भारतीय मानक
Indian Standard

IS 17634 : 2022

(*Superseding* IS 1883 : 2020, IS 3312 : 2021, IS 3313 : 1983, IS 3314 : 1984, IS 3497 : 1992, IS 3761 : 2020, IS 4116 : 1988, IS 4126 : 1986, IS 5923 : 1986, IS 7070 : 1988, IS 7760 : 1985, *and* IS 7761 : 1983)

भंडारण इकाइयाँ — विशिष्टि

Storage Units — Specification

ICS 97.140

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
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Furniture Sectional Committee, CED 35

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Furniture Sectional Committee had been approved by the Civil Engineering Division Council.

The Indian Standards on different type of storage units were published/revised earlier as follows:

1) IS 1883 : 2020 Metal shelving racks (adjustable type) — Specification (*fourth revision*),
2) IS 3312 : 2021 Steel shelving cabinets (adjustable type) — Specification (*third revision*),
3) IS 3313 : 1983 Specification for steel filing cabinets for general office purposes (*second revision*),
4) IS 3314 : 1984 Specification for steel clothes lockers (*second revision*),
5) IS 3497 : 1992 Steel wardrobes (adjustable type) — Specification (*second revision*),
6) IS 3761 : 2020 Metal side racks (adjustable type) — Specification (*second revision*),
7) IS 4116 : 1988 Specification for wooden shelving cabinets (adjustable type) (*second revision*),
8) IS 4126 : 1986 Specification for wooden wardrobes (adjustable and non-adjustable type) (*first revision*),
9) IS 5923 : 1986 Specification for wooden clothes lockers (*first revision*),
10) IS 7070 : 1988 Wooden shelving racks, adjustable and non-adjustable type — Specification (*first revision*),
11) IS 7760 : 1985 Specification for steel glass-front cabinets (*first revision*), and
12) IS 7761 : 1983 Specification for steel book cases (*first revision*).

In view in the diversification in the use of different materials and finishing systems in the furniture industry, this standard has been brought out and supersedes the above-mentioned standards. In this version, the requirements related to the performance and safety in terms of strength, stability and durability of storage units, including their movable and non-movable parts intended for domestic usage and for institutional usage have been specified.

This standard applies to completely manufactured/fabricated storage units. It also applies to ready-to-assemble units; in that case the requirements of this standard shall apply to the assembled units.

The tests consist of the application, to various parts of the unit, of loads, forces and velocities simulating normal functional use, as well as misuse, that might reasonably be expected to occur.

With the exception of the sustained load tests in **7.2**, the tests are designed to evaluate properties without regard to materials, design/construction or manufacturing processes. If the product is part of a range of multiple models, worst case(s) shall be determined which represents the whole range for testing.

The strength and durability tests do not assess the structure of the building, for example, the strength of wall hanging cabinets includes only the cabinet and the parts used for the attachment. The wall and the attachment into the wall are not included. Assessment of ageing and degradation is not included. The figures given in this Indian standard are typical and the test procedures shall be followed.

In the formulation of this standard, considerable assistance has been taken from ISO 7170 : 2005 ‘Furniture — Storage units — Determination of strength and durability’ and ‘ISO 7171 : 2019 Furniture — Storage units — Test methods for the determination of stability’.

The composition of the Committee responsible for the formulation of this standard is given in Annex D.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

STORAGE UNITS — SPECIFICATION

1 SCOPE

1.1 This standard covers the requirements related to the performance and safety of storage units, including their movable and non-movable parts intended for domestic usage and for institutional usage such as filing papers or similar.

1.2 This standard applies to completely manufactured/fabricated storage units. It also applies to ready-to-assemble units, in that case the requirements of this standard shall apply to the assembled units.

2 REFERENCES

The Indian standards listed below contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in below:

IS No	*Title*
3400 (Part 2) : 2014/ISO 48 : 2010	Methods of test for vulcanized rubber: Part 2 Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)
7888 : 1976	Methods of test for flexible polyurethane foam
17637 : 2021	Performance requirements of surface finishes for furniture application

3 TERMINOLOGY

For the purposes of this part of standard, the following definitions shall apply.

3.1 Catch Device — Device, which keeps or pulls a component in place.

NOTE — It does not require a second action in order to release it, for example, a magnetic catch or a self-closing mechanism.

3.2 Clear Height — Unobstructed height above the top of the bottom surface, for example, the top of the extension element bottom and the lower edge of the extension element above, or the structure of the unit (*see* Fig. 1).

3.3 Damper Mechanism — Mechanism which closes the element gently.

3.4 Durability Tests — Tests simulating the repeated movement of components occurring during long-term use and assessing the strength of the furniture under such conditions.

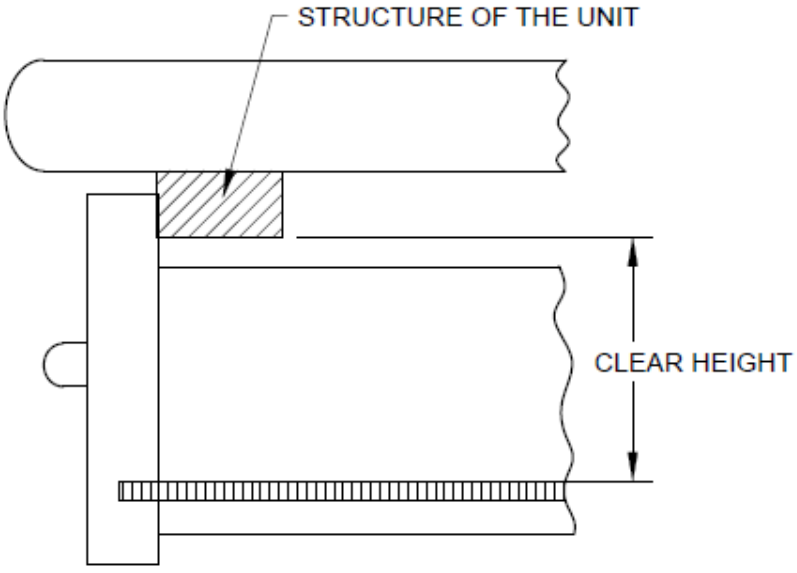


FIG. 1 CLEAR HEIGHT

3.5 Extension Element — Components that can be pulled out and pushed in. For example : drawer, suspended pocket file, keyboard tray, etc.

3.6 Flap — Horizontally hinged door, which opens upwards or downwards.

3.7 Free Standing Unit — Unit not intended to be attached to a load-bearing structure.

3.8 Interlock — Device which restrains the opening of more than one extension element at a time.

3.9 Latching Mechanism — Mechanism which retains an extension element or a door in the closed position.

NOTE — It requires a second action in order to release it.

3.10 Locking Mechanism — Mechanism that limits access to the interior of a unit or a storage element.

NOTE — It requires a key or a combination in order to activate it or to make it possible to activate it.

3.11 Stability Tests — Tests for the ability to withstand load in all normal use conditions without the product toppling or creating unsafe use case like injury to user or inability to perform task the product is meant for.

3.12 Stay — Hardware component usually used to hold a flap or door in the open position.

3.13 Strength Tests — Tests for the capacity of the product to withstand force or pressure as specified in the standard considering the extreme use conditions for a limited frequency of use.

3.13.1 *Static Tests* — Tests consisting of heavy loads being applied a few times to ensure that the furniture has sufficient strength to perform its function under the highest levels of loading that might reasonably be expected to occur.

3.13.2 *Impact Tests* — Tests to assess the strength of the furniture under the rapid rates of loading that occasionally occur.

3.14 Surface Finish Tests — Tests for surfaces of finished furniture to assess the resistance against given external conditions.

3.15 Top Hanging Unit — Unit intended to be entirely supported by the ceiling.

3.16 Wall, Panel and Screen-Hanging Unit — Unit intended to be supported by a wall, panel or screen.

4 DESIGN AND WORKMANSHIP

4.1 Design/model shall be as declared by the manufacturer.

4.2 The exposed/accessible edges and protruding parts shall be free from burrs, sharp edges and shall be rounded or chamfered. The ends of accessible hollow components shall be closed or capped. Movable and adjustable parts shall be designed so that injuries and inadvertent operations are avoided. In case wooden components, the same shall be free from any stain, unless it is from intended as part of design feature.

5 DIMENSIONS

The dimensions shall be as agreed to between the manufacturer and the purchaser or as per the design requirements may also be used.

6 SURFACE PERFORMANCE

6.1 The test sample rigid surfaces shall be tested for the following tests and shall qualify the minimum performance ratings specified in IS 17637.

a) Resistance to mechanical damage;
b) Pencil hardness;
c) Resistance to wet heat;
d) Resistance to dry heat;
e) Resistance to marking by cold liquids;
f) Resistance to marking by cold oils and fats; and
g) Adhesive performance.

The test samples for surface performance are to be tested on materials only and not on assembled unit.

6.2 Fabric and Leather (Synthetic and Natural) Performance

For fabric and/or leather (synthetic and natural) surfaces, the test sample surfaces shall be tested for the following tests and shall conform the minimum performance requirements specified in IS 17637.

a) *For Fabric and Synthetic Leather*:
   1) Breaking load,
   2) Elongation at break,
   3) Tear strength,
   4) Colour fastness to light,
   5) Colour fastness to rubbing,
   6) Colour fastness to perspiration,
   7) Colour fastness to water,
   8) Pilling resistance,
   9) Coating adhesion strength,
   10) Seam slippage,
   11) Resistance to damage by flexing,
   12) Abrasion resistance,
   13) Bursting strength, and
   14) Resistance to cold
b) *For Natural Leather*
   1) Tear strength,
   2) Flexing endurance,
   3) Finish adhesion,
   4) Colour fastness to artificial light,

5) Colour fastness to rubbing,
6) Colour fastness to water spotting,
7) Water vapour permeability, and
8) Colour fastness to water

The test samples for surface performance are to be tested on materials only and not on assembled unit.

7 SAFETY TESTS

7.1 General

The general test conditions and test apparatus requirements for the tests are given in Annex A and Annex B respectively.

The storage units have been categorized in different test levels in terms of their expected applications/uses as given in Table 1.

Table 1 Test Levels to Performance Category of Furniture

(*Clause* 7.1)

Sl No.	Test Level	Performance Category	Recommended Uses
(1)	(2)	(3)	(4)
i)	Level 1	Domestic	Careful use, living room bedroom, kitchen
ii)	Level 2	Institutional (light)	General office work area
iii)	Level 3	Institutional (heavy)	Cabinets where severe usage or heavy loads are observed: Dense storage, record rooms, library, etc.

7.2 Test for Non-Movable Parts

7.2.1 *Shelves*

7.2.1.1 *General*

When shelves are structurally interconnected (other than at their ends), all the shelves shall be equally loaded.

For units with an indeterminate number of shelves, unless otherwise specified by the manufacturer, divide the internal height of the unit, in millimetres, by 300 and take the lower integer. This number shall then be the number of shelves to be fitted.

7.2.1.2 *Deflection of shelves*

Testing of the deflection of shelves shall be carried out in a relative humidity as specified in **A-1**. For shelves made of metal, glass and stone the test need not be carried out in a relative humidity conditions.

Place the shelf on its supports in the unit. The deflection of the shelf shall be measured at the front edge where it is the greatest. The deflection shall be measured to an accuracy of ± 0.1 mm with reference to a straight line parallel to the front edge drawn between two adjacent supports.

Load the shelf uniformly (*see* Fig. 2) with the load specified in the Table 3 and apply for:

a) One hour for shelves made of metal glass and stone; and
b) One week for all other shelves.

Carry out the inspection and assessment according to **8.4**. Also, the max deflection of the shelves under load shall not exceed 5 mm/m.

At the same points as specified above, measure and record the deflection under load to an accuracy of ± 0.1 mm.

7.2.1.3 *Strength of shelf supports*

Load the shelf uniformly with half the load specified for **7.2.1.2**, except at 220 mm from one support, where the steel impact plate (*see* **B-10**) shall be tipped over 10 times over the support (*see* Fig. 3). The striking surface of the steel impact plate (*see* **B-10**) shall be faced with rubber. All supports of the shelf shall be tested. The mass and plate are given in Table 3 and Table 6.

Carry out the inspection and assessment according to **8.4**. Also, the shelf support shall not come off from its mounting after the test.

7.2.2 *Tops and Bottoms*

7.2.2.1 *Sustained load test for tops and bottoms*

This test is only applicable to tops which are ≤ 1 000 mm from the floor and to all bottoms. The sustained load test of tops and bottoms shall be carried out in a controlled-humidity environment (*see* **A-1**).

The deflection of the top or bottom shall be measured where it is the greatest. The deflection shall be measured and recorded with reference to a straight line drawn between two adjacent supports to an accuracy of ± 0.1 mm and expressed as a percentage of the distance between the supports.

Load the top or bottom uniformly (*see* Fig. 2) with the load specified in Table 3 and apply for:

a) One hour for tops and bottoms made of metal, glass and stone; and
b) One week for all other tops and bottoms.

Carry out the inspection and assessment according to **8.4**. Also, the movement of all extendible elements and doors shall not be affected after removal of load.

7.2.2.2 *Static load test for tops and bottoms*

This test is only applicable to tops which are ≤ 1 000 mm from the floor and to bottoms where the clear height (*see* **3.2**) is ≥ 1 600 mm.

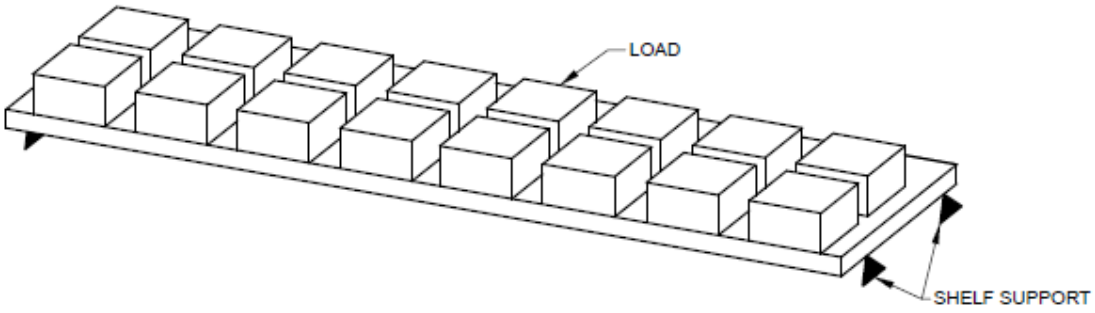
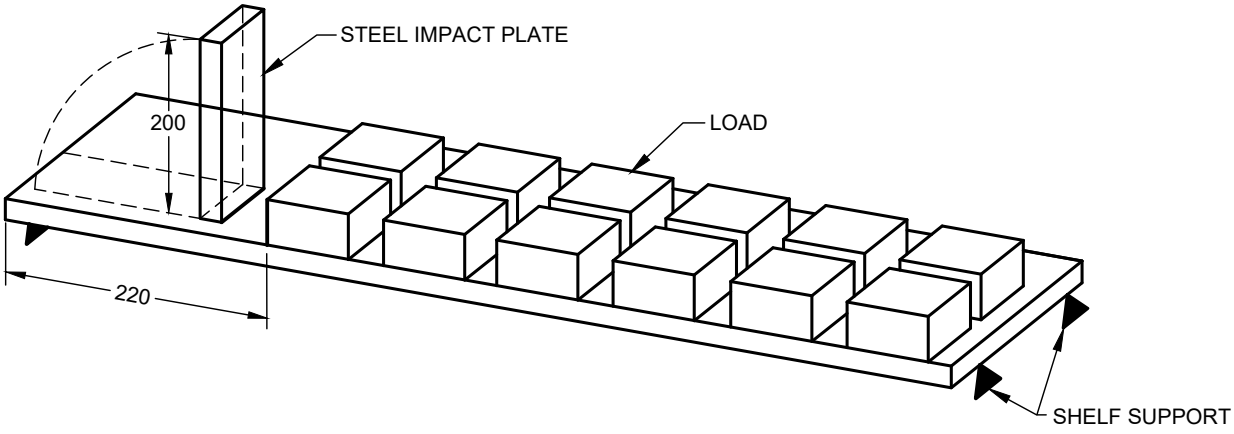


FIG. 2 DEFLECTION TEST OF SHELVES



All dimensions in millimetres

FIG. 3 STRENGTH TEST OF SHELF SUPPORTS

Apply through the loading pad (*see* **B-5**) a vertical downwards force 10 times at any position likely to cause failure but not less than 50 mm from the edges. If there are several such positions, apply the load as specified in Table 3, 10 times to a maximum of three positions. If the top or bottom is adjustable, place it in the position most likely to result in failure.

Carry out the inspection and assessment according to **8.4**. Also, movement of all extendible elements and doors shall not be affected after removal of loads.

7.2.3 *Strength of Clothes Rails and their Supports*

7.2.3.1 *Strength of clothes-rail supports*

Place the rail on its supports in the unit. Apply the load specified in Table 3, for one minute, as close as possible to the weakest support (*see* Fig. 4A).

If there are three or more supports [*see* Fig. 4B], each support shall be loaded simultaneously with the load specified in Table 3.

Carry out the inspection and assessment according to **8.4**.

7.2.3.2 *Dislodgement of clothes rails*

Place the rail on its supports in the unit (*see* Fig. 5). Load the rail uniformly with the load specified in Table 3 and apply for:

a) One hour for metal rails; and

b) One week for all other rails.

Carry out the inspection and assessment according to **8.4**. Also, the maximum deflection of the clothes rail shall not exceed 8 mm/m under load.

7.2.4 *Strength of the Structure*

7.2.4.1 *Test for structure and underframe*

This test is not applicable to units attached to another structure. Place stops around the legs or base (*see* Fig. 6 and Fig. 7). Levelling devices shall be opened 10 mm from the fully closed position.

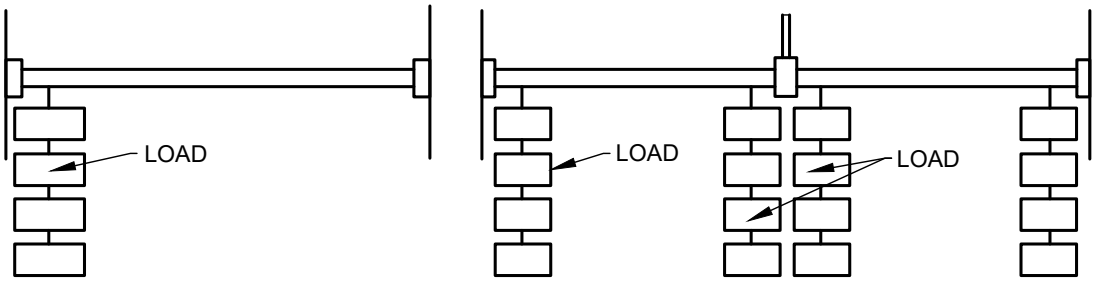


FIG. 4 STRENGTH TEST OF CLOTHES-RAIL SUPPORTS

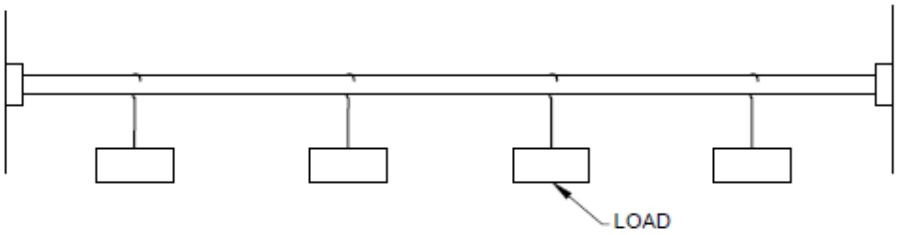


FIG. 5 DISLODGEMENT OF CLOTHES RAILS

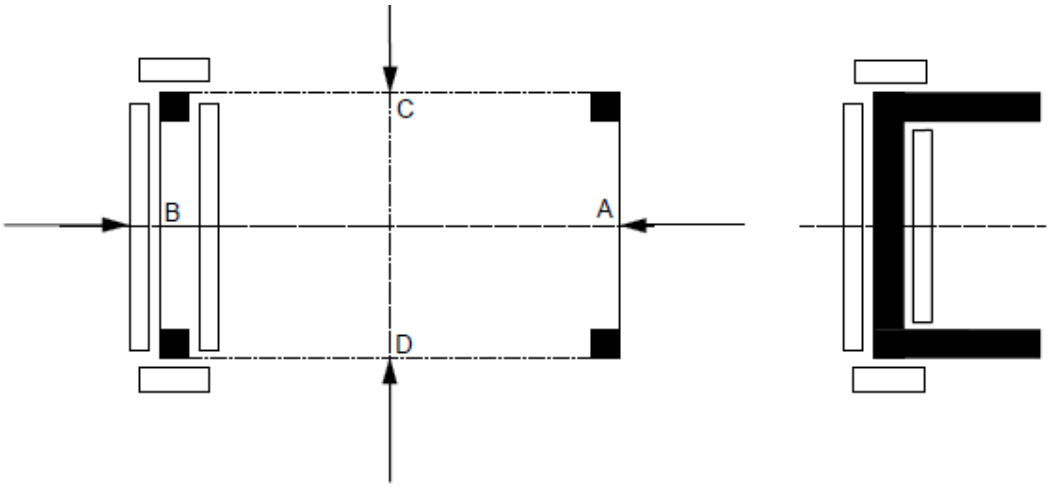
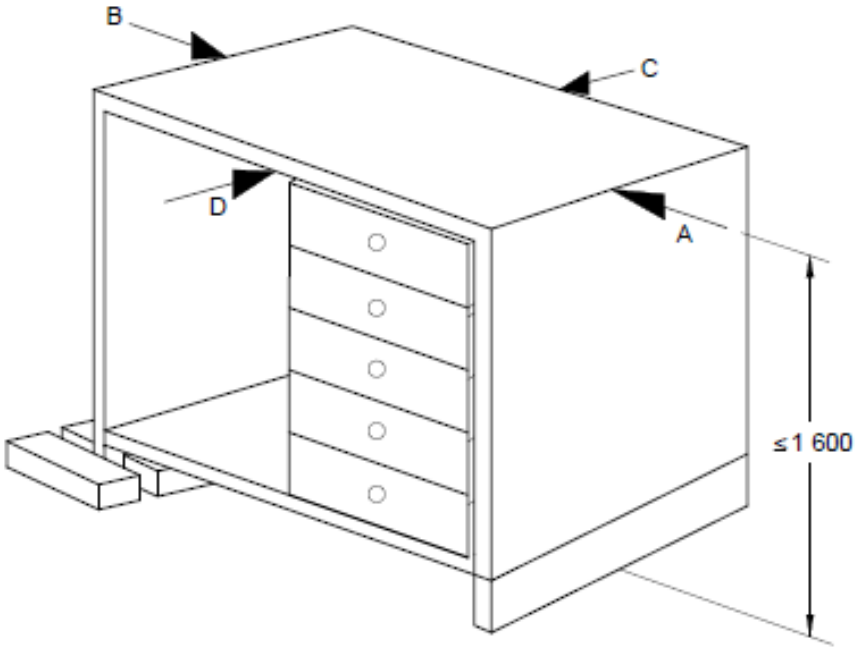


FIG. 6 STRENGTH TEST OF STRUCTURE AND UNDERFRAME – FORCE APPLICATION POINTS (A, B, C, D) AND DIRECTIONS



All dimensions in millimetres

FIG. 7 STRENGTH TEST OF STRUCTURE AND UNDERFRAME — FORCE APPLICATION POINTS (A, B, C, D)

Load all parts intended for storage purposes with the load specified in Table 8. Close extension elements, flaps, roll-fronts and doors.

Apply the static force specified in Table 3, 10 times at point A in Fig. 6, on the centre line of the side of the unit as high as possible but not higher than 1 600 mm from the floor (*see* Fig. 7). If no structural member exists at this position, apply the load by means of a rigid bar. Repeat this procedure 10 times at points B, C and D, with the legs or base still restrained by stops. If the unit tends to tilt, lower the force application point until tilting is just prevented. Record this height.

Carry out the inspection and assessment according to **8.4**. Also, all extendible elements shall meet the pull test criteria as per **7.3.7** after the test.

7.2.4.2 *Drop test*

The unit shall not be loaded. Levelling devices shall be opened 5 mm from the fully closed position, so that the leveller will not be in direct contact with the carcase.

Measure the force (F_1) required to lift one end of the unit. Measure the force (F_2), required to lift the other end of the unit.

Determine the drop height as a percentage of the nominal drop height as per Table 2. For forces (F), to lift the end of the unit, the drop height shall be as specified in Table 2.

Table 2 Determination of the Drop Height for the Drop Test

(*Clause* 7.2.4.2)

Sl No.	Force to Lift One End of the Storage Unit (N)	Percent of Specified Nominal Drop Height
(1)	(2)	(3)
i)	0 to < 200	100
ii)	200 to 400	100 – [70 (force to lift one end of unit – 200)/200]
iii)	> 400	30

Lift the same end of the unit to the drop height and let it drop freely onto the floor surface (*see* **B-2**). If the unit tends to overbalance at the specified drop height, lower the drop height to the point of equilibrium and record this in the test report. Minimum drop height shall not be less than 15 mm.

Carry out the test 6 times. Height-adjustable units shall be tested 3 times at the lowest position and 3 times at the highest position. Repeat on the opposite end.

This test is not applicable to units attached to another structure, interconnected storage units, storage units with width less than 500 mm and heights less than 787 mm, storage units with castors.

Carry out the inspection and assessment according to **8.4**. Also, all extendible elements shall meet the pull test criteria after the test as per **7.3.7**.

7.2.4.3 *Tests for units with castors or wheels*

Apply the force at the same point as in **7.2.4.1**, on the centre line of the side of the unit as high as possible but not higher than 1 600 mm from the floor. If no structural member exists at this position, apply the force by means of a rigid bar.

Move the unit (750 ± 50) mm back and forth at a rate of (10 ± 2) cycles per minute for the specified number of cycles over obstacles (*see* Fig. 8 and Table 4) or on flat surface as specified in Table 4. After changing direction at each end of the stroke, provide 200 mm to 400 mm of travel before encounting an obstacle. One cycle consists of a forward and a backward stroke. This cycle shall be repeated until the castors have been running for 2 min. There shall be a cooling period of 2 min before the next 2 min test run is started.

Carry out the inspection and assessment according to **8.4**. Also, inspect the castors and the structure for damage, which could affect functioning, immediately after testing and after a recovery period of 24 h.

7.3 Test Procedures for Movable Parts

7.3.1 *Pivoted Doors*

7.3.1.1 *General*

This test applies to all doors hinged on the vertical side, including folding doors. Mount stops around the legs or base in order to prevent the unit from moving on the floor during the tests. Load any storage component on the door to be tested as specified in Table 5.

7.3.1.2 *Strength of pivoted doors*

7.3.1.2.1 *Vertical load on pivoted doors*

Load the door as shown in Fig. 9 with the mass as specified in Table 3. The mass shall be suspended 100 mm from the edge furthest from the hinge.

Open and close the door 10 full cycles (back and forth) from a position 45° from fully closed to a position 10° from fully opened, up to a maximum of 135° from the fully-closed position. Opening and closing can be done by hand using 3 s to 5 s for opening and 3 s to 5 s to for closing. Carry out the inspection and assessment without the test load according to **8.4**.

7.3.1.2.2 *Horizontal load on pivoted doors*

Apply the horizontal static load specified in Table 3, perpendicular to the plane of the door on its horizontal centreline, 100 mm from the edge furthest from the hinge, as shown in Fig. 10. Carry out the test 10 times. Carry out the inspection and assessment according to **8.4**.

7.3.1.3 *Slam-shut test of pivoted doors*

This test is not applicable to pivoted doors fitted with damper mechanisms. The door shall be closed by means of a string or cord attached to the back of the door as close as possible to the position of the centre of the handle. If the handle has a length greater than 200 mm, the string shall be attached 100 mm below the top of the handle up to a maximum height from the floor of 1 200 mm.

If the door does not have a handle, the string shall be attached 25 mm from the front edge (furthest from the hinge) at the middle of the door height. The cord shall be perpendicular to the face of the door, when it is fully closed and shall not change direction by an angle greater than 10° during movement.

Determine the mass, m_1, required to just move the door. The test mass shall be $m_1 + m_2$. *See* Table 3.

Slam shut the door 10 times using the masses ($m_1 + m_2$).

The test mass shall act until 10 mm before the door is fully closed. The mass shall fall through a distance of 300 mm or the distance required to close the door through 30°, whichever is the smaller. The test shall be carried out as shown in Fig. 11. Carry out the inspection and assessment according to **8.4**.

7.3.1.4 *Durability of pivoted doors*

Attach two masses, as specified in Table 3 each, one on each side of the door at the middle of the vertical centreline (*see* Fig. 12). Fully open the door to a maximum of 130° and close it for the number of cycles (back and forth) specified in Table 4, without forcing built-in stops in the open position. If the door has a catch device at any position, operate this mechanism at each cycle.

The door shall be gently opened and closed at each cycle using approximately 3 s for opening and 3 s for closing the door. The recommended rate is a maximum of 6 cycles per minute. This test is aapplicable for all levels.

Carry out the inspection and assessment according to **8.4**.

7.3.2 *Sliding Doors and Horizontal Roll-fronts*

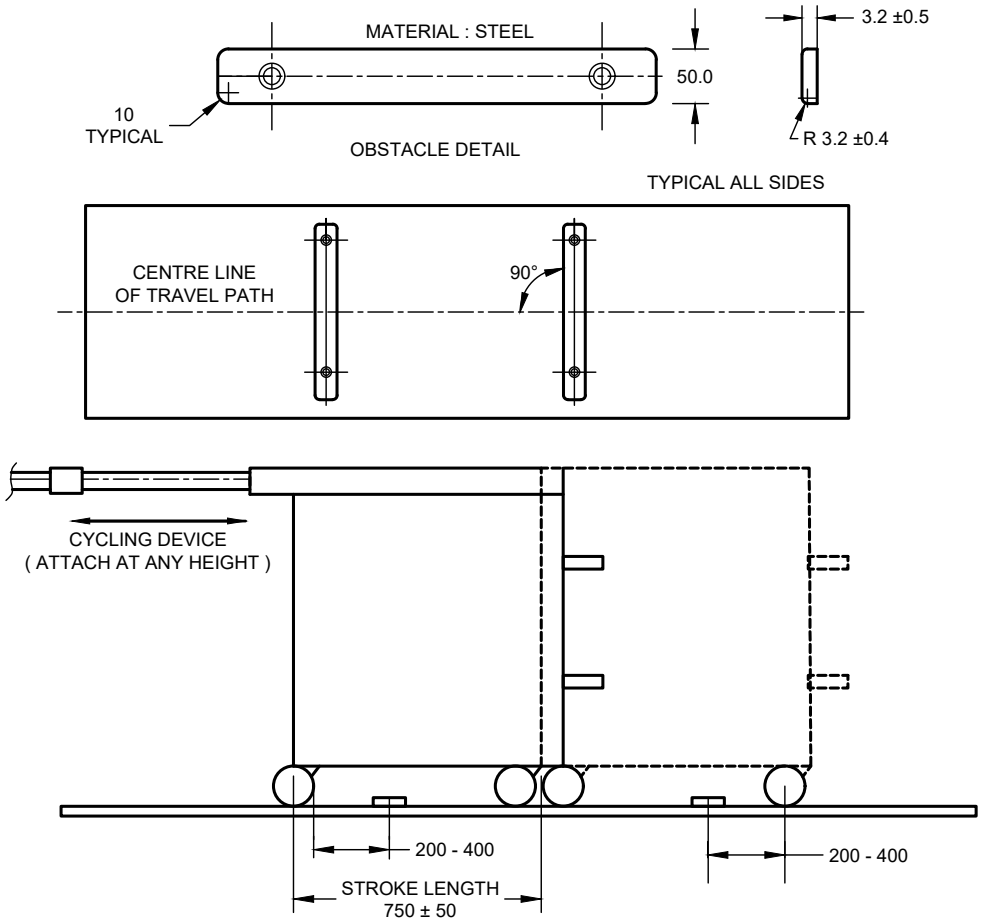
7.3.2.1 *General*

This test applies to all horizontally sliding doors, including those constructed from hinged elements. Mount stops around the legs or base in order to prevent the unit from moving on the floor during the tests.

7.3.2.2 *Slam shut/open test of sliding doors and horizontal roll-fronts*

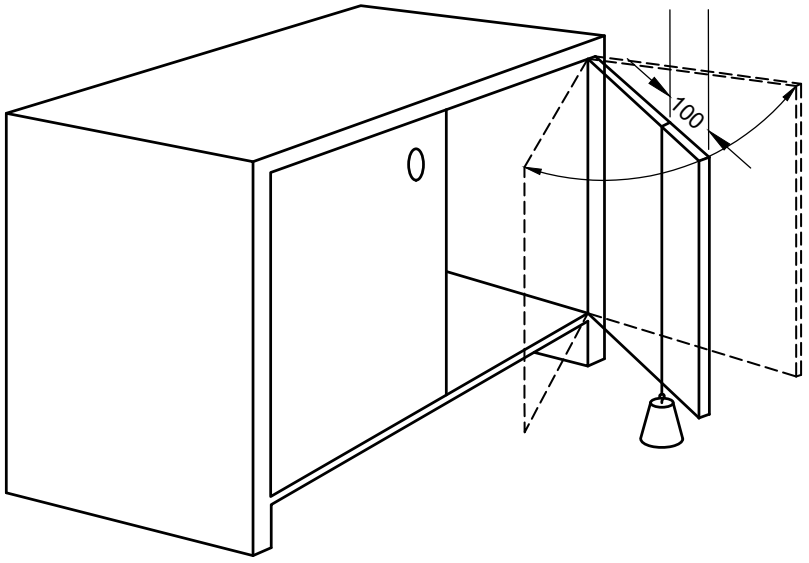
The door shall be opened/closed by means of a string or cord attached to the centre of the handle. If the handle has a length greater than 200 mm, the string shall be attached 100 mm below the top of the handle up to a maximum height from the floor of 1 200 mm. If the door does not have a handle, the string shall be attached at the middle of the door height.

Determine the mass, m_1, required to just move the door. The test mass shall be $m_1 + m_2$. *See* Table 3.



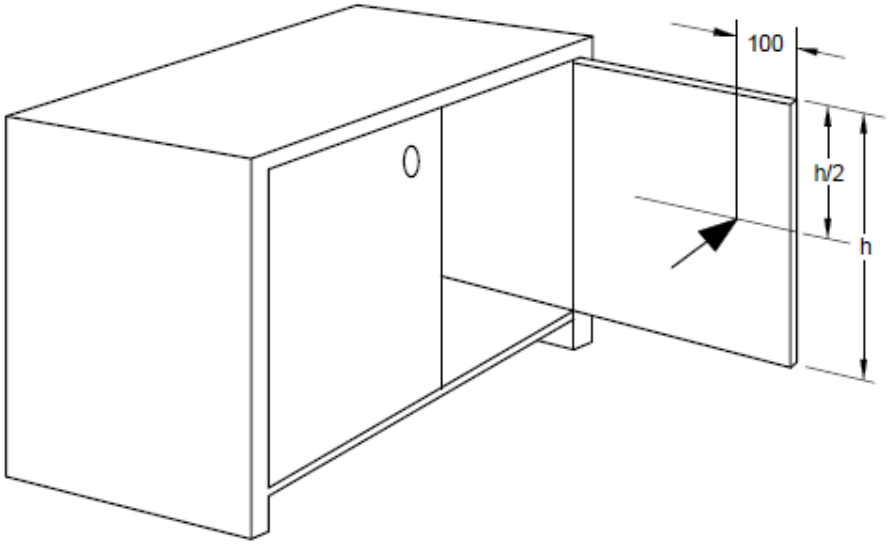
All dimensions in millimetres

FIG. 8 TESTS FOR UNITS WITH CASTORS OR WHEELS – OBSTACLE LAYOUT



All dimensions in millimetres

FIG. 9 VERTICAL LOAD TEST ON PIVOTED DOORS



All dimensions in millimetres

FIG. 10 HORIZONTAL LOAD TEST ON PIVOTED DOORS

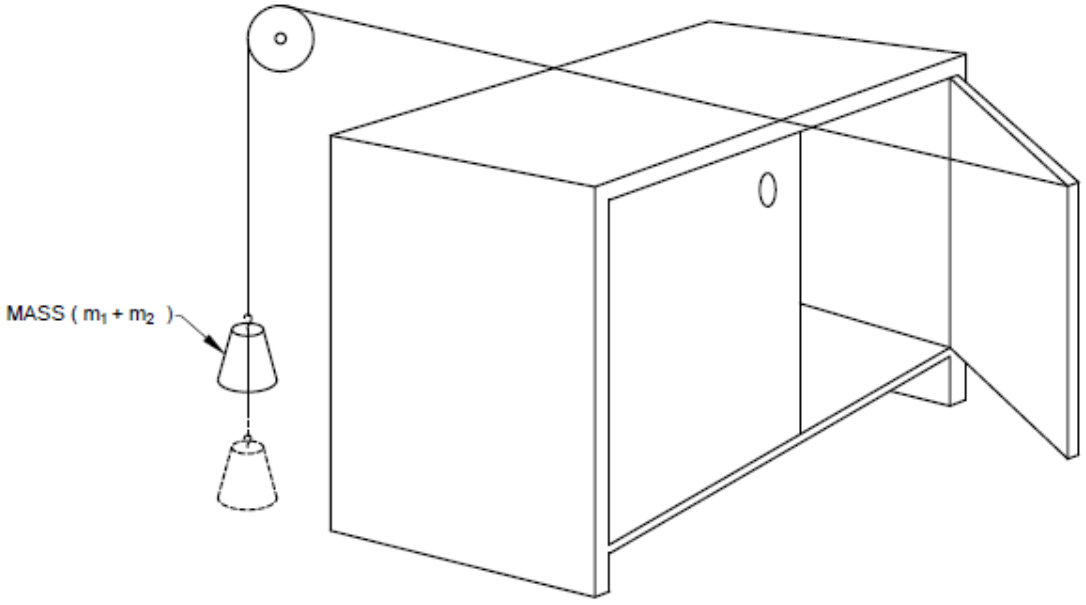


FIG. 11 SLAM-SHUT TEST OF PIVOTED DOORS

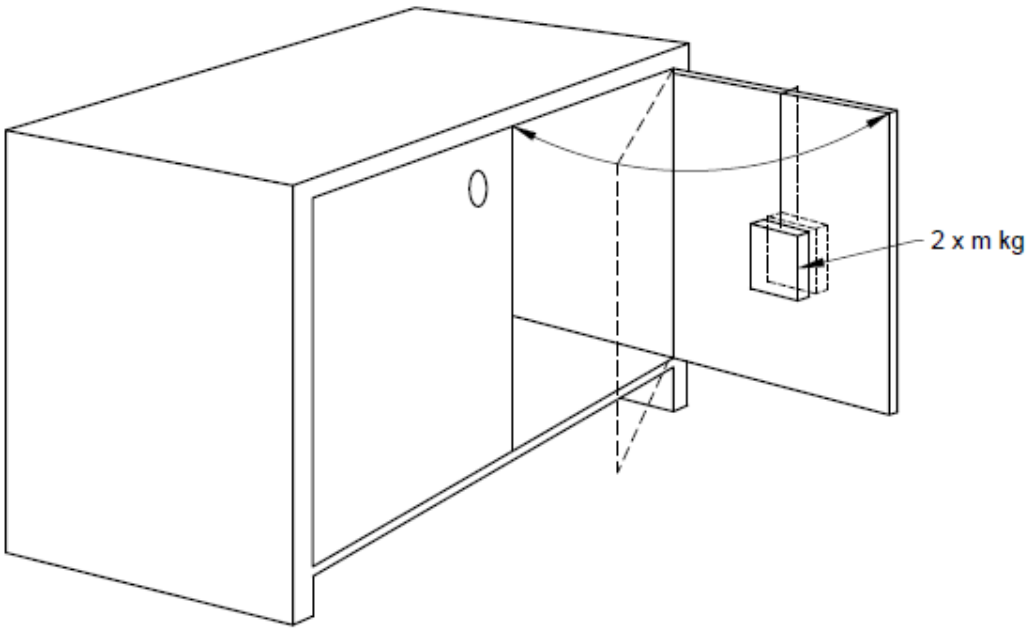


FIG. 12 DURABILITY TEST OF PIVOTED DOORS

Slam shut the door 10 times using the masses (m_1 + m_2). Close/open the door/roll-front 10 times towards the fully closed/opened positions using the masses (m_1 + m_2). Start the movement 300 mm from the closed/opened positions respectively. The test mass shall act until 10 mm before the door/roll-front is fully closed/opened. The test shall be carried out as shown in Fig. 13.

Carry out the inspection and assessment according to **8.4**.

NOTE — This test is not applicable for sliding doors fitted with damper mechanisms.

7.3.2.3 *Durability of sliding doors and horizontal roll-fronts*

Open and close the door/roll-front for the number of cycles specified in Table 4. The movement shall be from the fully closed position, without forcing the stops, to a position approximately 50 mm from the fully open position (*see* Fig. 14). The door shall be opened/closed gently at a rate of 6 to 15 cycles per minute. The recommended average speed is (0.25 ± 0.1) m/s. If the door/roll-front has a catch device at any position, operate this at each cycle.

Carry out the inspection and assessment according to **8.4**.

7.3.3 *Flaps*

7.3.3.1 *Strength of bottom-hinged flaps*

This test only applies to flaps that can be loaded in the open position, unless the manufacturer's instructions specifically prohibit it. With the flap in its fully opened/extended position, load with the static force specified in Table 3. Apply the force 10 times, 50 mm from the weakest corner (*see* Fig. 15).

Carry out the inspection and assessment according to **8.4**.

7.3.3.2 *Durability of flaps*

Open/close the flap for the number of cycles specified. Use approximately 3 s for opening respectively and 3 s for closing the flap. The rate is maximum of 6 cycles per minute. The number of cycles is given in Table 4.

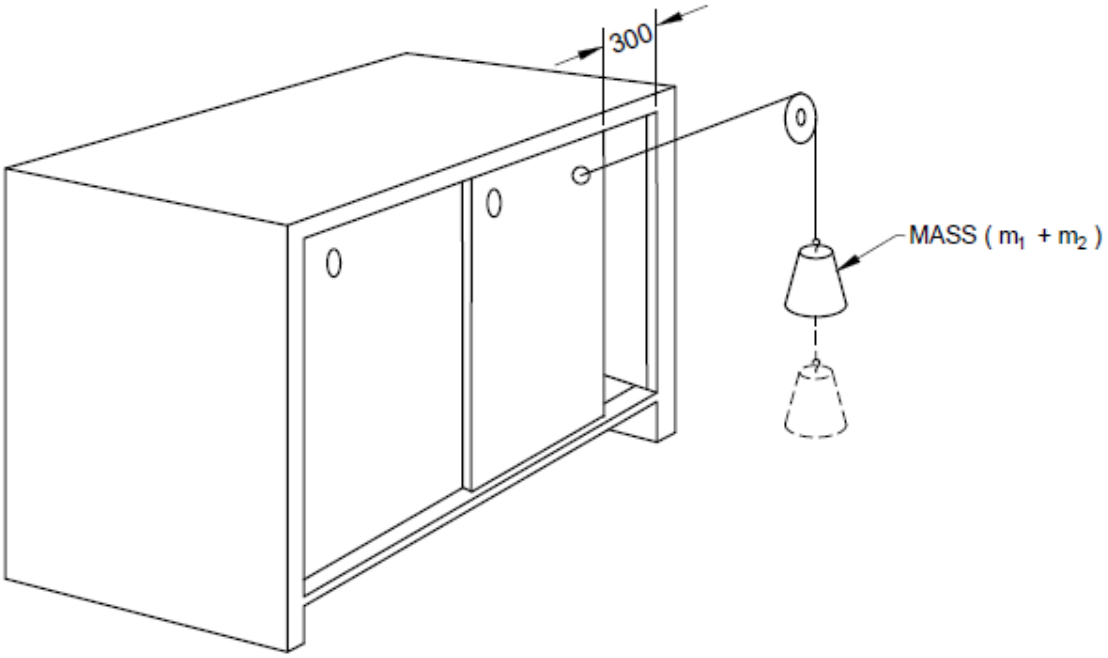
If the flap has a catch device at any position, this shall be allowed to operate at each cycle. Self-locking stays shall be opened until just before they lock and then closed from that position. When the flap is fitted with an adjustable friction stay, it shall be adjusted so that the flap will just open under its own weight and be readjusted not more than 10 times during the test.

Carry out the inspection and assessment according to **8.4.**

7.3.3.3 *Drop test for top-hinged flaps*

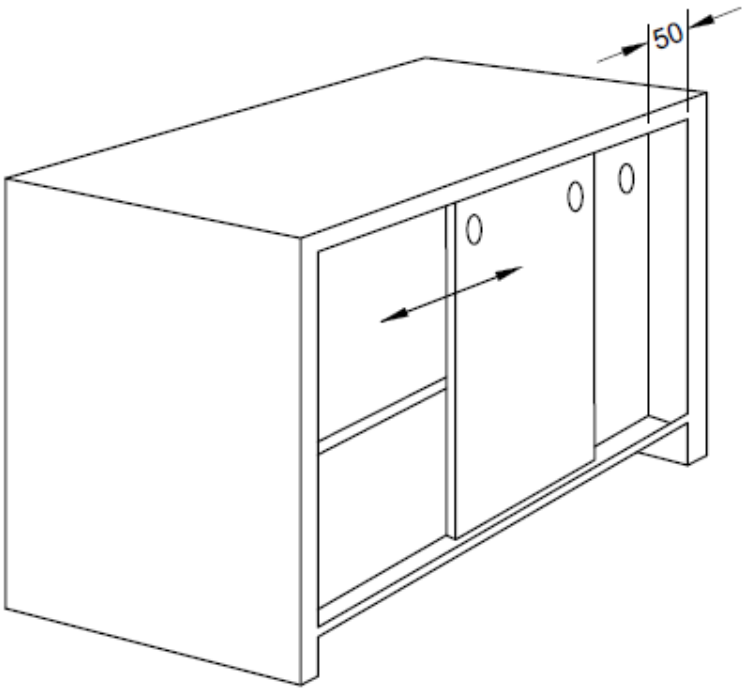
This test is not applicable to top-hinged flaps fitted with damper mechanisms. Lift the door/flap until it is horizontal and allow it to drop freely (*see* Fig. 16) for the number of cycles specified in Table 3. The rate is maximum 6 cycles per minute.

Carry out the inspection and assessment according to **8.4**.



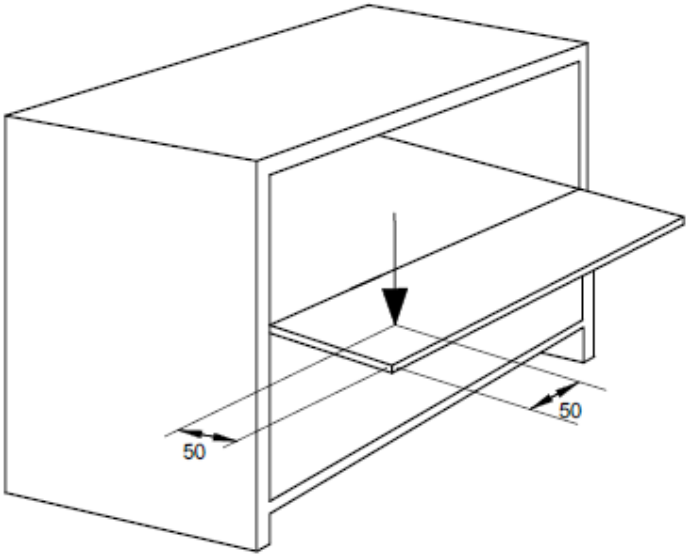
All dimensions in millimetres

FIG. 13 SLAM SHUT/OPEN TEST OF SLIDING DOORS



All dimensions in millimetres

FIG. 14 DURABILITY OF SLIDING DOORS



All dimensions in millimetres

FIG. 15 STRENGTH TEST OF FLAPS

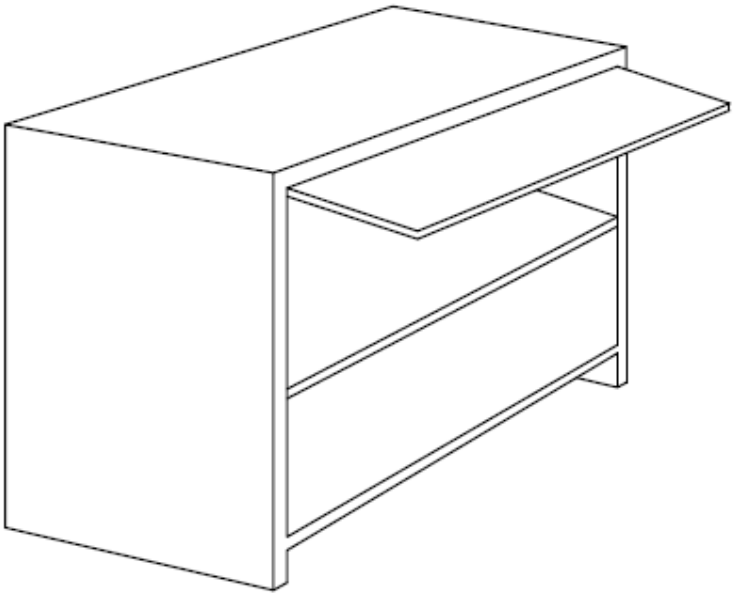


FIG. 16 DROP TEST FOR HORIZONTALLY TOP-HINGED DOORS/FLAPS

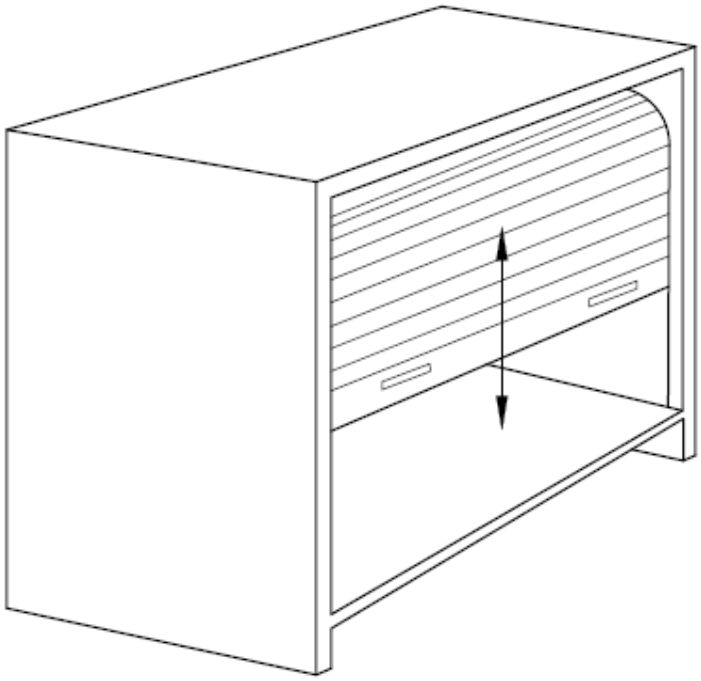


FIG. 17 SLAM SHUT/OPEN OF ROLL-FRONT

7.3.4 *Vertical Roll-Fronts*

7.3.4.1 *Slam shut/open test of vertical roll-fronts*

Allow the roll-front to fall freely in both directions from as near the point of equilibrium as possible (*see* Fig. 17) for the 10 number of cycles. If the roll-front does not fall, the test shall be carried out according to the same principle as specified in **7.3.2.2** with the force applied on the vertical centreline as per Table 3.

Carry out the inspection and assessment according to **8.4**.

7.3.4.2 *Durability of vertical roll-fronts*

By means of a force applied on the vertical centreline, open and close the roll-front fully and gently at a rate of 6 to 15 cycles per minute for the number of cycles specified in Table 4. The recommended average speed is (0.25 ± 0.1) m/s. If the roll-front has a catch device at any position, this shall be allowed to operate at each cycle.

Carry out the inspection and assessment according to **8.4**.

7.3.5 *Extension Elements*

7.3.5.1 *General*

Place stops around the legs or base in order to prevent the unit from moving on the floor during the tests.

7.3.5.2 *Strength of extension elements*

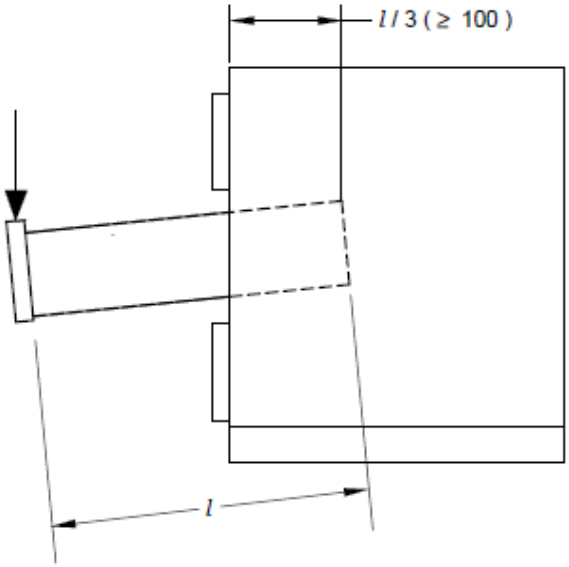
This test does not apply to pencil/center drawer with facia height less than 60 mm. Open the extension element to its open stops, or if there are no open stops, to the point at which one-third of the inside length (depth) of the extension element, or at least 100 mm, remains inside the unit (*see* Fig. 18). Apply the vertical downwards static force specified in Table 3 on one top corner of the extension element front. Repeat 10 times.

Carry out the inspection and assessment according to **8.4**. Also, upon completion of the test, the extendible member(s) shall meet the pull force requirements as per **7.3.7**.

7.3.5.3 *Durability of extension elements*

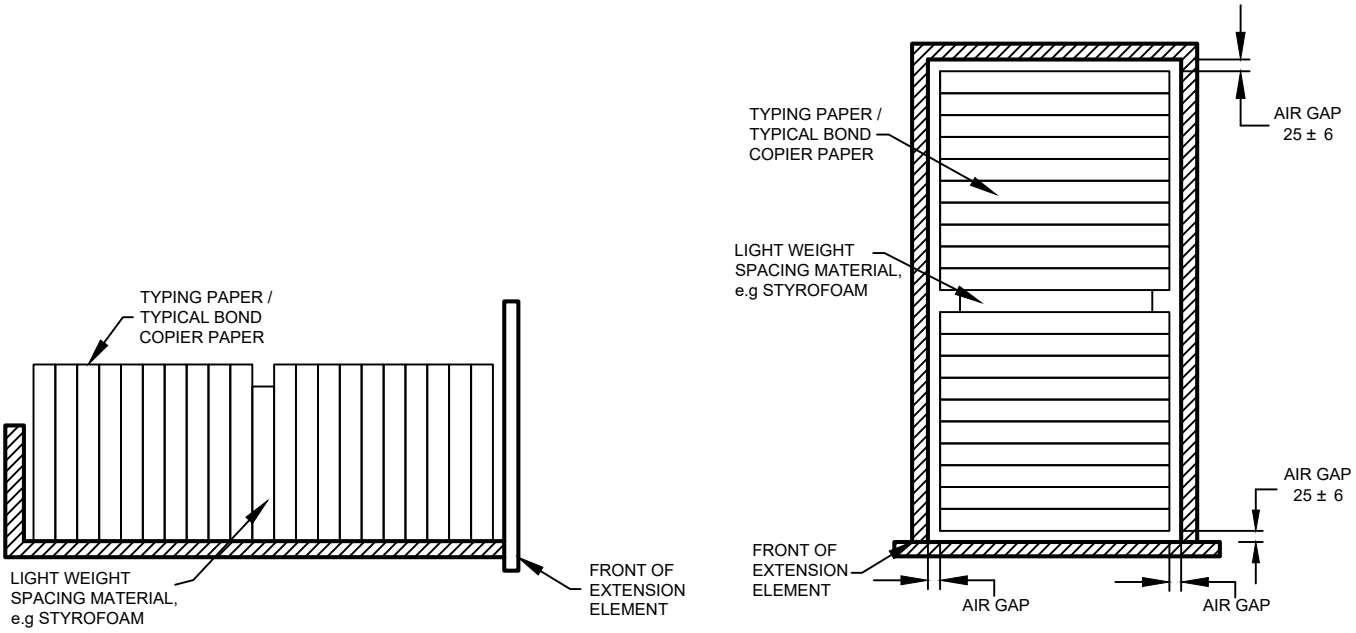
Load the extension element as specified in Table 5. When confirmed for pocket files, load it uniformly with paper (*see* **B-9**) as shown in Fig. 19.

Without impacting the stops, or providing vertical support, open and close the extension element gently for the number of cycles specified in Table 4. Extension elements that do not have open stops shall be opened to a point at which one-third of the inside length (depth) of the extension element, or at least 100 mm, remains inside the unit (*see* Fig. 20). If the extension element has a catch device at any position, this shall be allowed to operate at each cycle.



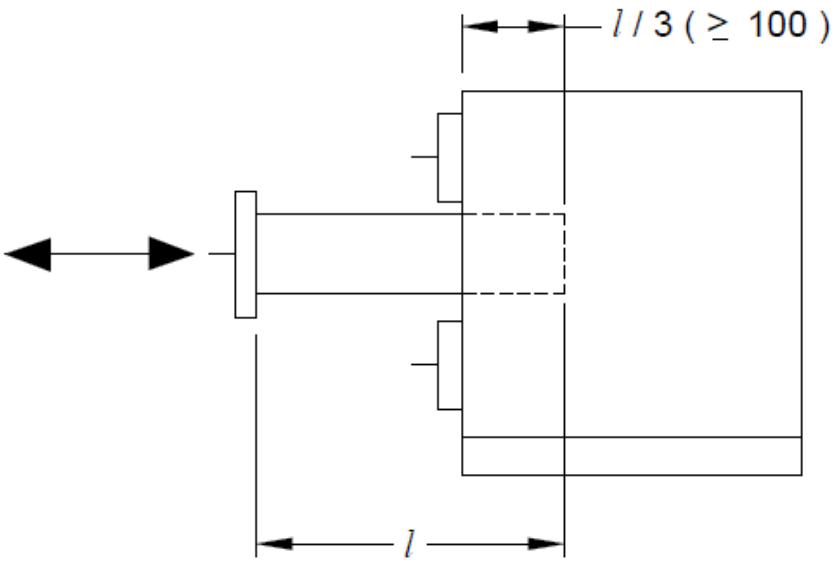
All dimensions in millimetres

FIG. 18 STRENGTH TEST OF DRAWERS AND RUNNERS



All dimensions in millimetres

FIG. 19 LOADING OF SUSPENDED FILING POCKETS WITH TYPING PAPER/TYPICAL BOND COPIER PAPER



All dimensions in millimetres

FIG. 20 DURABILITY TEST OF DRAWERS AND RUNNERS

The force shall be applied via the handle or, in case of two handles, in the middle between the handles. On extension elements without a handle, apply the force at the same level as the runners. The extension element shall be opened/closed gently at a rate of 6 to 15 cycles per minute. The average speed is (0.25 ± 0.1) m/s.

Carry out the inspection and assessment according to **8.4**. Also, upon completion of the test, the extendible member(s) shall meet the pull force requirements as per **7.3.7**. After the durability test, the extendible elements, if applicable shall meet the interlock test requirements as per **7.3.5.6**.

7.3.5.4 *Slam shut/open test of extension elements*

The slam-open part of the test is applicable only to extension elements fitted with stops in the open position. Place the extension element on its runners and load it as specified in Table 5 with marbles (*see* **B-8**), or, when confirmed for pocket files, load it with paper (*see* **B-9**) as shown in Fig. 19.

Open the extension element 300 mm, or fully open it if it cannot be opened 300 mm. Extension elements without stops in the open position shall be opened until 100 mm remains inside the unit. Slam shut the extension element 10 times using the velocities specified.

NOTE — Two suitable slam-test apparatus are shown in Annex C.

The slamming force shall act until 10 mm before the extension element reaches its end travel. Apply the force as specified in Table 3, to the handle or, in case of two handles, in the middle between the handles. On extension elements without a handle, apply the force at the same level as the runners. Carry out slam open according to the same principle as above, if the extension element is fitted with stops in the open position.

Carry out the inspection and assessment according to **8.4**. Also, the rebound position of the extendible element shall not exceed 40 mm from its closed position after each of the ten closings.

7.3.5.5 *Displacement of extension element bottoms*

Place the extension element on its runners or suspend it in a similar way and all storage areas shall be loaded with the loads specified in Table 8. Apply a static force as specified in Table 3 approximately 25 mm above the bottom of the extension element, acting at the middle of the front and back of the extension element (*see* Fig. 21). Apply the force 10 times.

Carry out the inspection and assessment according to **8.4**.

7.3.5.6 *Interlock test*

When interlocks are fitted, one extension element shall be fully extended and an outwards force as specified in Table 3 shall be applied to the handles of each of the remaining extension elements one at a time. The test shall be carried out a total of 10 times on each extension element. Record if the extension elements remain closed.

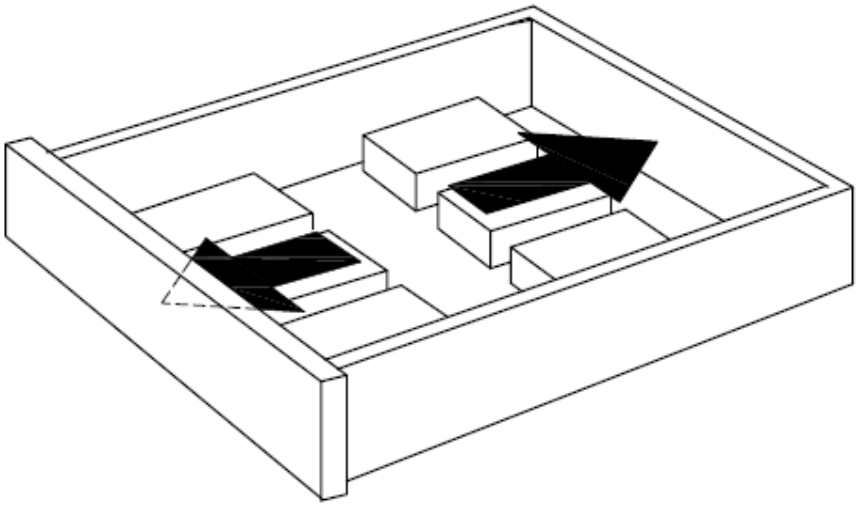


FIG. 21 DISPLACEMENT OF DRAWER BOTTOMS

Carry out the inspection and assessment according to **8.4**. Also, there shall be no loss of serviceability to the interlock system. The unopened extendible elements shall not bypass the interlock system.

7.3.6 *Locking and Latching Mechanism Tests*

7.3.6.1 *General*

Prevent the unit from moving during the test without interfering with the operation of the locking/latching mechanism and the furniture component being tested. Close all doors, flaps and extension elements and lock all locking/latching mechanisms.

7.3.6.2 *Strength test for locking and latching mechanisms for extension elements*

Apply a force as specified in Table 3, in the direction of travel of the extension element at a direction 90° to the front of the element and at 30° to that direction, upwards, downwards, to the left and to the right.

If the extension element is to be used with one specific handle or multiple handles, which are ≤ 1/3 of the width of the front of the extension element, the forces shall be applied at the centre of the handle(s). If no handle is fitted, apply the force to the centre of the front of the extension element. In addition, apply the forces 50 mm in from each of the left and right edges of the extension element.

If the handle is more than 1/3 of the width of the front of the extension element, apply the force to the centre of the handle and 50 mm from each end of the handle. Repeat the test for each extension element.

If the extendible element pull design does not allow a user to apply an outward upward, outward downward, outward left and outward right force, the test does not apply.

Carry out the inspection and assessment according to **8.4**. Also, the extendible elements shall remain in the normal locked position during application of the forces.

7.3.6.3 *Locking and latching mechanisms for doors, flaps and roll-fronts*

Apply a force as specified in Table 3, in the direction of travel of the door/flap/roll-front and at 30° to that direction, upwards and downwards.

The force shall be applied to the centre of the handle. If no handle is fitted and the position of the handle is not included in the manufacturer's instructions, the force shall be applied at the most adverse position. If the locking/latching mechanism requires rotation of the handle to operate it, the specified torque as per the manufacturer shall be applied to the handle in the direction of opening. Repeat the test for each door.

If the door pull design does not allow a user to apply an upward or downward force, the test does not apply.

Carry out the inspection and assessment according to **8.4**. Also, the doors shall remain in the normal locked position during application of the forces.

7.3.6.4 *Durability test of locking and latching mechanisms*

Open and close the locking/latching mechanism for the specified number of cycles (*see* Table 4) using any suitable test equipment at a rate of 6 to 15 cycles per minute.

Carry out the inspection and assessment according to **8.4**.

7.3.7 *Pull Force Test*

The storage unit shall be placed on a test platform, levelled and secured against movement. Extendible elements shall be uniformly loaded as specified in Table 5. For extendible elements functioning as a shelf the load shall be evenly distributed front to back and left to right on the shelf surface. Any latching mechanisms shall be disabled. Doors with storage capability shall not be loaded for this test.

Extendible elements and doors shall be subjected to a break-in period of up to 100 cycles if the extendible element does not initially meet the pull force requirement. One cycle is defined as travel from 0 to 6 mm of the closed position to 0 to 6 mm of the fully extended/open position and return. Horizontal receding doors may be supported in a horizontal plane during this test. Where applicable (typically for ball-bearing suspension) fully open and fully close the extendible element one time to ensure the suspension is adequately reset before performing the pull force test.

A force gauge or other force measurement device shall be attached to the centre of the pull area (*see* Fig. 22). For dual pull and wide pull extendible elements and doors, the force shall be measured at the centre of each pull (dual pull) and at each end of the wide pulls at a distance equal to one sixth of the extendible element width. Open the extendible element or door from its fully closed position to its fully extended/open position while measuring the maximum force.

Carry out the inspection and assessment according to **8.4**. Also, the applied force shall not exceed 70 N.

For the extendible elements mounted on non-roller or slides without ball bearing running elements, the acceptance level shall be 120 N.

7.3.8 *Top Load Ease Cycle Test*

This test applies to units with tops less than or equal to 1 000 mm in height including mobile and freestanding pedestals.

This test does not apply to:

a) Units with cushioned or contoured seating surfaces;

b) Shelves or adjustable keyboard surfaces. (If it is unclear whether the surface is a unit top or a shelf, this test applies);

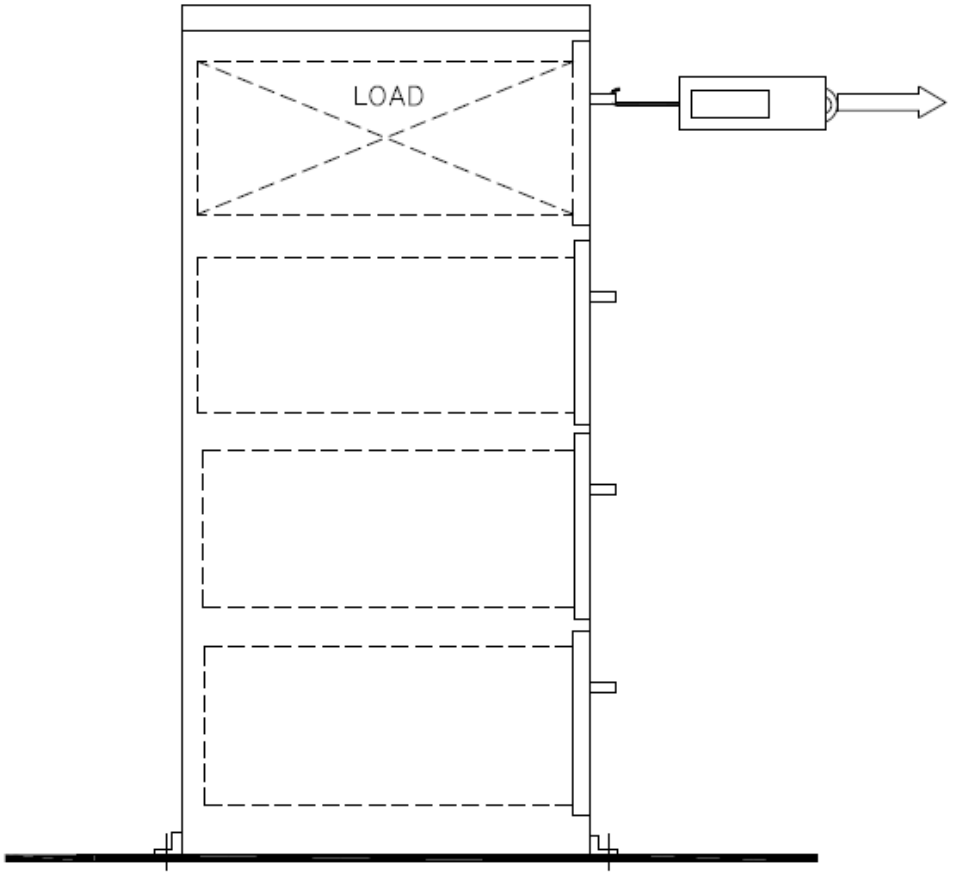


FIG. 22 PULL FORCE TEST

c) Units with tops less than 400 mm in depth; and

d) Units with integral (non-detachable) overhead storage units, hutches, etc that limit the useable depth of the top or with designs that interfere with a person's ability to sit on the surface.

The unit shall be placed on the test surface/platform, levelled, and restrained to prevent movement. All extendible elements shall be tested to meet the pull force test requirements as per **7.3.7**.

Apply the load to the applicable elements (except the unit top) as specified in Table 5. For units with a unit top greater than or equal to 450 mm deep, a 91 kg weight applied by means of a 400 mm ± 15 mm diameter bag, or force applied through a 400 ± 15 mm disk shall be positioned on the unit top with the edge of the bag/disk within 25 mm from the edge of the surface at the apparent weakest point. For unit tops less than 450 mm deep, centre the bag/disk on the available surface depth (*see* Fig. 23).

The cycling device shall be set to operate at a rate of 14 ± 6 cycles per minute. The number of cycles as specified in Table 4. The bag shall be raised or force removed until the entire load is off the unit top and then eased or reapplied (without impact) onto the surface so that it takes the entire weight/force without any support from the cycling device. Remove the load and perform the pull force test as per **7.3.7**.

Carry out the inspection and assessment according to **8.4**. Also, upon completion of the cycling test, the extendible element(s) shall meet the pull force requirements as per **7.3.7**.

7.3.9 *Durability Test for Units with Seating Surfaces – Cyclic Impact*

The unit shall be placed on a test surface/platform and be restrained in a manner that will maintain the impact location on the seat. The method of restraint shall not add support or structure to the unit or inhibit movement of the unit's response to the impact. Castors, if present, shall be initially placed at the apparent worst-case position.

If adjustable features are available, set these adjustments at midpoint of any adjustment ranges. Apply the distributed load to the applicable elements (other than the seating surface) as specified in Table 3. Shelf loads shall be evenly distributed front to back and left to right. Extendible elements shall be closed for the duration of the test.

Units with less than 44 mm initial thickness of cushioning materials in the seat shall have foam added to bring total cushioning thickness to 50 mm ± 6 mm. Any additional foam added to the top of the seat shall have a 25 percent indentation force deflection (IFD) of 200 N ± 22 N as per IS 7888.

A test bag approximately 400 mm in diameter containing media (steel shot, slugs, punches, sand, etc) weighing 57 kg, shall be attached to a cycling device, permitting a free fall to the seat. The free fall shall begin after lifting the test bag 30 mm above the uncompressed surface on the seating surface, as measured at the center of the seating surface (*see* Fig. 24). Other methods of creating the impact are acceptable if the impact can be shown as equivalent. The drop height and/or seat height shall be adjusted during the test if the drop height increases by more than 13 mm. *See* Annex C for recommended bag construction details

The cycling device shall be set at an appropriate rate between 10 and 30 cycles per minute. The bag shall be centered side-to-side on the seating surface and the edge of the bag shall be 13 mm back from the front edge of the seating surface. The unit shall be tested for cycles mentioned in Table 4.

Carry out the inspection and assessment according to **8.4**. Also, upon completion of the cycling test, the extendible element(s) shall meet the pull force requirements as per **7.3.7**. Inspect the castors and the structure for damage, which could affect functioning, immediately after testing and after a recovery period of 24 h.

7.3.10 *Drop Test – Dynamic – for Units with Seat Surfaces*

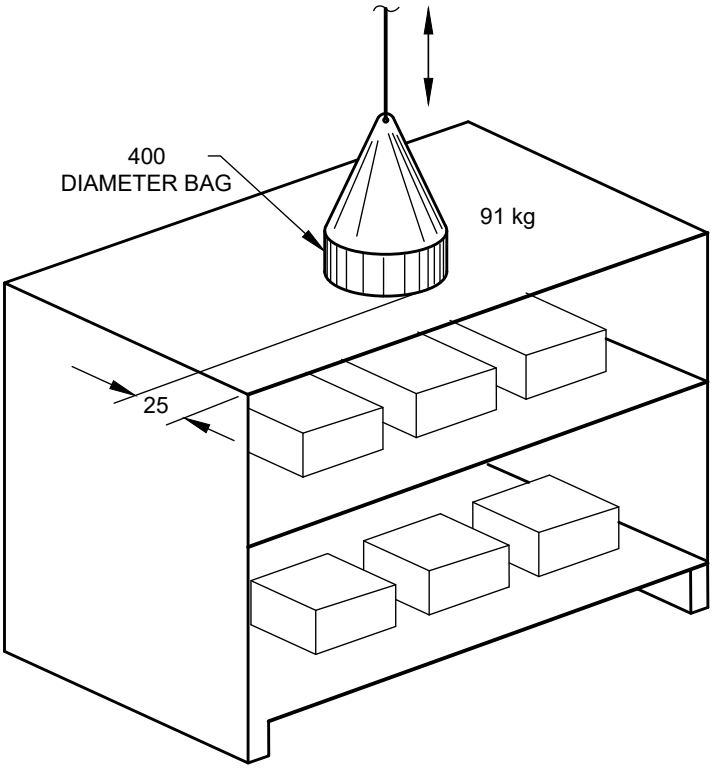
This test applies to all pedestals and storage units with seating surfaces that are cushioned or contoured and that are less than or equal to 965 mm in height. The unit shall be placed on a test surface/platform. If adjustable features are available, set these adjustments at midpoint of any adjustment ranges. Castors, if present, shall be initially placed at the apparent worst-case position.

Apply the load to the applicable elements (other than the seating surface) as specified in Table 3. Extendible elements shall be closed for the duration of the test.

A test bag as shown in Annex C or other fixture that gives an equivalent impact shall be attached to a device permitting a free fall to the seating surface as shown in Fig. 25. The bag shall be centered side-to-side on the seating surface and the edge of the bag shall be 13 mm back from the front edge of the seating surface.

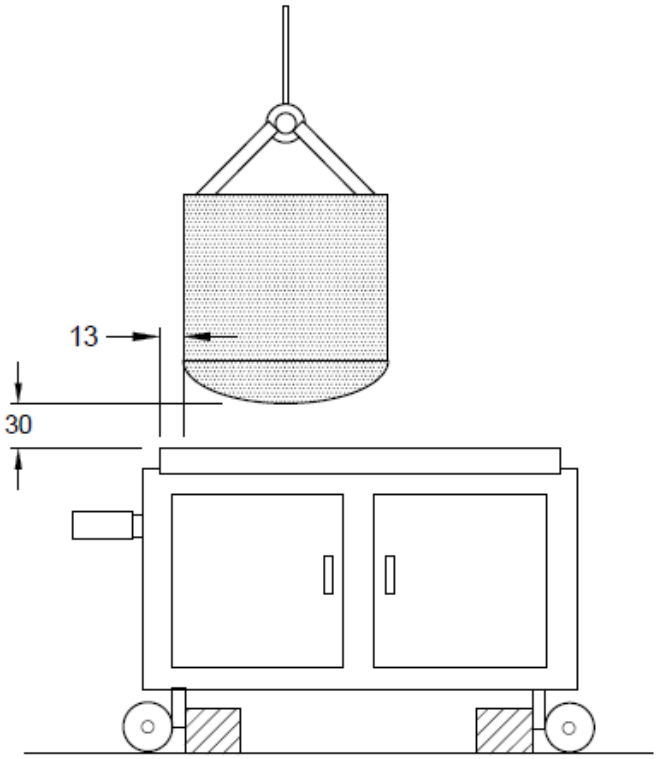
Test bag approximately 400 mm in diameter containing shot weighing 91 kg shall be raised 76 mm above the uncompressed seat and allowed to free fall onto the seating surface one time.

Carry out the inspection and assessment according to **8.4**. Also, there shall be no sudden and major change in the structural integrity of the storage unit or its components. Loss of serviceability is acceptable.



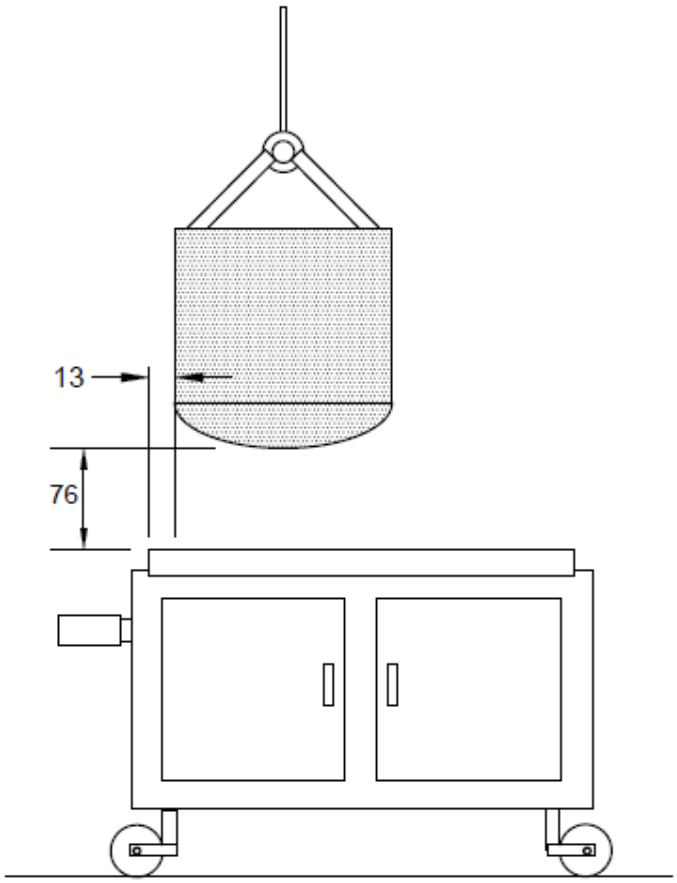
All dimensions in millimetres

FIG. 23 TOP LOAD EASE CYCLE TEST



All dimensions in millimetres

FIG. 24 DURABILITY TEST FOR UNITS WITH SEATING SURFACES – CYCLIC IMPACT



All dimensions in millimetres

FIG. 25 DROP TEST – DYNAMIC – FOR UNITS WITH SEAT SURFACES

7.4 Units Mounted to the Building or Other Structure

7.4.1 *Units Not Supported by the Floor*

7.4.1.1 *General*

The tests specified in this clause are intended to assess only the strength of the devices used for the mounting to the building or structure including the attachment to the unit. The tests may be carried out on a separate unit.

The unit(s) shall be mounted according to the manufacturer's installation instructions. Where the manner of mounting is not unambiguously defined, the manner of mounting shall be recorded. Adjustable wall attachment devices, for example, cabinet suspension brackets, shall be adjusted to the maximum depth (as far from the wall as possible) and to the middle of the height adjustment range. Distance devices/spacers used for levelling the unit shall be placed as low and as far apart as possible.

7.4.1.2 *Movable parts, shelf supports, tops and bottoms*

Load the unit(s) according to Table 8 and carry out the following tests on those components most likely to cause failure to the wall attachment:

a) Strength of shelf supports;
b) Static load test for tops and bottoms;
c) Vertical load on pivoted doors;
d) Slam shut/open test of sliding doors and horizontal roll-fronts;
e) Strength of bottom-hinged flaps;
f) Slam shut/open test of vertical roll-fronts; and
g) Strength of extension elements.

7.4.1.3 *Sustained load test (overload)*

After carrying out the tests specified in **7.4.1.2**, load all the storage areas with the specified load (*see* Table 8) according to the following principle.

If the number of shelves is not determined by the structure of the unit(s) or specified in a requirement document, divide the internal height of the unit(s), expressed in millimetres, by 300 and take the lower integer. This number shall then be the number of shelves to be used during testing.

a) Load on bottom: Specified load;
b) Load on first shelf: Specified load × 0.6;
c) Load on second shelf: Specified load × 0.4;
d) Load on third and following shelves: Specified load × 0.25; and
d) Load on top surfaces: Specified load × 0.2.

Specified load shall be as given in Table 3.

If the volume of the unit, calculated by the inner width, depth and height, is greater than 0.225 m^3, the total load shall be multiplied by the factor *R*:

$$R = \frac{1.2}{(0.75 + 2V)}$$

Where *V* is the volume of the unit in cubic metres, m^3.

When reduction of the load is necessary, it shall be removed from the bottom(s). The unit shall be loaded for one week. The unit shall remain attached to the structure and carries the test load.

7.4.1.4 *Dislodgement test*

Assemble the units according to the manufacturer's instructions. Apply to the unloaded unit the vertical upwards force specified in Table 3 at the least favourable point of the front edge.

Carry out the inspection and assessment according to **8.4**. Also, the unit shall not detach from its mounting.

7.4.2 *Units Supported by the Floor*

This test applies to units standing or resting on the floor and mounted to the building, for example, a wall.

The unit shall be mounted according to the manufacturer's instructions. If the manner of mounting is ambiguously defined, the manner of mounting shall be recorded in the test report. Apply a horizontal outwards static force as specified in Table 3 to the centre of the top edge of the unit.

Carry out the inspection and assessment according to **8.4**. Also, the unit shall not detach from its mounting.

7.5 Stability Tests

7.5.1 *General*

The stability tests shall be carried out with the unit placed on the test floor (*see* **B-2**).

Units for which the manufacturer's instructions state that they are to be placed against a wall or other rigid vertical structure shall not be tested in the rearward's direction. Castors and height adjustment devices shall be in the position most likely to cause the unit to overturn.

Requirements for stability only apply to units where the height to the top of the unit is 600 mm and more above the floor level, and when the potential energy exceeds 60 Nm.

7.5.2 *Doors, Extension Elements and Flaps Closed, All Storage Units Unloaded*

7.5.2.1 *Units that can be adjusted to a Height of 1 000 mm or less*

Apply the vertical force specified in Table 7 by means of the loading pad on the top surface acting 50 mm from the outer edge of the unit at any point likely to cause overturning (*see* Fig. 26).

Record if the unit overturns or is supported by an open extension element, opened door or opened flap. If, during testing, the unit is prevented from overturning by an extension element, open door or flap, the component shall be closed and the test repeated. Also, the unit shall not overturn or tip over as the result of the force application.

7.5.2.2 *Units that can be adjusted to a height of more than 1 000 mm*

Apply a vertical force of 350 N together with the outward horizontal force specified in Table 7 on the top surface acting 50 mm from the outer edge of the unit at any point likely to cause overturning (*see* Fig. 27).

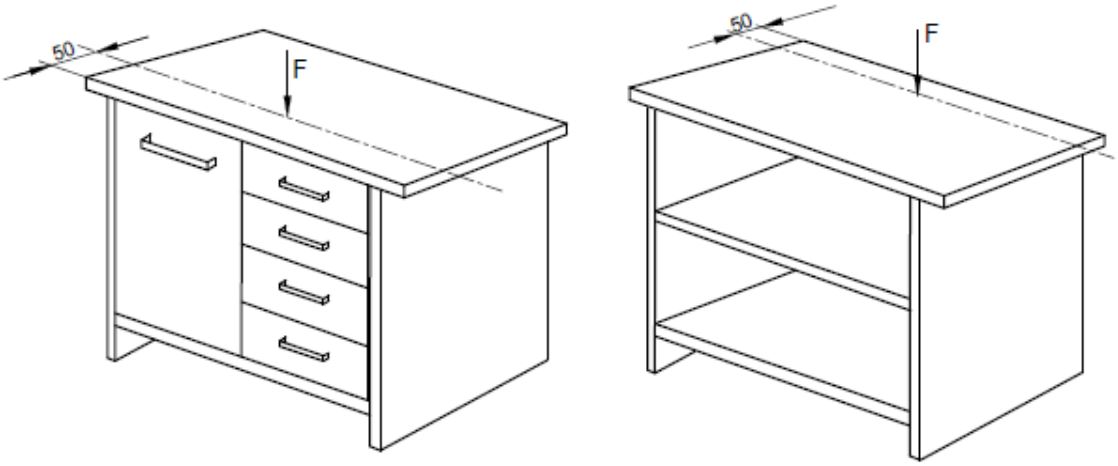
Record if the unit overturns or is supported by an open extension element, opened door or opened flap. If, during testing, the unit is prevented from overturning by an extension element, open door or flap, the component shall be closed and the test repeated. Also, the unit shall not tip over as the result of the force application.

7.5.3 *Opening Doors, Extension Elements and Flaps, All Storage Units Unloaded*

Apply a horizontal force one at a time to all doors, extension elements or flaps just sufficient to open them 40 mm. Then close the component before testing the next. The opening force shall be applied to the centre of the handle, knob, key, etc (*see* Fig. 28).

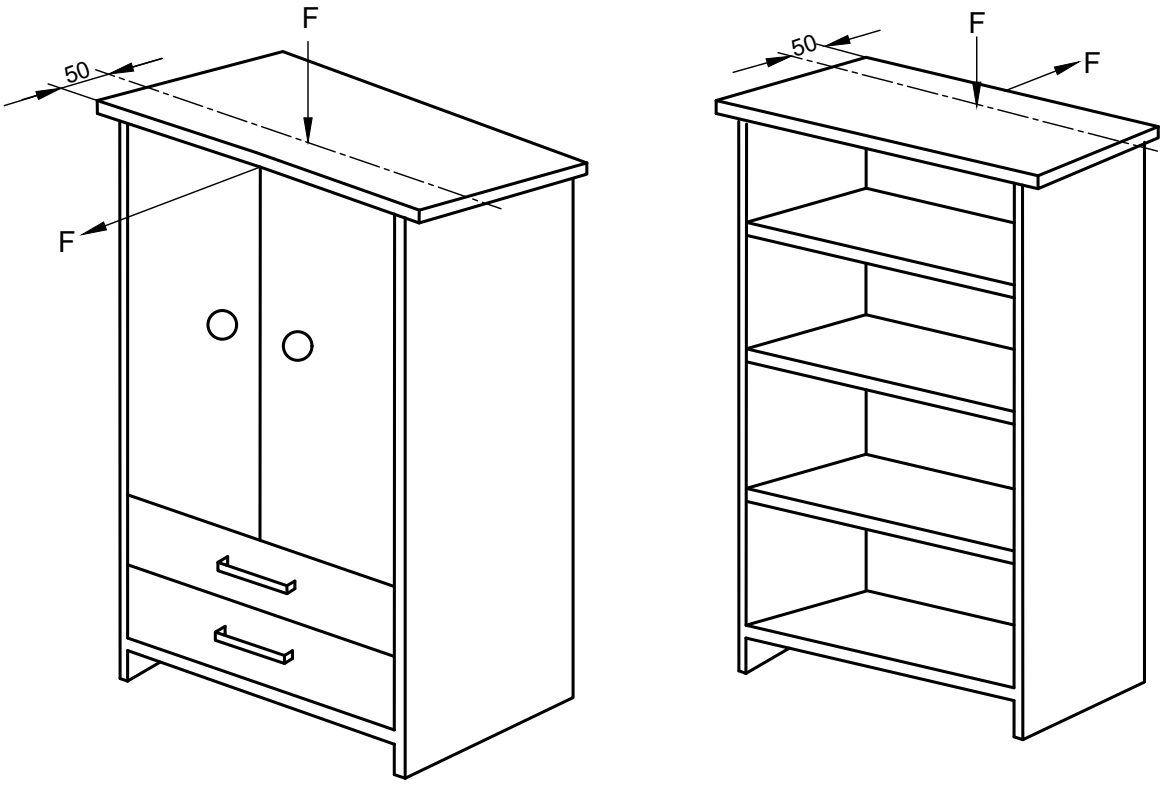
For units with one door, the test shall be carried out with the door opened to its maximum but not more than 90°. When two or more doors are fitted, the test shall be carried out with the worst-case door opened to its maximum but not more than 90°. All other doors shall be closed. With the worst-case door open, open all extension elements and flaps behind that door, except where there are no stops, in which case they shall be opened to two thirds of the internal length. Locking mechanisms shall be unlocked.

Record if the unit overturns or is supported by an open extension element, opened door or opened flap. If, during testing, the unit is prevented from overturning by an extension element, open door or flap, the component shall be closed and the test repeated. Also, the unit shall not tip over as the result of the force application.



All dimensions in millimetres

FIG. 26 EXAMPLES OF UNITS THAT ARE OR CAN BE ADJUSTED TO A HEIGHT OF 1 000 MM OR LESS

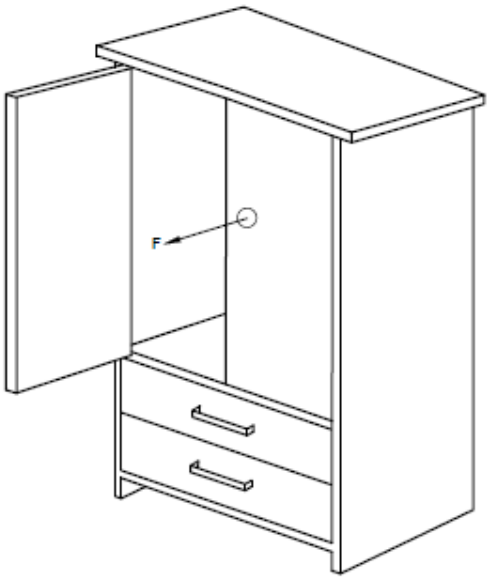


27A VERTICAL FORCE 50 mm FROM THE FRONT

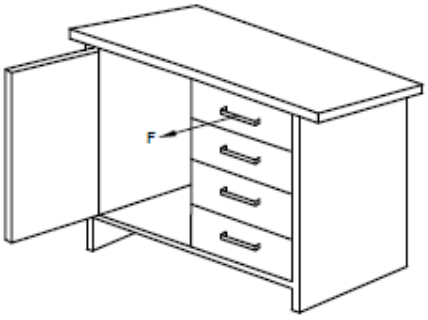
27B VERTICAL FORCE 50 mm FROM THE BACK

All dimensions in millimetres

FIG. 27 EXAMPLES OF UNITS THAT ARE OR CAN BE ADJUSTED TO A HEIGHT OF MORE THAN 1 000 MM



28A Horizontal Force Outwards From a Closed Door



28B Horizontal Force Outwards From a Top Drawer

Fig. 28 Examples of Units Opening Doors, Extension Element and Flaps, All Storage Units Unloaded

7.5.4 *Doors, Extension Elements and Flaps Opened and Unlocked*

7.5.4.1 *All storage areas unloaded and all doors, extension elements and flaps open*

All doors shall be opened to their maximum but not more than 90° and all extension elements shall be fully opened, except where there are no open stops, in which case they shall be opened to two thirds of the internal length. All flaps shall be fully opened (*see* Fig. 29). Interlock mechanisms shall not be overridden.

Record if the unit overturns or is supported by an open extension element, opened door or opened flap. Also, the unit shall not tip over as the result of the force application.

7.5.4.2 *All storage areas unloaded with overturning load*

Doors shall be opened to their maximum but not more than 90° and extension elements shall be fully opened, except where there are no open stops, in which case they shall be opened to two thirds of the internal length. Flaps shall be fully opened (*see* Fig. 30). Extension elements and flaps shall be opened across the full width of the unit. Only one extension element in each vertical line of extension elements shall be opened to produce the configuration most likely to cause overturning.

Apply the vertical force specified in Table 7 to any point likely to cause overturning, on the centreline of the front of an extension element or 50 mm from the outer edge of a door or flap.

Record if the unit overturns or is supported by an open extension element, opened door or opened flap. If, during testing, the unit is prevented from overturning by an extension element, open door or flap, the component shall be closed and the test repeated. Also, the unit shall not tip over as the result of force application.

7.5.4.3 *All storage areas loaded with overturning load*

All storage areas shall be loaded with the loads specified in Table 9. The total mass of the unit shall be the weight of the unloaded unit plus the load in the unit when loaded with the loads specified in Table 9.

Doors shall be opened to their maximum but not more than 90° and extension elements shall be fully opened, except where there are no open stops, in which case they shall be opened to two thirds of the internal length. Flaps shall be fully opened. Extension elements and flaps shall be opened across the full width of the unit. Only one extension element in each vertical line of extension elements shall be opened to produce the configuration most likely to cause overturning.

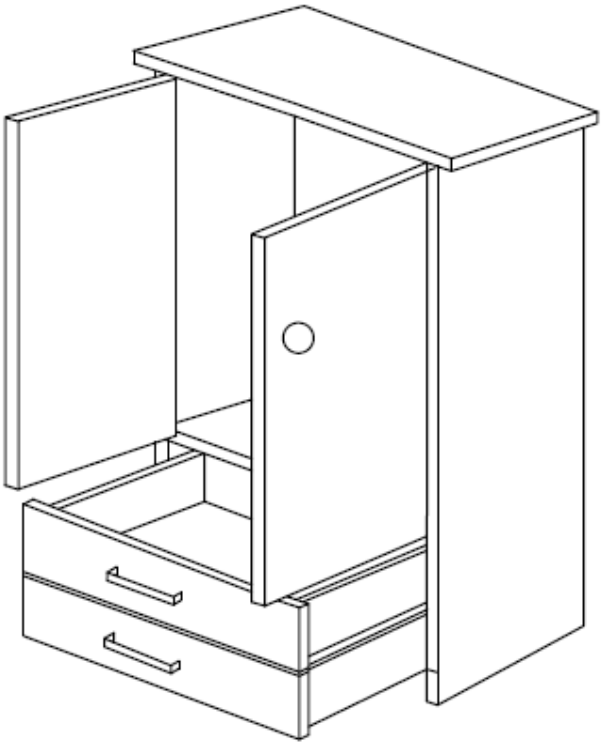
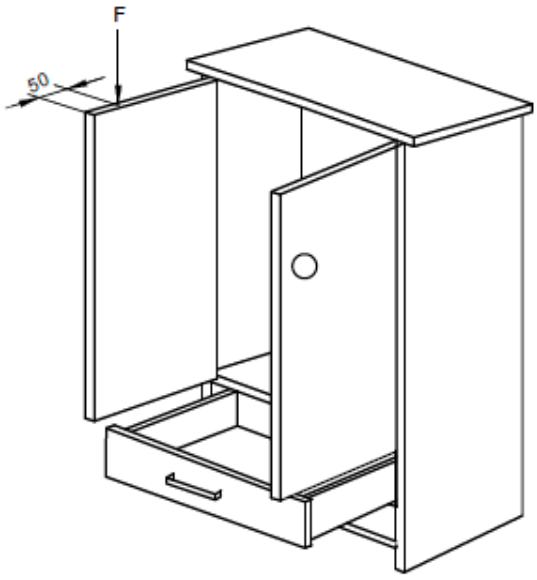
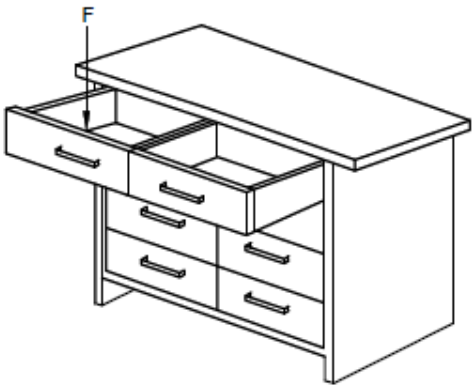


FIG. 29 EXAMPLE OF A UNIT WITH ALL STORAGE AREAS UNLOADED AND ALL DOORS, EXTENSION ELEMENTS AND FLAPS OPEN



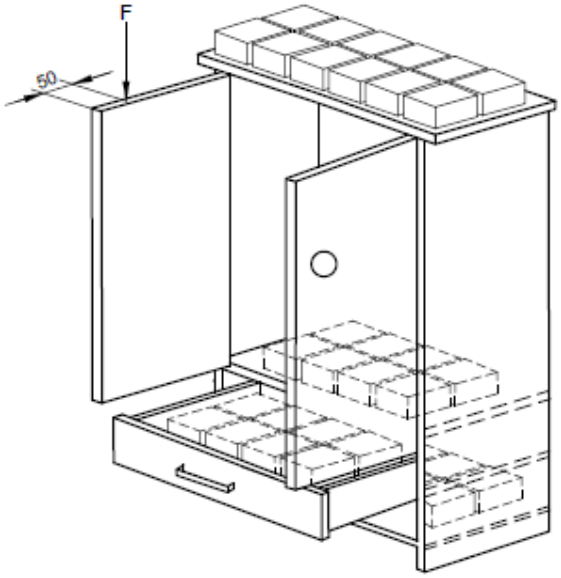
30A VERTICAL FORCE ACTING 50 mm FROM THE OUTER EDGE OF AN OPEN DOOR



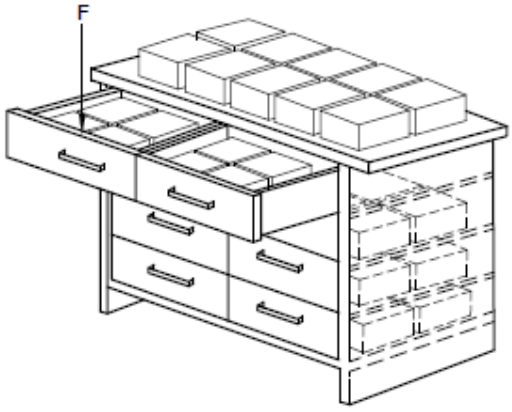
30B VERTICAL FORCE ACTING ON THE CENTRELINE OF THE FRONT OF AN EXTENSION ELEMENT

All dimensions in millimetres

FIG. 30 EXAMPLE OF UNITS, ALL STORAGE AREAS UNLOADED WITH OVERTURNING LOAD



31A Vertical Force Acting 50 mm from the Outer Edge of an Open Door



31B Vertical Force Acting on the Centreline of the Front of an Extension Element

All dimensions in millimetres

Fig. 31 Example of Units, All Storage Areas Loaded with Overturning Load

Apply a vertical force as specified in Table 7 to any point most likely to cause overturning, on the centreline of the front of an extension element or 50 mm from the outer edge of a door or flap (*see* Fig. 31).

Record if the unit overturns or is supported by an open extension element, opened door or opened flap. If, during testing, the unit is prevented from overturning by an extension element, open door or flap, the component shall be closed and the test repeated. Also, the unit shall not tip over as the result of the force application.

7.5.5 *Doors, Extension Elements and Flaps Closed and Locked, All Storage Units Loaded*

All storage areas shall be loaded with the loads specified in Table 9. When two or more doors can be locked, the test shall be carried out on one closed door with the other door opened to its maximum but not more than 90°. If doors and flaps provide access to other extension elements or flaps, these shall be opened when carrying out the test.

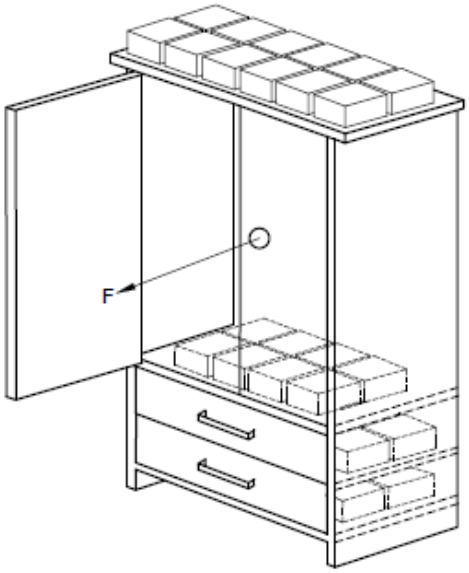
Apply the horizontal outwards force as specified in Table 7 in turn to all locked doors, extension elements and flaps (*see* Fig. 32). The force shall be applied to the centre of the handhold, handle, knob, etc in the direction of opening.

In case of no obvious handhold or if the handhold length covers the whole width or height of the door, apply the force at the most outward or upper position but not more than 1 300 mm above the floor.

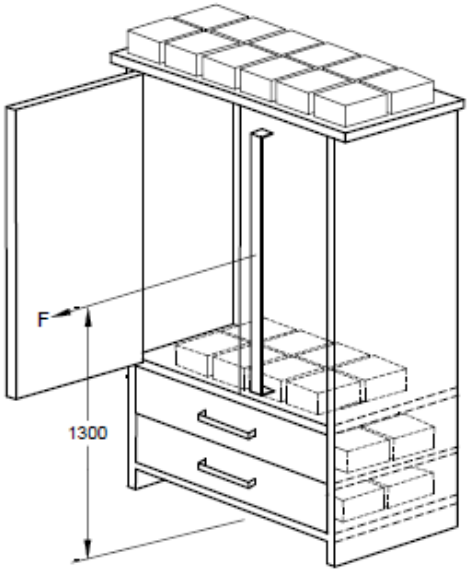
Record if the unit overturns or is supported by an open extension element, opened door or opened flap. If, during testing, the unit is prevented from overturning by an extension element, open door or flap, the component shall be closed and the test repeated. Also, the unit shall not tip over as the result of the force application.

7.5.6 *Vertical Force Stability Test for Storage Units*

This test is applicable to storage units that are taller than 1 000 mm. The unit shall be placed on a test surface/platform and levelled. The glides, feet, or castors shall be blocked or otherwise prevented from moving along the surface. The blocks shall not restrict the tilt of the product. If equipped with castors, each front castor shall be blocked with an obstruction or other restraining device 13 mm in height affixed to the test platform. The device shall prevent sliding but not restrict the unit from tipping. The castors shall be positioned in their least stable position. If so equipped, any doors in the storage unit shall be opened 90° to the face of the unit during this test. Pocket doors shall be extended and at 90° to the face of the unit.



32A Horizontal Force Outwards From the Locked Doors Handhold



32B Horizontal Force Outwards From the Locked Doors Handhold at 1 300 mm from the Floor

All dimensions in millimetres

Fig. 32 Example of Units with Doors, Extension Elements and Flaps Closed and Locked, all Storage Units Loaded

Suspend 22 kg load on a vertical line 190 mm in front of the outermost edge of the most forward protruding fixed shelf or top (*see* Fig. 33). The fixture used to apply the load shall be neutrally balanced so that it does not affect the stability of the unit (that is, the centre of gravity of the fixture should be vertically aligned with the pivot point of the unit). *See* Annex C, examples of load application devices. Also, the unit shall not tip over as the result of the force application.

7.5.7 *Stability Test for Pedestals/Storage Units with Seat Surfaces*

The purpose of this test is to determine the stability of pedestal/storage units that are also equipped for use as seats (such as those with cushioned or contoured top surfaces). This test only applies to units less than 965 mm in height as measured from the floor to the top of the seating surface.

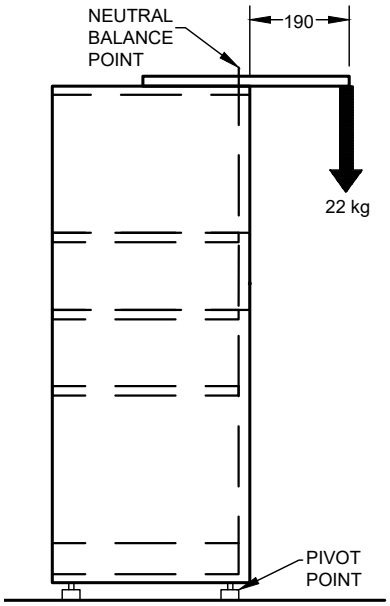
The unit shall be placed on a test surface/platform and levelled. If the storage unit is equipped with glides, extend them to their midpoint but not to exceed 13 mm from the fully retracted position. All extendible elements and horizontal surfaces shall be unloaded. All doors and extendible elements shall be closed. If equipped with castors, each front castor shall be blocked with an obstruction or other restraining device 13 mm in height affixed to the test platform. The device shall prevent sliding but not restrict the unit from tipping. If equipped with castors, they shall be positioned in their least stable position. Determine the centre line of the front, back and one of the side edges. Place the centre of a 200 mm diameter disk at a point 60 mm in from the edge of the seat structure at one of the positions determined above.

Apply a vertical load of 600 N, to the disk. Apply a horizontal force to the unit in the plane of the bottom of the disk in the direction most likely to overturn the unit. The loads shall be applied at the centre line of the front and back edges and centre line of one of the sides [*see* Fig. 34A and 34B]. Gradually increase the force until 20 N is attained.

Repeat steps at each of the two remaining positions. Also, the unit shall not tip over as the result of the force application.

7.5.8 *Dynamic Stability Test for Units with Castors*

Apply the load to the applicable elements (except the unit top) as specified in Table 9, utilising glass marbles



All dimensions in millimetres

FIG. 33 VERTICAL FORCE STABILITY TEST FOR STORAGE UNITS

in a suitable bag. All doors, extension elements and flaps shall be closed. Any locking castor shall be unlocked.

Place the storage unit on the test floor with a stop. If the unit has a handle for moving the unit then the unit shall be placed such that the handle is parallel to the stop and is the furthest edge from the stop. If the unit has no handles and has doors or extension elements, the unit shall, wherever possible, be positioned such that the front of the doors, or extension elements, are perpendicular to the stop.

The storage unit shall travel at a velocity, *v*, of 0.5 m/s towards a stop. The means of moving the unit shall be removed (50 ± 5) mm before the stop and the unit shall be allowed to strike a stop (*see* Fig. 35)

The unit shall not overturn or tip over as the result of the force application.

7.5.9 *Strength Test for Wall Attachments*

This test is applicable to safety devices intended to prevent the overturning of an unloaded storage furniture. Apply the horizontal outwards force specified in Table 7 in the direction most likely to cause the unit to overturn (*see* Fig. 36). The force shall be maintained for not less than 10 s and not more than 15 s.

The unit shall not overturn and not get detached as the result of the force application.

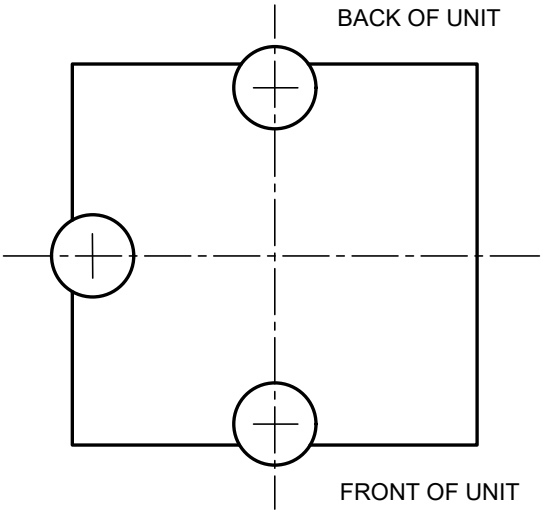
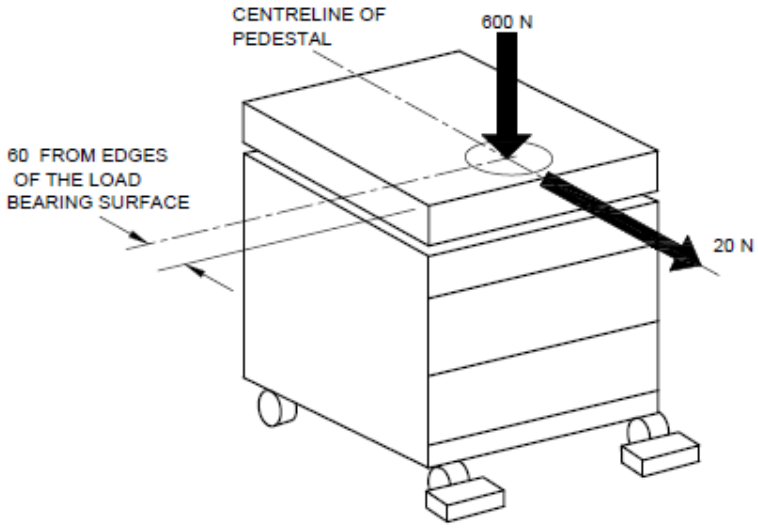


FIG. 34A TOP VIEW



34B ISOMETRIC VIEW

All dimensions in millimetres

FIG. 34 STABILITY TEST FOR PEDESTALS/STORAGE UNITS WITH SEAT SURFACES

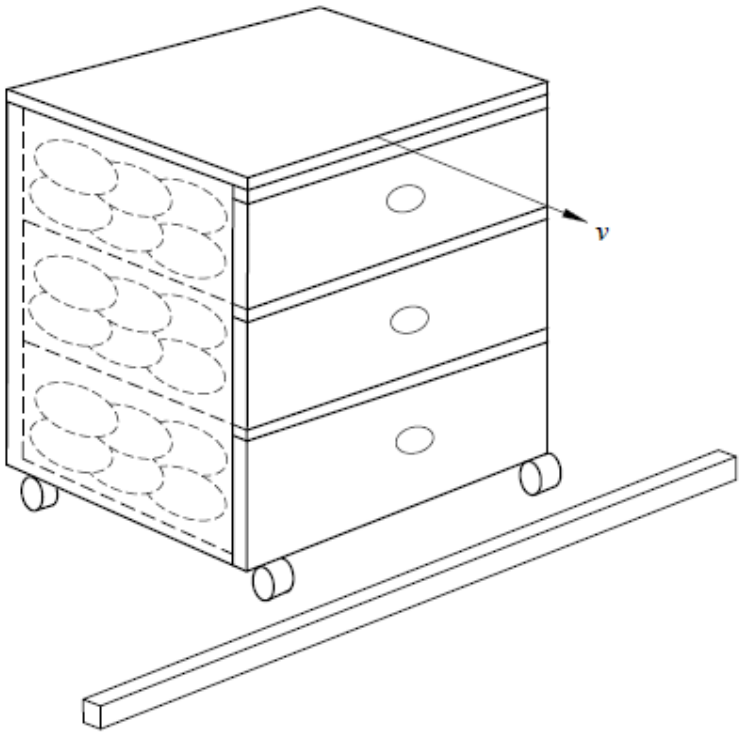


FIG. 35 EXAMPLE OF UNIT WITH CASTORS FOR DYNAMIC STABILITY TEST

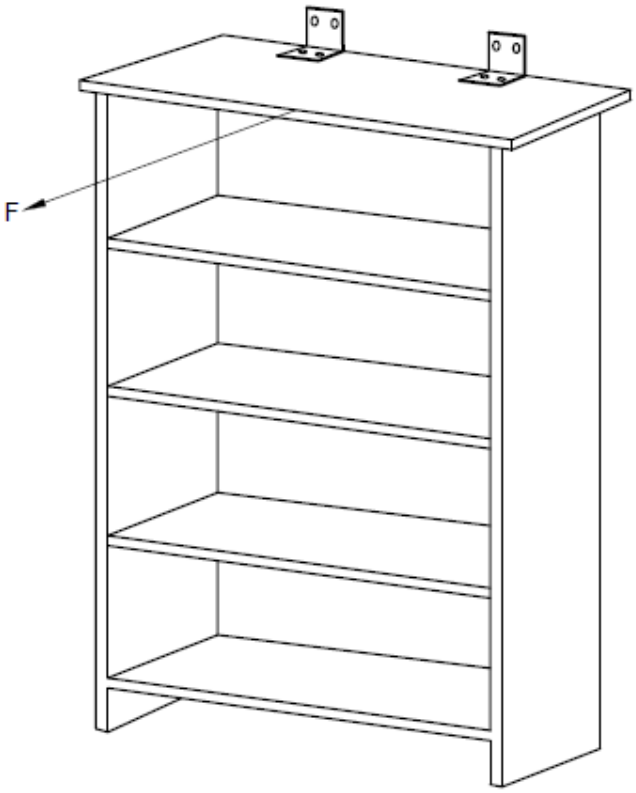


FIG. 36 EXAMPLE OF A UNIT FOR STRENGTH TEST FOR WALL

Table 3 Strength Tests — Test Loads and Forces

(*Clauses* 7.2.1.2, 7.2.1.3, 7.2.2.1, 7.2.2.2, 7.2.3.1, 7.2.3.2, 7.2.4.1, 7.2.4.2, 7.3.1.2.1, 7.3.1.2.1, 7.3.1.2.2, 7.3.1.3, 7.3.2.2, 7.3.3.1, 7.3.3.3, 7.3.4.1, 7.3.4.2, 7.3.5.3, 7.3.5.5, 7.3.5.6, 7.3.6.2, 7.3.6.3, 7.3.8, 7.3.9, 7.3.10, 7.4.1.3, 7.4.1.4 *and* 7.4.2)

Sl No.	Test	Test Load/Force Unit	Test loads and forces		
			Level 1	Level 2	Level 3
(1)	(2)	(3)	(4)	(5)	(6)
i)	Deflection of shelve	kg/m^2	100	150	200
ii)	Strength of shelf supports (*see* Table 6)	kg	1.1	1.7	2.5
iii)	Sustained load test for tops and bottoms	kg/m^2	100	150	200
iv)	Static load test for tops and bottoms to tops which are ≤ 1 000 mm from the floor and to bottoms where the clear height (*see* **3.2**) is ≥ 1 600 mm.	N	600	750	1 000
v)	Strength of clothes-rail supports	kg/m	20	30	30
vi)	Dislodgement of clothes rails	kg/m	20	30	30
vii)	Test for structure and underframe	N	200	300	450
viii)	Drop test	mm	—	50	100
ix)	Vertical load on pivoted doors up to 900 mm ht	kg	4	4	10
x)	Vertical load on pivoted doors above 900 mm ht	kg	10	10	20
xi)	Horizontal load on pivoted doors	N	50	60	70
xii)	Slam-shut test of pivoted doors	m_2, kg	2	3	4
xiii)	Durability of pivoted doors for door height up to 900 mm	m, kg	No Mass	No Mass	No Mass
xiv)	Durability of pivoted doors for doors height from 900 mm to 1 500 mm	m, kg	0.5	0.5	0.5
xv)	Durability of pivoted doors for doors above 1 500 mm height	m, kg	1	1	1
xvi)	Slam shut/open test of sliding doors and horizontal roll-fronts	m_2, kg	2	3	4
xvii)	Strength of bottom-hinged flaps	N	150	200	250
xviii)	Drop test for top-hinged flaps	Cycles	125	250	500
xix)	Slam shut/open test of vertical roll-fronts (only for roll-fronts not falling under own weight)	$m_{2,}$ kg	2	3	4
xx)	Strength of extension elements	N	100	200	300
xxi)	Slam shut/open test of extension elements (velocity of calibration extension element in) m/s	5kg	1.1	1.3	1.4
		35 kg	0.8	1	1.1
		factor ***K***	1.6	2.5	2.9
xxii)	Displacement of extension element bottoms	N	40	60	70
xxiii)	Interlock test	N	200	200	200
xxiv)	Strength test for locking and latching mechanisms for extension elements, and locking and latching mechanisms for doors, flaps and roll-fronts	N	200	200	200
xxv)	Top load ease cycle test	kg	NA	91	91
xxvi)	Durability test for units with seating surfaces — Cyclic impact	kg	57	57	57
xxvii)	Drop test — Dynamic for units with seat surfaces	kg	91	91	91
xxviii)	Sustained load test (overload)	kg/m^2	100	100	150
xxix)	Dislodgement test	N	Not applicable	100	200
xxx)	Units supported by the floor	N	200	200	200

Table 4 Durability Tests – Test Cycles

(*Clauses* 7.2.4.3, 7.3.1.4, 7.3.2.3, 7.3.3.2, 7.3.4.2, 7.3.5.3, 7.3.6.4, 7.3.8 *and* 7.3.9)

Sl No.	Clause/Test	Test cycles		
		Level 1	Level 2	Level 3
(1)	(2)	(3)	(4)	(5)
i)	Tests for units with castors or wheels (Unloaded unit weight ≤ 45 kg)	500 (Over obstructions)	1 000 (Over obstructions)	2 500 (Over obstructions)
ii)	Tests for units with castors or wheels (Unloaded unit weight > 45 kg)	NA (Over obstructions) 1 000 (over Flat)	100 (Over obstructions) 1 000 (over Flat)	100 (Over obstructions) 1 000 (over Flat)
iii)	Durability of pivoted doors	20 000	40 000	80 000
iv)	Durability of sliding doors and horizontal roll-fronts	10 000	20 000	40 000
v)	Durability of flaps	5 000	10 000	20 000
vi)	Durability of vertical roll-fronts	5 000	10 000	20 000
vii)	Durability of extension elements	20 000	40 000	80 000
viii)	Durability test of locking and latching mechanisms	2 500	5 000	10 000
ix)	Top load ease cycle test	NA	10 000	10 000
x)	Durability test for units with seating surfaces – Cyclic impact	7 500	7 500	7 500

Table 5 Loads in Storage Components for Tests

(*Clauses* 7.3.1.1, 7.3.5.3, 7.3.5.4, 7.3.7, 7.3.8, 7.5.4.3, 7.5.5 *and* 7.5.8)

Sl No.	Component	Test Loads Unit	Test load		
			Level 1	Level 2	Level 3
(1)	(2)	(3)	(4)	(5)	(6)
i)	Door baskets	kg/m^2	100	150	200
ii)	Extension elements [a]	kg/m^3	200	350	500
iii)	Suspended pocket files	kg/m length	20	30	40

[a] The volume of extension elements is calculated from the internal depth x internal width x internal clear height (height from drawer bottom not exceeding 300 mm).

Table 6 Impact Plates for Testing Strength of Shelf Supports

(*Table* 2 *and* B-10)

Sl No.	Plate Parameter	Parameter Unit	Test Mass		
			Plate no. 1 (Level 1)	Plate no. 2 (Level 2)	Plate no. 3 (Level 3)
(1)	(2)	(3)	(4)	(5)	(6)
i)	Mass (excluding rubber)	kg	1.1	1.7	2.5
ii)	Approximate width	mm	70	109	160
iii)	Approximate thickness	mm	10	10	10
iv)	Length	mm	200	200	200

[a] The impact plates shall be faced with a 3 mm thick layer of rubber with a hardness of (85 ± 10) IRHD according to IS 3400 (Part 2).

Table 7 Forces for Stability Tests for Storage Units

(*Clauses* 7.5.2.1, 7.5.2.2, 7.5.3, 7.5.4.1, 7.5.4.2, 7.5.4.3, 7.5.5, 7.5.6, 7.5.7, 7.5.8 *and* 7.5.9)

Sl No.	Test	Loading	Force		
			Level 1	Level 2	Level 3
(1)	(2)	(3)	(4)	(5)	(6)
i)	Doors, extension elements and flaps closed, all storage units unloaded - Units that are or can be adjusted to a height of 1 000 mm or less	Vertical force, N	750	750	750
ii)	Doors, extension elements and flaps closed, all storage units unloaded - Units that are or can be adjusted to a height of more than 1 000 mm	Outward force, N	50	50	50
iii)	Opening doors, extension elements and flaps, all storage units unloaded	NA	NA	NA	NA
iv)	All storage areas unloaded and all doors, extension elements and flaps open	NA	NA	NA	NA
v)	All storage areas unloaded with overturning load	Vertical force, N			
		Components [a] <1 000 mm from the floor	75	75	75
		Components [a] ≥ 1 000 mm and < 1 600 mm from the floor	150	150	150
		Components [a] ≥ 1 600 mm from the floor	100	100	100
vi)	All storage areas loaded with overturning load	Vertical force, N			
		Components [a] < 1 000 mm from the floor	20 percent of total mass of the unit but not greater than 200 N	20 percent of total mass of the unit but not greater than 200 N	30 percent of total mass of the unit but not greater than 200 N
		Components [a] ≥ 1 000 mm and < 1 600 mm from the floor	20 percent of total mass of the unit but not greater than 300 N	20 percent of total mass of the unit but not greater than 300 N	30 percent of total mass of the unit but not greater than 300 N
		Components [a] ≥ 1 600 mm from the floor	20 percent of total mass of the unit but not greater than 200 N	20 percent of total mass of the unit but not greater than 200 N	30 percent of total mass of the unit but not greater than 200 N
vii)	Doors, extension elements and flaps closed and locked	Outward force, N	100	100	100
viii)	Vertical force stability test for storage units	mass, kg	22	22	22
ix)	Stability test for pedestals/ storage units with seat surfaces	Vertical force, N	600	600	600
		Outward horizontal force, N	20	20	20
x)	Dynamic stability test for units with castors	NA	NA	NA	NA
xi)	Strength test for wall attachments	Outward force, N	300	300	300

[a] Determined as the vertical distance between the floor and where to apply the force to the component.

8 SAMPLING AND CRITERIA OF CONFORMITY

8.1 All storages units of same model/design and manufactured from same raw materials offered for inspection shall constitute a lot.

NOTE — Products made in different colours are considered to be the same lot.

8.2 The required number of tables shall be selected at random and depend upon the size of the lot.

8.3 The sample selected as per **8.2** shall be subjected to the tests as per **6** and **7** as applicable. The lot shall be declared as conforming to the requirements of this standard, if the sample meets the requirements of all the tests mentioned therein.

8.4 The criteria of the conformity for the tests as per **6** shall be same as specified therein. However, for the tests as per **7**, the criteria of conformity shall be as follows:

a) The fracture of any component or joint;
b) The loosening of any joint intended to be rigid, which can be demonstrated by hand pressure;
c) The deformation or wear of any part or component such that its functioning is impaired;
d) The loosening of any means of fixing components to the unit;
e) Any impaired function of unit, component or part; and
f) Any additional acceptance level, for deflection, pull force etc, specified against each test.

9 MARKING

9.1 Each storage unit shall be indelibly and legibly marked with the following particulars:

a) Manufacturer's name, brand name or his recognized trade mark, if any;
b) Date of manufacture;
c) Design/Model Number (as declared by the manufacturer); and
d) Batch/lot number.

9.2 Each storage unit meant to be assembled by the customer shall have the instruction for assembly provided as a leaflet and/or available in digital document file.

9.3 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

ANNEX A

(*Clause* 7.1)

GENERAL TEST CONDITIONS

A-1 PRELIMINARY PREPARATION

The furniture unit shall be tested as delivered or the unit shall be assembled and/or confirmed according to the instructions supplied with it. The most adverse configuration intended for use shall be used for each test. If mounting or assembly instructions are not supplied, the assembly method shall be recorded in the test report. Fittings shall be tightened before testing and shall not be retightened unless specifically required by the manufacturer.

For furniture that includes hygroscopic materials, at least one week in normal indoor conditions shall have elapsed between manufacturing (or assembly) and testing.

Except for the test for deflection of shelves (*see* below), the tests shall be carried out in indoor ambient conditions at a temperature between 15 °C and 35 °C. The test for deflection of shelves, except metal, stone and glass shelves, shall be carried out at a relative humidity (RH) of 65 ± 5 percent.

NOTE — Before testing, parts made of timber products shall be checked with an electric moisture meter to determine whether the moisture content is between 8 percent and 12 percent. If the moisture is outside this range the sample shall be allowed to stand in a warm ventilated room until the moisture content is between 8 percent and 12 percent.

Before beginning the testing, visually inspect the unit thoroughly. Record any defects so that they are not assumed to have been caused by the tests. During testing, the unit shall be placed on the floor and levelled, unless otherwise specified.

A-2 APPLICATION OF FORCES

The test forces in the static load tests shall be applied slowly enough to ensure that negligible dynamic force is applied. Unless otherwise indicated, each force shall be maintained for (20 ± 10) s.

The test forces in durability tests shall be applied at a rate such that excessive heating does not occur. Unless otherwise specified, each test force shall be maintained for (2 ± 1) s.

The forces may be replaced by masses. The relationship 10 N = 1 kg shall be used.

A-3 TOLERANCES

The following tolerances are applicable:

a) Forces : ± 5 percent of the nominal force;

b) Velocity : ± 5 percent of the nominal velocity;

c) Masses : ± 1 percent of the nominal mass;

d) Dimensions : ± 1 mm of the nominal dimension; and

e) Angles : ± 2° of the nominal angle.

The accuracy for the position of loading pads and impactor shall be ± 5 mm.

A-4 SEQUENCE OF TESTING

All applicable tests as mentioned in **7** shall be carried out on the same sample and in the sequence as the clauses are numbered in the standard. All tests specified for a particular component shall be carried out on the same sample.

More than one product may be tested for different tests to cover a product from a worst-case condition standpoint. In such a case tests specified for a particular component shall be carried out on the same sample and shall be declared the manufacturer.

A-5 PREVENTION OF MOVEMENT DURING TEST

If a freestanding unit tends to overbalance during the tests specified in Clauses **6** and **7**, load the bottom unit until this tendency stops, unless otherwise specified.

If a freestanding unit tends to slide during the tests specified in **6** and **7**, with the exception of **7.2.4.2** and **7.2.4.3**, the unit shall be restrained by stops (*see* **B-4**).

A-6 LOAD ON PARTS NOT SUBJECT TO TESTING

All storage components, other than the parts being tested for strength and durability, shall be uniformly loaded according to Table 8; for stability tests use loads as mentioned in Table 9.

Table 8 Load on Applied to Parts other than the Part Being Tested for Determination of Strength and Durability

(*Clauses* 7.2.4.1, 7.4.1.2, 7.4.1.3 *and* A-6)

Sl No	Part	Load [a]
(1)	(2)	(3)
i)	Horizontal surfaces, shelves, door baskets, etc.	65 kg/m^2
ii)	Extension elements	200 kg/m^3
iii)	Suspended pocket files	15 kg/m [a]
iv)	Clothes rails	20 kg/m

[a] Measured perpendicular to the plane of the filing pockets.

Table 9 Loads for Stability Testing

(*Clauses* 7.5.4.3, 7.5.8 *and* A-6)

Sl No.	Component	Load
(1)	(2)	(3)
i)	All horizontal storage areas, including shelves, bottoms, tops and flaps	32.5 kg/m^2
ii)	Extension elements, trays and baskets with clear height (**3.7**), H, ≤ 0.1 m	200 kg/m^3
iii)	Extension elements, trays and baskets with clear height (**3.7**), H, between 0.1 m and 0.25 m (H in m)	(266.7 – 66.7 H) kg/m^3
iv)	Extension elements, trays and baskets with clear height (**3.7**), H, ≥ 0.25 m	100 kg/m^3
v)	Hanging rails	20 kg/m
vi)	Suspended filing pockets	12.5 kg/m

ANNEX B

(*Clause* 7.1)

TEST APPARATUS

B-1 GENERAL

The equipment shall not inhibit deformation of the unit/component, that is, it shall be able to move so that it can follow the deformation of the unit/component during testing, so that the loads are always applied at the specified points and in the specified directions.

All loading pads shall be capable of pivoting in relation to the direction of the applied force. The pivot point shall be as close as practically possible to the load surface.

B-2 FLOOR SURFACE

A horizontal, rigid and flat surface. For the strength test of the structure and underframe (**7.2.4.1**), the surface shall be a smooth decorative thermosetting synthetic resin bonded laminated sheet.

For the drop test (**7.2.4.2**), the floor shall be faced with a 3 mm thick layer of rubber with a hardness of (85 ± 10) IRHD, according to IS 3400 (Part 2).

B-3 WALL SURFACE

A vertical, rigid and flat surface.

B-4 STOPS

Devices to prevent the article from sliding but not tilting. They should not be higher than 12 mm, except in cases where the design of the unit necessitates the use of higher stops, in which case the lowest stop that will prevent the item from moving shall be used.

B-5 LOADING PAD

Unless otherwise specified, use rigid disc 100 mm in diameter (or 50 mm if it is to be used in a limited space), with a flat face and a 12 mm front edge bend radius.

B-6 TEST APPARATUS

Apparatus for slam shut/open of extension elements, two apparatuses as well as calibration. Instructions are given in Annex C.

B-7 MASSES

Masses shall be designed so that they do not reinforce the structure or re-distribute the stresses. Material of any density that meets the weight requirements of the test may be used.

(Examples: concrete bricks, shot bags, metal plates, sand bags, typical bond copier paper, etc).

B-8 GLASS MARBLES

Glass marbles shall be of solid glass with 10 mm to 15 mm diameter. They shall be in a flexible bag large enough to allow them to move in the bag during the test.

B-9 LOADS FOR FILING POCKETS

Suspended filing pockets shall be loaded with typing paper or an equivalent alternative as shown in Fig. 19.

B-10 STEEL IMPACT PLATES

Steel plates, 200 mm in length, with one surface faced with a 3 mm thick layer of rubber with a hardness of

(85 ± 10) IRHD, according to IS 3400 (Part 2). A range of steel plates is given in Table 6.

B-11 IMPACT BAG

Bag to contain a sufficient quantity of media to bring the bag to the specified load. Media may be shot, slugs, punches, etc. Media may be contained within smaller individual bags/compartments. Media may not be a singular solid material (for example, single steel or concrete mass). Construction is as described in Fig. 41.

ANNEX C

(*Clauses* 7.3.5.4, 7.3.9, 7.3.10 *and Annex* B)

TEST APPARATUS FOR SLAM-SHUT/OPEN TEST OF EXTENSION ELEMENTS

C-1 PRINCIPLE

Lightweight (empty) extension elements are slammed at consistently higher speeds than heavy (full) extension elements, but friction does not significantly affect the slamming speed.

Standard “empty” (5 kg) and “full” (35 kg) extension elements with minimal friction are used to simulate these conditions. Using this reference, extension elements, the speed of the extension element slamming apparatus is adjusted to the slamming velocities specified.

C-2 TEST APPARATUS

The following two types of apparatus are recommended for the slam shut/open test of extension elements.

C-2.1 Pneumatic Slamming Apparatus

Consisting of a pneumatically actuated low-friction piston/cylinder with a means of regulating the pressure of air supplied from a reservoir.

The airflow between the piston/cylinder and the reservoir is controlled by an air-operated valve which allows the air stored in the reservoir to be connected to the piston/cylinder rapidly, when the control valve is operated.

The rate of flow is controlled by the incorporation of connecting tubing of appropriate internal diameters and lengths (*see* Fig. 37).

C-2.2 Slamming Apparatus with Weight and String or Cord

The extension element shall be shut/opened by a hanging weight of mass *m* that is attached to the extension element by means of a string or cord. The force exerted by the weight is removed 10 mm before the extension element reaches its end stops. The movement is started 300 mm from the fully opened position (*see* Fig. 38).

C-3 CALIBRATION

C-3.1 Pneumatic Slamming Apparatus

Using two reference extension elements, having masses of 5 kg and 35 kg, respectively and exhibiting a total frictional force in the runners of not greater than 10 N, calibrate the apparatus to produce the closing and opening velocities specified in Table 3. This can be achieved by adjusting the pressure to produce the calibration velocity for the reference extension element of 35 kg. Then the tube length from the pressure regulator (*see* Fig. 37) is adjusted to produce the calibration velocity for the reference extension element of 5 kg.

C-3.2 Slamming Apparatus with Weight and String

The hanging-weight mass, m, is calculated by using the following formula:

$$m = K \cdot \sqrt[3]{M}$$

where

M = total mass of the extension element; and

K = specified in Table 3.

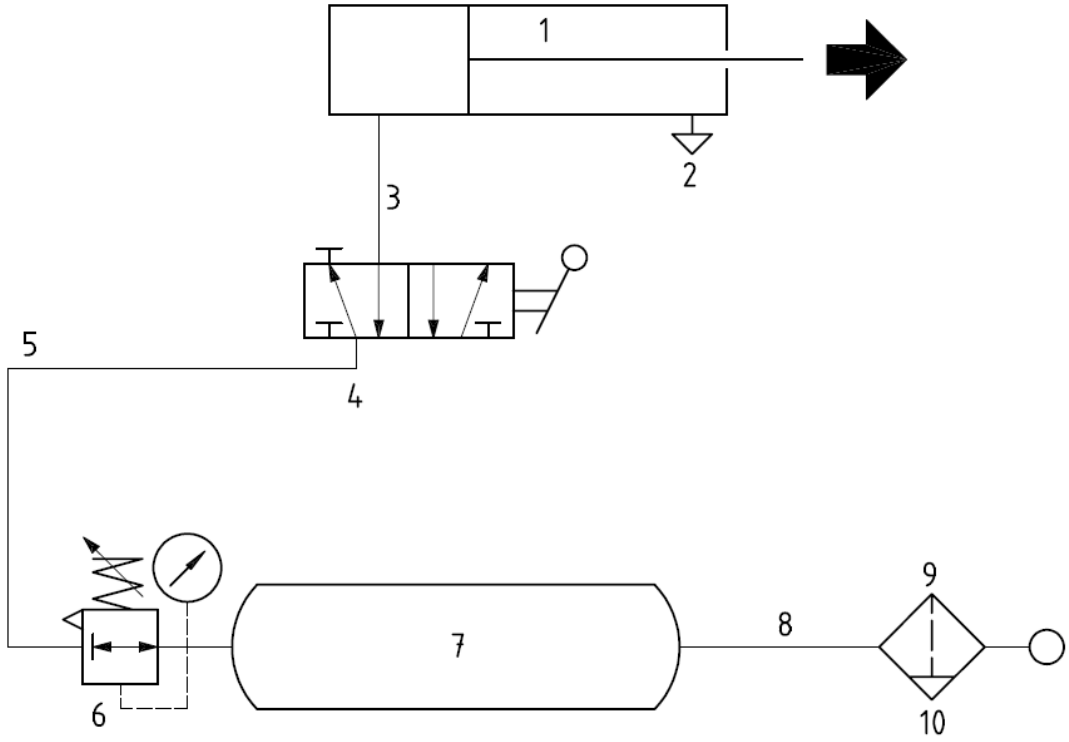
Using the values for K given in Table 3, the slam velocities after a travel distance of 300 mm will be equal to the slam velocities exerted by the pneumatic slamming apparatus.

C-4 PROCEDURE

C-4.1 Slam-shut Test

Open the extension element to a maximum of 300 mm or to a point at which one third of the inside length (depth) of the extension element or at least 100 mm, remains in the furniture (*see* Fig. 39).

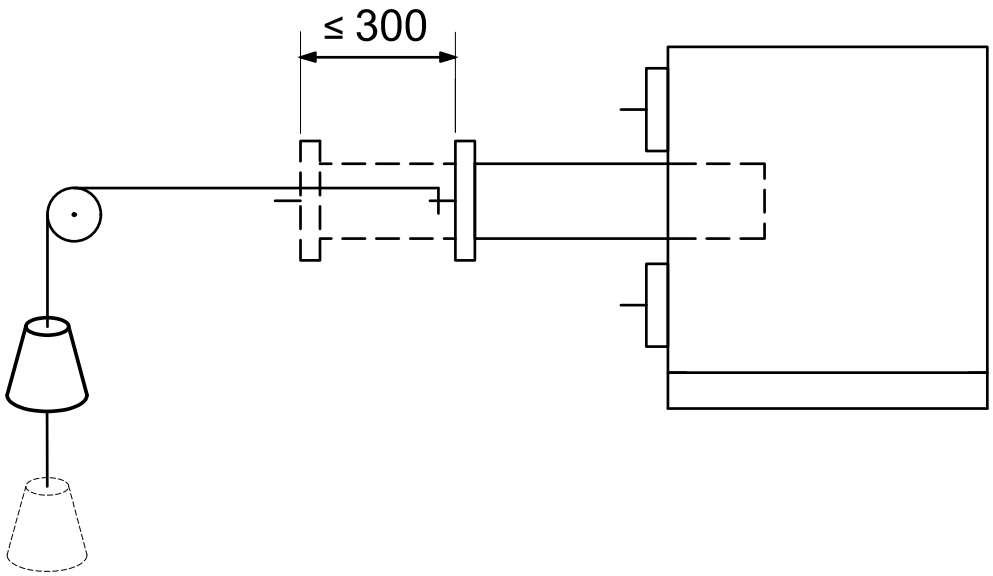
Slam shut the extension element from that position.



Key

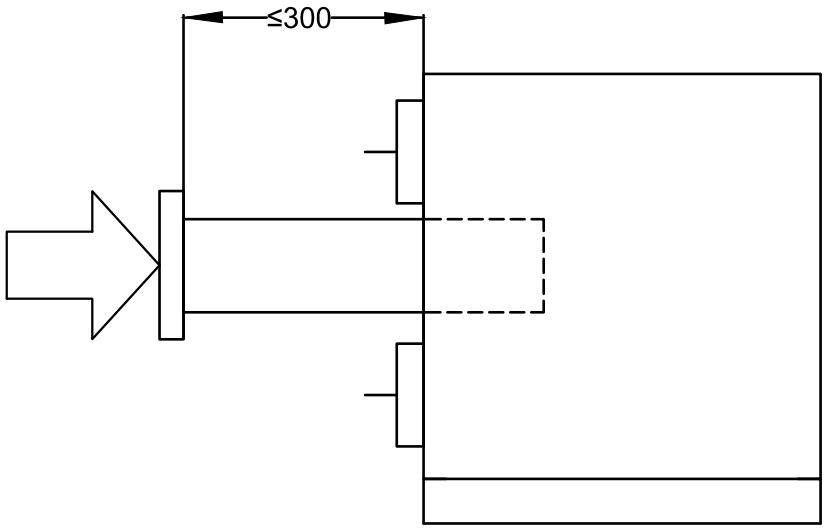
1 Cylinder φ 40 mm, stroke ≤ 300 mm
2 Free outlet
3 Valve to be mounted directly on cylinder
4 Valve Nominal air flow > 900 l/min.
5 Tube length 720 mm, internal diameter 6
6 Pressure regulator. Nominal air flow > 900 l/min.
7 Air reservoir (φ = 70 mm, L = 350 mm, V = 1545.6 cm^3)
8 Tube length 1 040 mm, internal diameter 3
9 Air cleaner
10 Primary pressure 6 bar

FIG. 37 ILLUSTRATION OF CIRCUIT DIAGRAM FOR PNEUMATIC DRAWER-SLAMMING APPARATUS



All dimensions in millimetres

FIG. 38 SLAM-OPEN TEST OF EXTENSION ELEMENT



All dimensions in millimetres

FIG. 39 SLAM-SHUT TEST OF EXTENSION ELEMENT

C-4.2 Slam-open Test

This test only applies to extension elements with end stops in the open position.

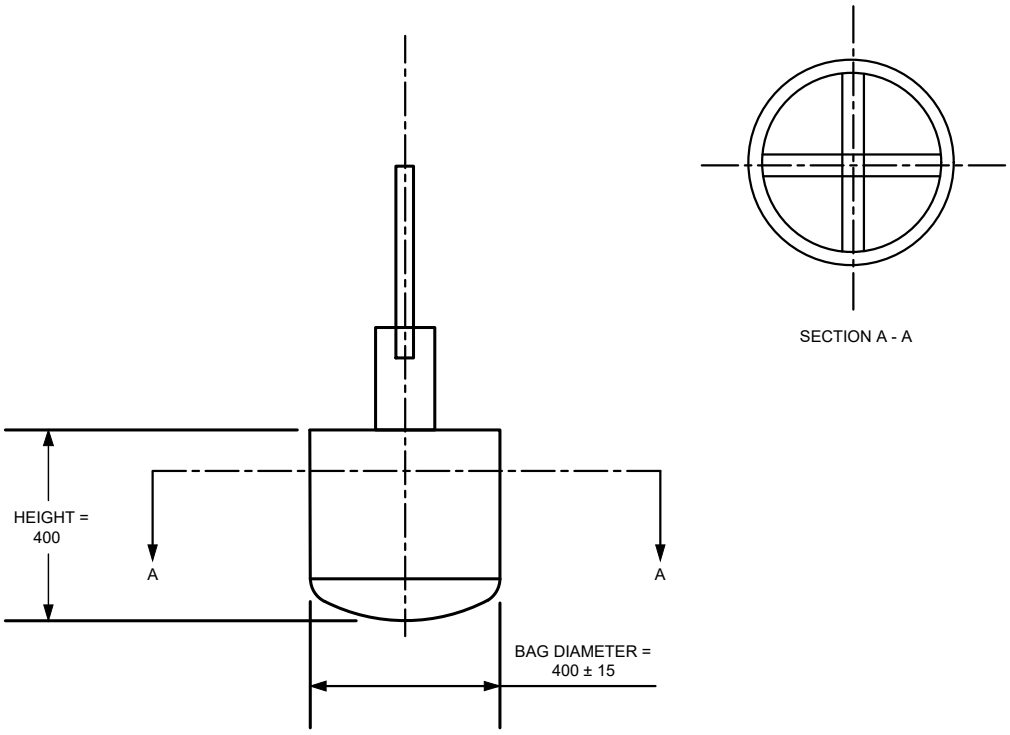
Close the extension element to 300 mm before the fully open position is reached, or close it completely, if the travel length of the extension element is less than 300 mm (*see* Fig. 38).

Slam open the extension element from that position.

C-4 IMPACT BAG

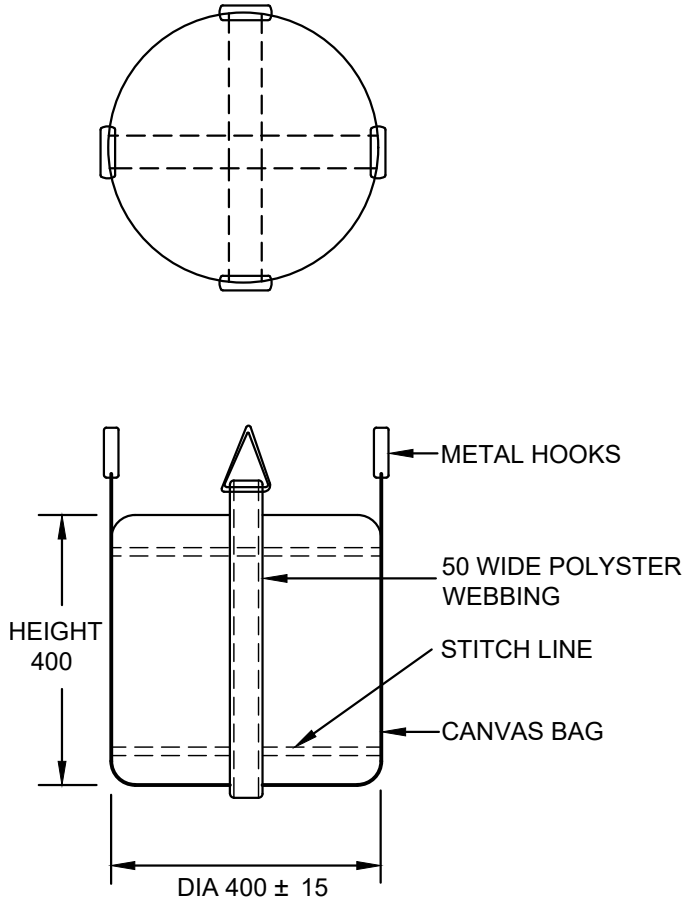
Bag to contain a sufficient quantity of media to bring the bag to the specified load. Media may be shot, slugs, punches, etc. Media may be contained within smaller individual bags/compartments. Media may not be a singular solid material (for example, single steel or concrete mass) *see* Fig. 40 and 41.

NOTE — For health and environmental reasons, lead shot is not recommended. Other fixtures or media are acceptable if they provide an equivalent impact.



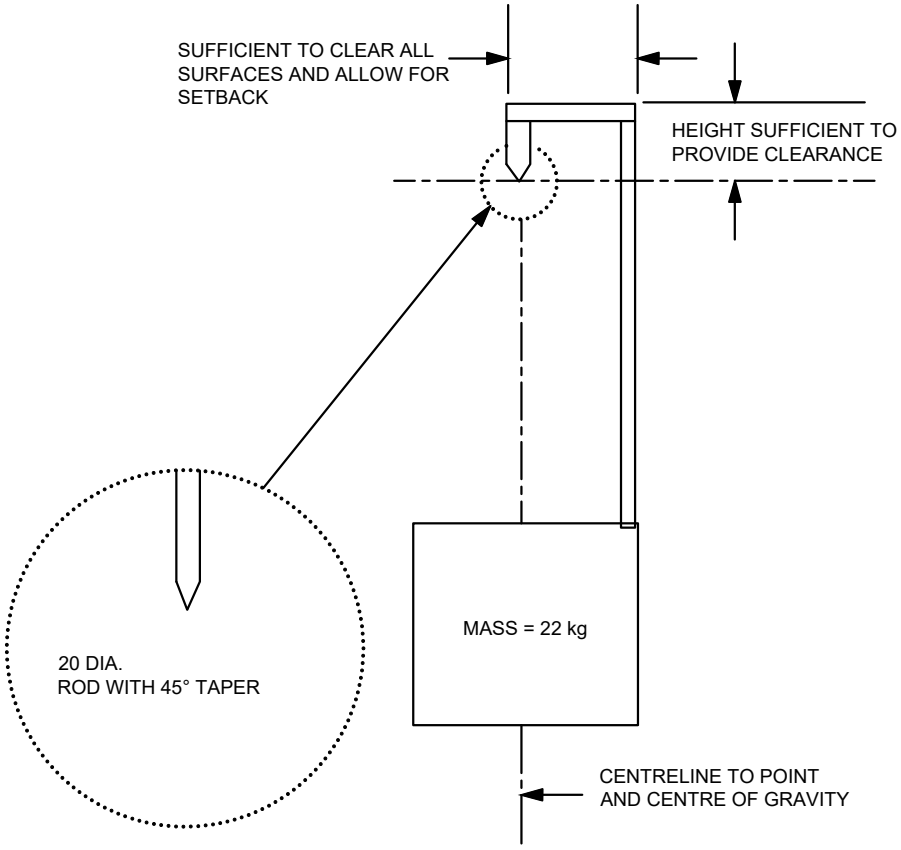
All dimensions in millimetres

FIG. 40 ILLUSTRATION OF IMPACT BAG



All dimensions in millimetres

FIG. 41 DETAILS OF IMPACT BAG



All dimensions in millimetres

FIG. 42 VERTICAL FORCE STABILITY LOADING FIXTURE

ANNEX D

(*Foreword*)

COMMITTEE COMPOSITION

Furniture Sectional Committee, CED 35

Organization	*Representative(s)*
In Personal Capacity (*II A, K-11, Ground Floor, Kailash Colony, New Delhi 110048*)	Shri Balbir Verma (***Chairman***)
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The Indian Institute of Architects, Mumbai	Ar Vikramray Pramodray Pandya

Organization	*Representative(s)*
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In Personal Capacity (*Pratap Nursery Lane, Near Gurudwara Sahib, Panditwari, Dehradun*)	Shri K. S. Pruthi
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