BRITISH STANDARD

BS EN
13150:2001

Workbenches for laboratories — Dimensions, safety requirements and test methods

The European Standard EN 13150:2001 has the status of a British Standard

ICS 71.040.10

National foreword

This British Standard is the official English language version of EN 13150:2001. This British Standard partially supersedes BS 3202-2:1991, which remains current but which will be amended accordingly.

The UK participation in its preparation was entrusted to Technical Committee LBI/18, Laboratory furniture and fittings, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

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This British Standard, having been prepared under the direction of the Sector Policy and Strategy Committee for Materials and Chemicals, was published under the authority of the Standards Policy and Strategy Committee and comes into effect on 22 August 2001

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English version

Workbenches for laboratories - Dimensions, safety requirements and test methods

Paillasses de laboratoire - Dimensions, spécification de sécurité et méthodes d'essai

Arbeitstische für Laboratorien - Maße, Sicherheitsanforderungen und Prüfverfahren

This European Standard was approved by CEN on 16 April 2001.

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 Management Centre 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 Management Centre has the same status as the official versions.

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Management Centre: rue de Stassart, 36 B-1050 Brussels

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Contents

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 2001, and conflicting national standards shall be withdrawn at the latest by November 2001.

This European Standard EN 13150 is applicable with date of publication (dop.) For workbenches for laboratories complying with a national standard before dop, this previous national standard may continue to apply for production and placing on the market until 2 years after dop. This standard does not apply to workbenches for laboratories, which have been put into service in the laboratory before 2 years after dop.

Annex A is normative. Annex B is informative.

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 safety requirements and test methods for workbenches for laboratories including laboratory tables and gives recommendations for their dimensions.

This European Standard applies to workbenches, movable tables and workbench shelves designed for use in research, educational, quality control and similar laboratories.

This European Standard does not apply to workbenches for pupils in scientific class rooms of schools. It does not apply to workbenches for special purposes, e.g. for heavy diagnostic or processing machines.

It should be understood that fulfilling the requirements does not ensure that failure will not occur as a result of habitual misuse or after an excessively long period of service. The tests are designed to be applied to a stand-alone workbench that is fully assembled and ready for use.

Requirements and test methods related to the fire safety of workbenches and to the resistance of the work surface are not included in this European Standard.

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 527-1:2000, *Office furniture - Work tables and desks - Part 1: Dimensions*

EN 1730, *Domestic furniture - Tables - Test methods for determination of strength, durability and stability*

prEN 12600:1999, *Glass in building - Pendulum test - Impact test method for flat glass and performance requirements*

EN 61010-1, *Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements (IEC 61010-1:1990 + A1:1992, modified)*

ISO 48, *Rubber, vulcanized or thermoplastic – Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 2813, *Paints and varnishes - Determination of specular gloss of non-metallic paint films at 20°, 60° and 85°*

3 Terms and definitions

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

3.1
work surface height, h_1
vertical distance between the floor and the top of the work surface (see Figure 1)

3.2
overworkbench shelf height, h_2
vertical distance between the floor and the top of the shelf surface (see Figure 1)

3.3
bottom rail height, h_3
vertical distance between the floor and the lower part of bottom rail (see Figure 2)

3.4
overall depth, d_1
horizontal distance between the front and the rear edge of the workbench including possible service zones (see Figure 2)

3.5
clear work surface depth, d_2
horizontal distance between the front and the rear edge of the workbench excluding edges and possible service zones (see Figure 2)

3.6
overworkbench shelf depth, d_3
horizontal distance between the front and the rear edge of the overworkbench shelf (see Figure 2)

3.7
service zone depth, d_4
horizontal distance of overall depth d_1 minus clear work surface depth d_2 (see Figure 2)

3.8
static test
test consisting of heavy loads being applied a few times to ensure that the workbench has sufficient strength to perform its function under the highest levels of loading that might reasonably be expected to occur

3.9
impact test
test to assess the strength of the workbench under the rapid rates of loading that occasionally occur

3.10
fatigue test
test simulating the repeated application of loads or movement of components occurring during long-term use and assessing the durability of the workbench under such conditions

3.11
structure
load bearing parts of the workbench including the frame, top and legs

3.12
workbench
work surface with supporting structure and services as required

3.13
movable workbench or table
unit which is not fixed to the floor or wall nor has any service connections

NOTE This definition is for the purpose of the drop test only (see A.3.7).

4 Recommended dimensions

Other dimensions than those recommended in this clause 4 may be agreed between customer and manufacturer.

4.1 Heights

4.1.1 Work surface height

The nominal heights h_1 are listed in Table 1. In every case there should be an levelling range of minimum 20 mm. For seated work the relationship between seat height and work surface height is critical. The use of adjustable height seat is recommended.

Table 1 - Work surface heights

Type of workbench	Nominal heights h_1 in mm
Sitting Standing [a)]	720 900
[a)] or sitting on high chairs or stools	

4.1.2 Leg room

Minimum leg room under the workbench should be in accordance with clause 6 of EN 527-1:2000.

4.1.3 Overworkbench shelves

For workbenches with a depth $\geq$ 600 mm, the maximum height h_2 of the highest reagent shelf combined with the workbench should be 1750 mm (see Figure 1).

4.1.4 Bottom rails

If there are bottom rails, the height h_3 (see Figure 2) should be minimum 150 mm.

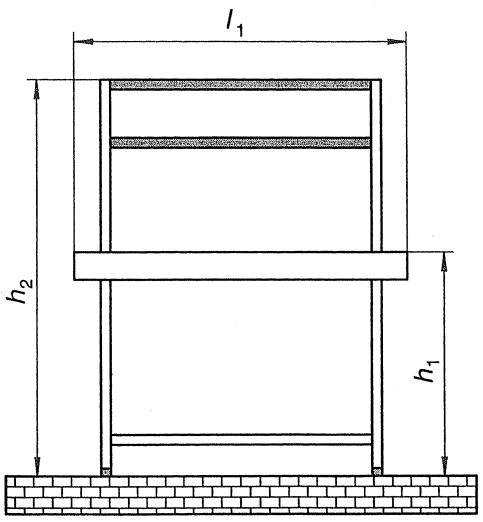
4.2 Depths

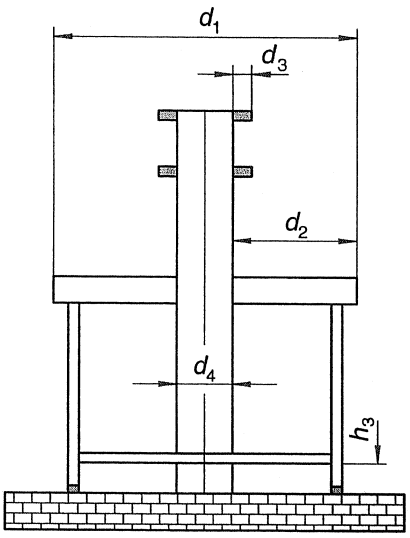
4.2.1 Overall depth

The recommended depths are listed in Table 2.

Table 2 - Depths

Part of workbench	Depth in mm
Clear work surface d_2	600 to 900
Service zone d_4	50 to 400
Overworkbench shelves d_3	max. 150 for reagents; min. 150 for equipment
Overall depth d_1	Clear work surface plus possible service zone





NOTE Drawings are examples only.

Figure 1 - Front view of a workbench

Figure 2 - Side view of two workbenches back-to-back

4.2.2 Clear work surface depth

The clear work surface depth d_2 should be minimum 600 mm and maximum 900 mm (see Figure 2).

4.2.3 Service zone depth

The depth of the service zone d_4 should be minimum 50 mm and maximum 400 mm (see Figure 2).

4.2.4 Depth of overworkbench shelving

The depth of overworkbench shelving d_3 should be maximum of 150 mm for reagents and minimum 150 mm for equipment (see Figure 2).

4.3 Length

The length l_1 should be in multiples of 300 mm with prefered dimensions of 600 mm up to 1800 mm (see Figure 1).

5 General safety requirements

Workbenches shall be manufactured so as to minimise injuries and damage to the human body or parts of the body during normal working conditions. Components or parts of the workbench with which the user may come into contact during intended use shall not have burrs, sharp edges or sharp corners and points.

Workbenches shall be manufactured from materials which are resistant to the mechancial, chemical and thermal requirements of the intended use of the workbench. Any vertical glass component greater than or equal to 0,06 m^2 shall comply with prEN 12600:1999 type 4B or 4C.

The width of accessible apertures (excluding drawers and doors and their associated fittings but including the gap between handles and other parts of the structure) shall always be either less than 8 mm or more than 25 mm. Handles shall not incorporate recesses in which substances may accumulate. Accessible open ends and feet of tubular components shall be capped or otherwise closed.

Work surfaces specifically designed to retain liquids shall be provided with retaining edges on all sides so that the retention capacity is min. 5 litres per square metre of work surface.

Any joints and work surfaces shall be made using materials to give a surface which will not crack, retain dirt or foreign matter or absorbs liquid. When required by the intended use, special care shall be taken to ensure that the growth of harmful pathogenic agents will not be promoted or sustained.

A retaining strip of min. 30 mm height shall be provided on the rear edges and open ends of overworkbench shelves unless they abut a wall. When the work requires it, a separation shield shall be provided between two opposite work surfaces.

6 Specific requirements

6.1 Stability

A free standing workbench shall not overturn when tested in accordance with 6.3.

6.2 Strength and durability

The workbench shall show no failure which can affect safety when tested as specified in 6.3 and it shall still fulfil its function. Furthermore in the deflection of workbench shelves test (see A.3.4) there shall be no deflection greater than span/200 under load and no permanent deflection greater than span/1000 24 hours after unloading.

6.3 Sequence and conditions of safety testing

The sequence of safety testing and the test conditions shall be as specified in Table 3.

NOTE A list of optional test methods and suggested requirements is included in annex B.

Table 3 - Conditions for safety testing

Subclause	Test	Parameter	Value
A.3.1	Horizontal static load	Force in N	600
A.3.2	Vertical static load - main surface - ancillary surface	Force in N	 2000 500
A.3.3	Sustained vertical load if required	kg/dm^2	1,25
A.3.4	Deflection of workbench shelves	kg/dm^2	1,25
A.3.5	Horizontal impact stability	Drop height in mm Mass in kg	40 50
A.3.6	Vertical load stability - without drawers - with drawers	Mass in kg	 100 75
A.3.7	Drop	Drop height in mm	150

6.4 Surface reflection

The reflection of the work surface shall be stated by the manufacturer and shall be determined in accordance with ISO 2813 at 60 degrees.

6.5 Electrical safety

All the electrical features shall comply with the relevant requirements given in EN 61010-1.

NOTE Attention is drawn to relevant national regulations.

7 User information

A manual shall be supplied with workbenches for laboratories which covers at least the following items:

a) description of the main constructional parts;

b) installation instructions, if the workbench is not installed by the manufacturer;

c) operating instructions;

d) safety instructions;

e) maintenance and cleaning instructions;

f) spare part list.

8 Marking and labelling

The following inscriptions shall be mounted at each workbench for laboratories at a suitable, visible place:

a) name and/or trade mark of the manufacturer;

b) unambiguous type designation;

c) year or date of production.

The manufacturer may claim the conformance of the workbench with this European Standard by the inscription "EN 13150".

9 Test Report

The test report shall include at least the following:

(a) the number of this European Standard;

(b) details of the workbench tested;

(c) details of any defects observed before the tests;

(d) details of any defects observed after the tests;

(e) the test result;

(f) details of any deviation from the test procedures.

Annex A
(normative)

Test methods for safety testing

A. 1 General test conditions

A. 1.1 Preliminary preparation

The tests shall be carried out in indoor conditions. When temperature is less than 15 °C or more than 25 °C this shall be recorded in the test report.

Before any of the tests are commenced, the workbench shall be old enough to ensure that it has developed its full strength. At least four weeks in normal indoor conditions shall have elapsed between manufacture and testing in the case of glued joints in timber and the like.

A. 1.2 Application of forces

The forces in strength tests shall be applied sufficiently slowly to ensure that dynamic effects are negligible. The forces in fatigue tests shall be applied sufficiently slowly to ensure that heating does not occur.

A. 1.3 Tolerances

For tolerances, unless otherwise stated all forces shall be measured to an uncertainty of ± 5%, all masses to an uncertainty of ± 0,5% and all dimensions to an uncertainty of ± 1,0 mm. The measurement of linear deformations shall have an uncertainty of ± 0,1 mm.

A. 2 Test apparatus

A. 2.1 Horizontal force application device capable of applying a gradually increasing horizontal force to the workbench at the height of its top. The device shall be capable of applying the force at the required angle of inclination to the horizontal and shall not hinder any free movement of the workbench.

A. 2.2 Vertical force application device capable of applying either a fixed vertical force, or a gradually increasing vertical force. The device shall not hinder any free movement of the workbench.

A. 2.3 Horizontal impact device (see Figure A.1), consisting of a basketball inflated to a pressure of (74,5 ± 5) kPa and attached by a network of elastic retaining straps to an annular seating. The ball mounting shall consist of a ring of timber (or timber derivative) having an outside diameter of 150 mm and an inside diameter of 90 mm. Its rear face shall be attached to the main body of the impactor and its front face shaped to fit the ball.

The main body of the impactor shall consist of a mass supported by cords or flexible wires 850 mm long so that the longitudinal axis of the ball, mounting ring and main body assembly shall remain horizontal when the support cords are displaced from the vertical. The main body of the impactor shall be of such a mass that the total mass of all moving parts, excluding the support cords shall be 50 kg.

A. 2.4 Floor, horizontal, flat and rigid with a smooth melamine surface. For the drop test (see A.3.7) a rubber mat 2 mm thick, with hardness (85 ± 5) IRHD according to ISO 48, on a concrete floor.

A. 2.5 Stops, to prevent the workbench from sliding but not from overturning. Stops shall not be higher than 12 mm except in cases where the design of the workbench necessitates the use of higher stops, where the lowest stop that will prevent the workbench from sliding shall be used.

A. 2.6 Loading Pad, rigid cylindrical object 100 mm in diameter, with a flat face and a 12 mm edge radius.

A. 2.7 Masses, which do not reinforce the structure of the workbench. If bags with lead shot or the like are used, the bags shall be divided into small compartments to prevent the contents from moving during the test.

A. 3 Test Procedures

A. 3.1 Horizontal static load test

Restrain the base of the workbench by stops placed at the end at which the test force is first applied.

Apply the force (see A.2.1) as specified in Table 3 by means of the loading pad (see A.2.6) to the edge of the work surface. Begin loading with the force horizontal. If the workbench tends to overturn, incline the force downwards gradually until the workbench is just prevented from overturning (see Figure A.3).

Apply the force ten times at point A (see Figure A.2) first along the longitudinal centreline and then remove it and reapply it ten times at point B in the opposite direction. Leave the stops in position for the reversal of the application of the test force.

Repeat the above loading along the transverse centreline of the top in two directions at points C and D (see Figure A.2).

NOTE More details of the test procedure are given in EN 1730.

A. 3.2 Vertical static load test

Apply a vertical downward force (see A.2.2) as specified in Table 3 to the work surface of the workbench. Apply the force 10 times using the loading pad (see A.2.6) anywhere on the work surface likely to cause a failure but not less than 100 mm from any edge. If there are several such positions repeat the test (see Figure A.4) at those positions.

Repeat the test on each ancillary work surface e.g. flaps or leaves, using the force specified in Table 3. If the workbench tends to overturn, load the main work surface sufficiently to prevent overturning.

A. 3.3 Sustained vertical load test

The test is only carried out if the vertical static load test shows deflection of the work surface affecting the safety of the workbench.

NOTE The aim of the sustained vertical load test is to check that any deflection developed due to longterm loading of the horizontal surfaces remains within limits which are acceptable in respect of safety.

Load the work surface with an uniformly distributed load as specified in Table 3 and leave it loaded for 24 hours. The following measurements shall be made:

a) deviation from straight before loading;

b) deflection after 24h when loaded;

c) deflection after 24h after unloading.

A. 3.4 Deflection of workbench shelves

Load the shelf with a uniformly distributed load as specified in Table 3 and leave it loaded for 24 hours. Measure the deflection of the shelf at the middle as close as possible to the front edge. If the shelf has one or more supports, the deflection shall be measured where it is greatest.

The following measurements shall be made:

a) deviation from straight before loading;

b) deflection after 24 hours when loaded;

c) deflection after 24 hours after unloading.

The deflections from a straight line and the distance between supports shall be reported in millimetres as difference b) - a) respectively c) - a).

A. 3.5 Horizontal impact stability test of free standing workbenches

Position the workbench on the floor with the stops against the legs furthest from the position of impact. Impact the workbench using the horizontal impactor (see A.2.3) falling through the height specified in Table 3, so that the impactor strikes the top edge of the workbench at the position likely to have the most adverse effect.

A. 3.6 Vertical load stability test of free standing workbenches

Apply, by means of the loading pad (see A.2.6), a vertical load of 1000 N (see Table 3) at any point on that side which may produce the most adverse result. The centre of gravity of the load shall be 50 mm from the outer edge of the workbench top (see Figure A.5).

Repeat the test on one short side of the workbench and with the vertical force at the centre of this short side. Repeat the above procedure on the other long side and then on the other short side of the workbench if it is constructed differently (i.e. if the workbench is not symmetrical).

If the workbench is equipped with drawers fixed to the structure, load the drawers with the load of 0,5 kg/dm^3. Open the drawers in the most adverse combination. For example, when an interlock is not fitted all drawers shall be opened but when an interlock is fitted only the largest drawer in each pedestal shall be opened. The drawers shall be opened as far as the open stop will allow and a vertical load of 750 N shall be applied at the centre of the front of the workbench 50 mm from the edge (see Figure A.5).

Record if the workbench overbalances.

A. 3.7 Drop test of movable workbenches (tables)

This test refers to movable workbenches or tables. Lift the workbench at one end (see Figure A.6) and then allow it to fall freely from the height specified in Table 3 so that the impacting feet or castors strike the floor (see A.2.4). Carry out the test 10 times.

Repeat the test on the other end of the workbench if it is constructed differently (i.e. if the workbench is not symmetrical).

Annex B
(informative)

Optional tests

B.1 General

The optional test methods specified in the annex B together with the loads and cycles recommended in Table B.1 can be used for the assessment of strength and durability of workbenches for laboratories.

Table B.1 - Conditions for non-safety testing of workbenches

Clause	Test	Parameter	Values
B.3	Horizontal fatigue	Force in N n° of cycles	150/200/250/300 5000/10000/15000/20000
B.4	Vertical fatigue	Force in N n° of cycles	300/400/500 5000/10000/15000/20000
B.5	Vertical impact	Drop height in mm	150/200/300

B.2 Vertical impactor (see Figure B.1)

B.2.1 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 ± 0,1) kg and the whole apparatus, including body, springs and striking surface, shall have a mass of (25 ± 0,1) kg.

B.2.2 Springs, such that the combined spring system has a nominal spring rate of (6,9 ± 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 an 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.

B.2.3 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.

B.3 Horizontal fatigue test

Restrain the base of the workbench with stops in all directions and at all legs. Place a mass of 50 kg on the geometric centre of the workbench top.

Apply a horizontal force (see A.2.1) of the selected magnitude as specified in Table B.1 alternatively at point a and b, as shown in Figure B.2, by means of two loading pads (see A.2.6). Apply the force for the selected number of cycles (see Table B.1). Repeat the test at the other corner positions c and d (see Figure B.2).

If the workbench tends to overturn in one direction using the force selected, reduce the horizontal force to the highest value that does not cause overturning. Perform the test using this reduced force in that direction only. Record the value of any reduced force used.

B.4 Vertical fatigue test

Apply the selected vertical downward force (see Table B.1) to the top at the most adverse position 100 mm from the top edge of the workbench, the loading pad centre being at 100 mm from the workbench top edge. Maintain the force for at least 2 seconds. Remove it for at least 2 seconds before the next application. Carry out the number of selected cycles as given in Table B.1.

B.5 Vertical impact test

Allow the vertical impactor (see B.2.1) to fall freely from the selected height (see Table B.1) onto the work surface at the following positions:

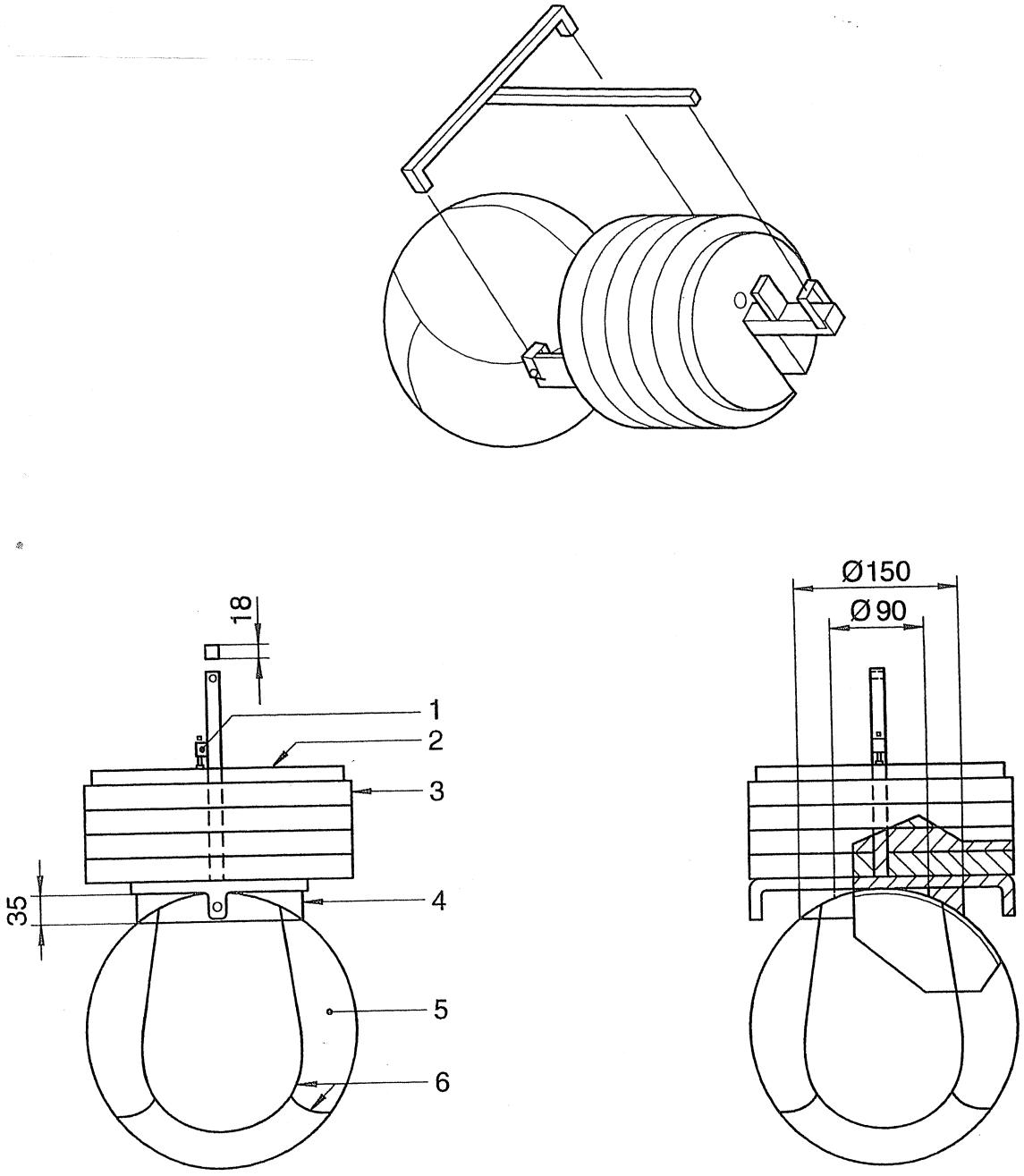
- 10 times as close as possible to one point of support of the work surface but not less than 100 mm from any edge;

- 10 times 100 mm from the edge at the centre of the longest span;

- 10 times 100 mm from the edges at one corner.

NOTE For different geometries, the "centre of the edge of the longest span" is a point 100 mm from the edge of the work surface as far away from the supports as possible.

All dimensions in millimetres



Key

1 Safety clamp
2 Mass
3 Further masses
4 Timber ball mounting ring
5 Basket ball
6 Elastic retaining straps

Figure A.1 - Horizontal impact device

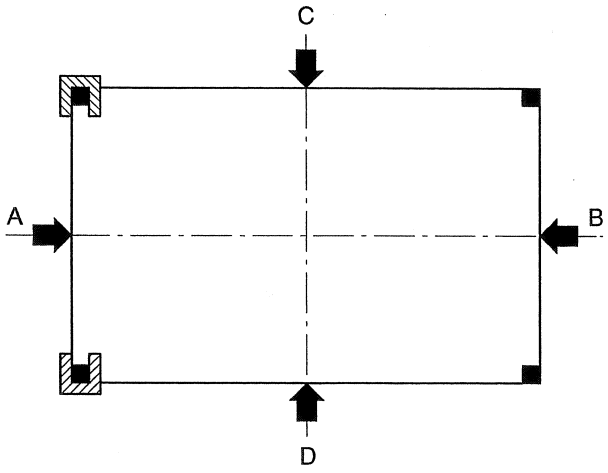


Figure A.2 - Positions of forces and stops during horizontal static load test

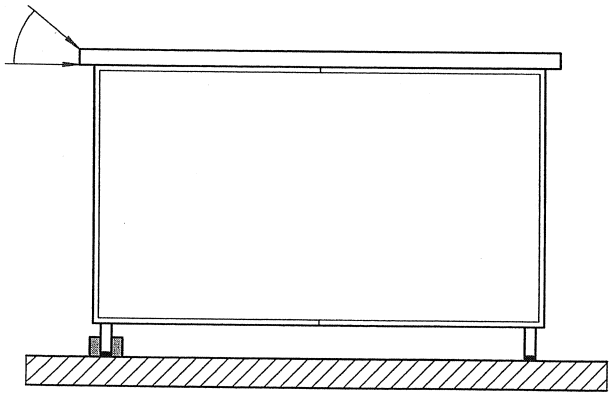
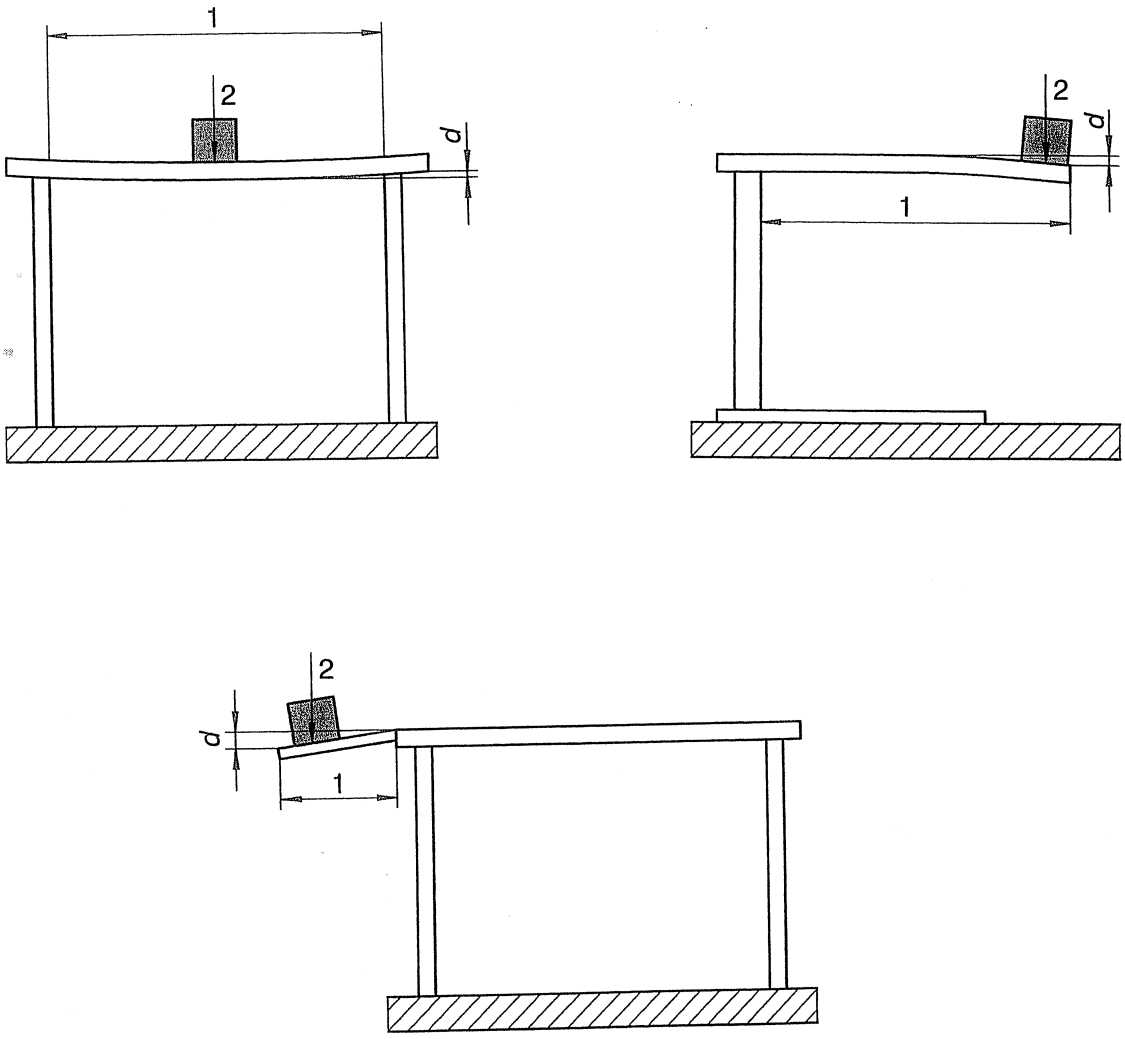


Figure A.3 - Inclination of force during horizontal static load test



Key

1 Span
2 Force
d Declination

Figure A.4 - Vertical static load test

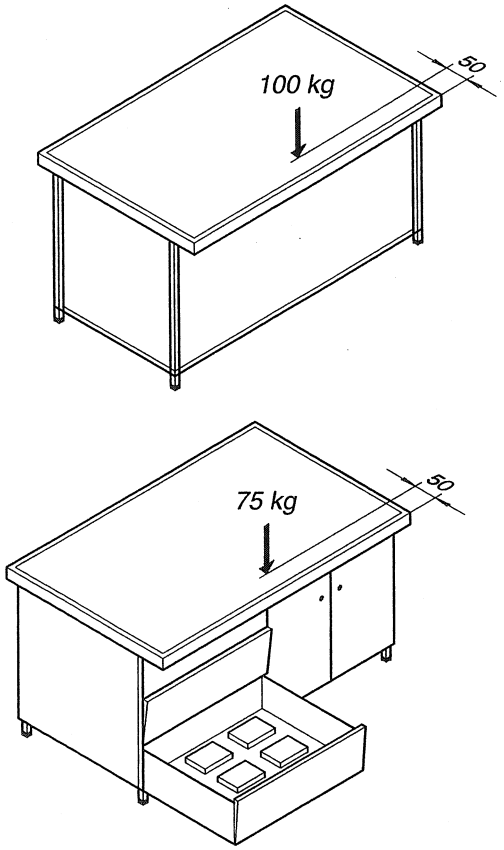
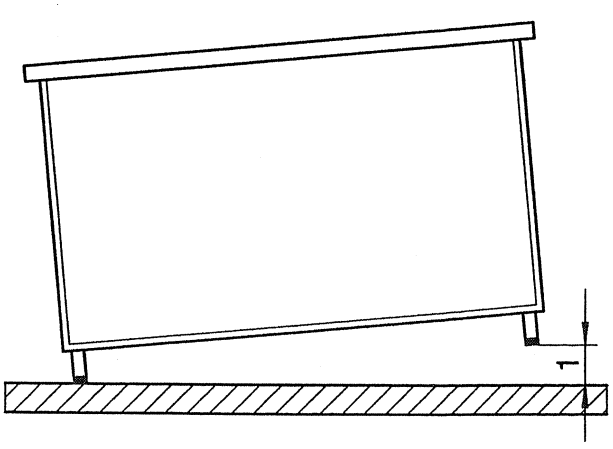


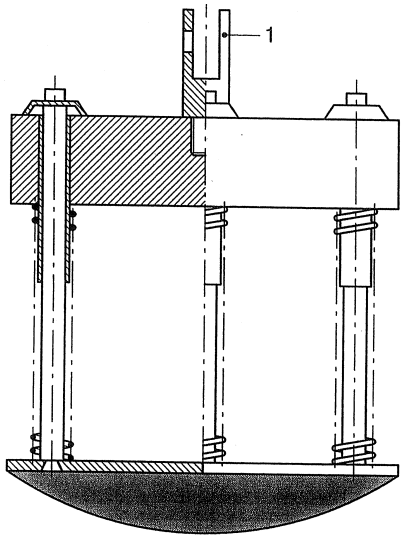
Figure A.5 - Vertical load stability test



Key

1 Drop height

Figure A.6 - Drop test



Key

1 Joint of lifting device not inhibiting free fall

Figure B.1 - Details of vertical impactor

Dimensions in millimetres

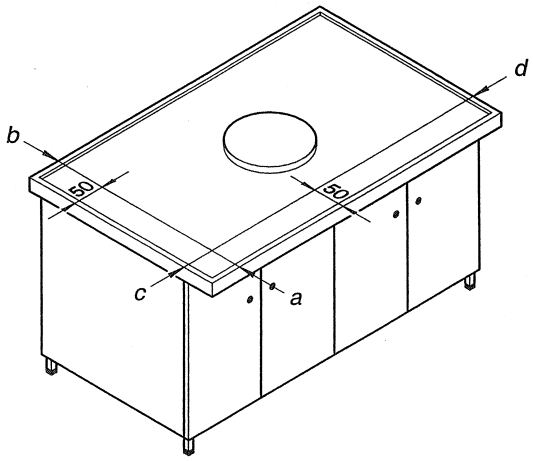


Figure B.2 - Horizontal fatigue test

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