at least the following information:

- a) a reference to this European Standard;
- b) the piece of furniture tested (relevant data) and details of any defects before testing;
- c) test requirements and test values as specification used.
- d) the test results;
- e) details of any deviations from this European Standard;
- f) the name and address of the test facility;
- g) the date of test.

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