भारतीय मानक

Indian Standard

IS 18297 : 2023

कैबिनेट कब्ज़े — विशिष्टि

Cabinet Hinges — Specification

ICS 91.190

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

June 2023 **Price Group 8**

Builder's Hardware Sectional Committee, CED 15

FOREWORD

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

A cabinet hinge is a type of hardware used to attach doors to the cabinet frame. It allows the door to swing open and close, while also providing support for the weight of the door. These cabinet hinges have advantage over other hinges due to its capability to serve most of the requirement of cabinet and are mostly installed as concealed. These hinges are typically made of metal and can be installed using basic tools.

Cabinet hinges are widely used in the country in both residential and commercial infrastructure. They are used as component of any cabinets, whether it's a kitchen cabinet, wardrobe, or office cabinet. The use of cabinet hinges in India has increased over the years, especially with the growing demand for modular kitchens and furniture.

In the preparation of this standard, assistance has been derived from EN 15570 : 2008 ‘Hardware for furniture — Strength and durability of hinges and their components — Hinges pivoting on a vertical axis’.

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

This standard contributes to the Sustainable Development Goal 9 ‘Industry innovation and infrastructure : Build resilient infrastructure promote inclusive and sustainable industrialization and foster’.

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 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. 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

CABINET HINGES — SPECIFICATION

1 SCOPE

This standard lays down the requirements for materials, type, dimensions, finish and functional performance of cabinet hinges.

2 REFERENCES

The standards given 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 these standards.

IS No.	*Title*
IS 2380	Methods of test for wood particle boards and boards from other lignocellulosic materials:
(Part 3) : 1977	Determination of moisture content and density
(Part 14) : 1977	Screw and nail withdrawal test
IS 4905 : 2015/ ISO 24153 : 2009	Random sampling and randomization procedures (*first revision*)
IS 9844 : 1981	Method of testing corrosion resistance of electroplated and anodized aluminium coating by neutral salt spray test

3 TERMINOLOGY

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

3.1 Catch Device — Device, which keeps or pulls a door 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 Concealed Hinge — A hinge installed in such a way that it cannot be seen from the outside when the cabinet door is in a closed position.

3.3 Damper — Mechanism which stops the movement of a cabinet door gently.

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

3.5 Self-Closing Hinge — A hinge incorporating a device to store energy, usually a spring, causing a cabinet door to close from an open position.

3.6 Self-Closing Integrated Damper Hinge — A self-closing hinge with an integrated damper mechanism located in the hinge cup or hinge arm assembly. Some damper mechanisms can be turned off-on or include dampening adjustment.

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

4 TYPE AND SIZE

4.1 Type

On the basis of installation of cabinet doors, cabinet hinges can be classified into three types (*see* Fig. 1):

a) Full overlay (*see* Fig. 1A);
b) Half overlay (*see* Fig. 1B); and
c) Inset (*see* Fig. 1C).

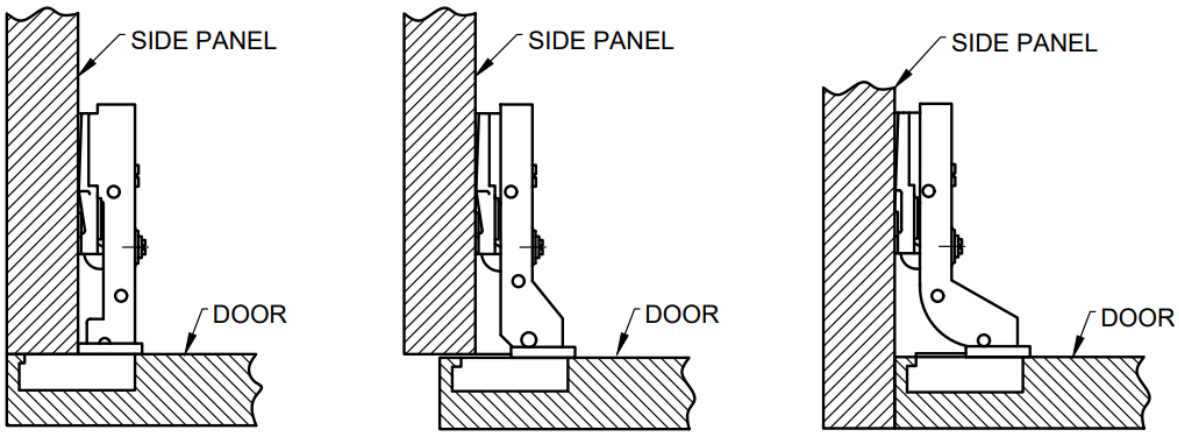
4.2 Size

The size of the cabinet hinge (L) shall be denoted by the length of the hinge in closed condition (mm). Cabinet hinges are manufactured in different sizes (L), the most common sizes of cabinet hinge are 30 mm, 50 mm, 75 mm, 100 mm, 125 mm, 150 mm, 175 mm and 200 mm (*see* Fig. 2).

4.3 Other types and size of cabinet hinge may also be manufactured as per the agreement between manufacturer and purchaser.

5 MATERIALS

Cabinet hinge may be manufactured from any suitable material for example steel and stainless steel. However, the material selected shall not affect the performance of cabinet hinge in accordance with this standard. Manufactures shall declare the grade/type/variety/class of raw material used as per the relevant Indian Standards.



1A FULL OVERLAY 1B HALF OVERLAY 1C INSET

FIG.1 TYPICAL SKETCH OF TYPE OF CABINET HINGES

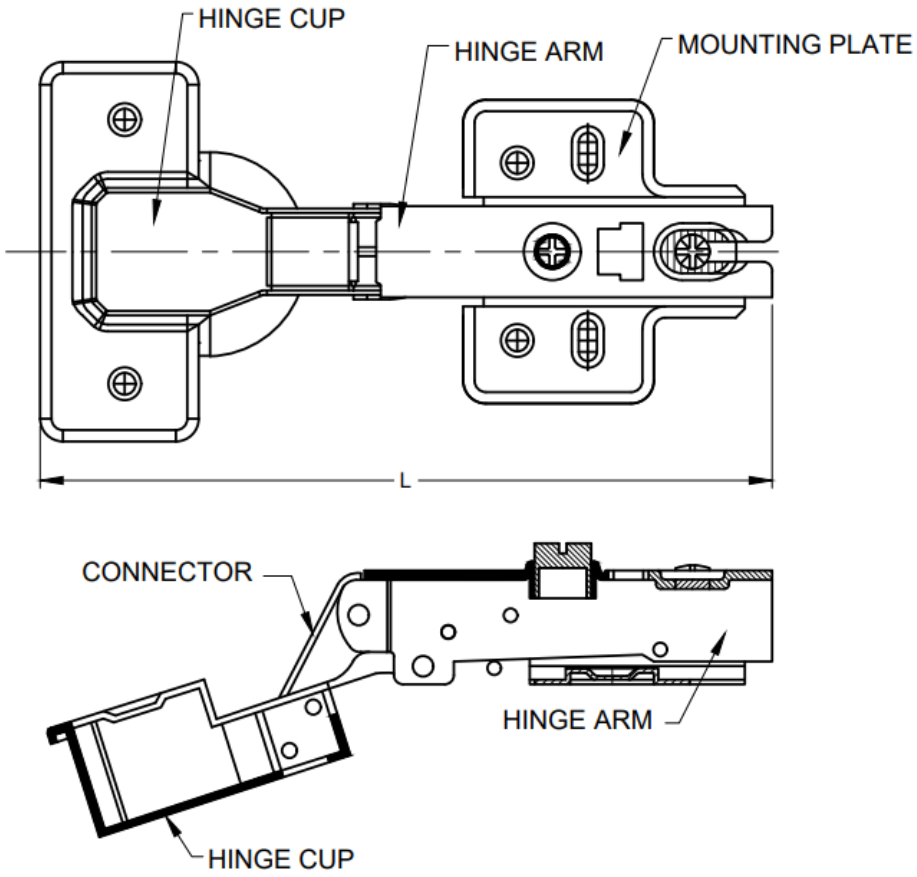


FIG. 2 TYPICAL SKETCH OF CABINET HINGES

6 MANUFACTURE

The cabinet hinge should be free from defects including burrs, sharp edges so as to facilitate easy handling. The number of mounting holes to be punched in different sizes of cabinet hinge may vary based on type and size but in no case it shall be less than 2 holes. Holes (vertical, horizontal and round) may be provided with the provision of adjustment. On the basis of performance, cabinet hinges are categorized into three categories and the end use of these cabinet hinges shall be decided on the basis of their performance. Table 1 provides the level of performance with their recommended uses.

7 REQUIREMENTS

7.1 General Test Requirements

7.1.1 *Preparatory Measures*

Hinges to be tested shall be assembled according to the mounting instructions provided by the manufacturer. Where mounting instructions are not provided, the most unfavourable assembly method shall be selected and recorded in the test report. The pullout shall be systematically examined by visual inspection. Before starting the testing, hinges and its components shall be visually examined and all detected defects/special features shall be recorded, in order to establish that the defects are not induced during testing. Before starting the test, fittings shall be tightened and shall not be re-tightened once testing is initiated. Unless specifically required in the manufacturer's instructions.

Hinges which include structural hardware parts made of hygroscopic plastic materials (such as polyamide) shall be conditioned at relative humidity of (65 ± 5) percent and a temperature of (27 ± 2) °C for 7 days. All tests shall also be carried out at the humidity and temperature mentioned above.

7.1.2 *Limiting Deviations*

The following deviations shall be applicable to the testing equipment and tests:

a) Forces : ± 5 percent
b) Velocities : ± 5 percent
c) Masses : ± 1 percent
d) Dimensions : ± 1 mm
e) Angles : ± 2°

7.1.3 *Application of Forces*

The forces in the static load tests shall be applied sufficiently and slowly to ensure that negligible dynamic force is applied. Each force shall be maintained for not less than 10 s and not more than 15 s. The forces in durability tests shall be applied at a rate to ensure that excessive heating does not occur. The forces shall be positioned with an accuracy ± 5 mm. Where the forces are replaced by masses, the relation 10 N = 1 kg shall be used for the purpose.

7.1.4 *Sequence of Testing*

For the tests, two sets of hinges shall be used. One set of cabinet hinges shall comprise two numbers of cabinet hinges. The first set shall be used for carrying out overload tests and second set shall be used for carrying out functional tests. The sequence of testing for evaluating the performance of the cabinet hinges, shall be as given below:

a) Overload tests:
   1) Vertical static overload test; and
   2) Horizontal static overload test.

b) Functional tests:
   1) First vertical static load test;
   2) First horizontal static load test;
   3) Slam shut test;

Table 1 Test Levels Corresponding to Performance Category of Cabinet Hinge

(*Clause* 6)

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

4) Durability test;
5) Deflection (sagging) test;
6) Second vertical static load test; and
7) Second horizontal static load test.

7.1.5 *Testing Equipment*

The test equipment shall not prevent deflection of the test door, which means that the equipment shall be so flexible that it shall be able to move so as to allow the deflection of the test door during testing.

7.1.5.1 *Masses*

Masses shall be designed so that they do not reinforce the structure or re-distribute the stresses.

7.1.5.2 *Standard test frame*

The tests specified in **7.2** and **7.3** shall be carried out in a test frame (*see* Fig. 3), which is so constructed that the deformation under the applied loads is not more than 1 mm.

Unless otherwise specified, hinges for wooden doors shall be mounted on particle board having the properties as given in Table 2.

7.1.5.3 *Standard door dimensions and masses*

The standard door dimensions and masses for use for testing is as given in Table 3. For cabinet hinges used in wooden doors, particle board shall be used for test and for cabinet hinges used in other door materials such as glass, plastic or metal, glass door shall be used for testing as per the parameters given in Table 3. Two number of cabinet hinges shall be fixed at a centre to centre distance of 380 mm, as given in Fig. 4.

Table 2 Particle Board Properties

(*Clause* 7.1.5.2)

Sl No.	Properties	Requirement	Test Methods, Ref to
(1)	(2)	(3)	(4)
i)	Face withdrawal of screws, N	(1 200 ± 100)	IS 2380 (Part 14)
ii)	Density, kg/m^3	(650 ± 50)	IS 2380 (Part 3)

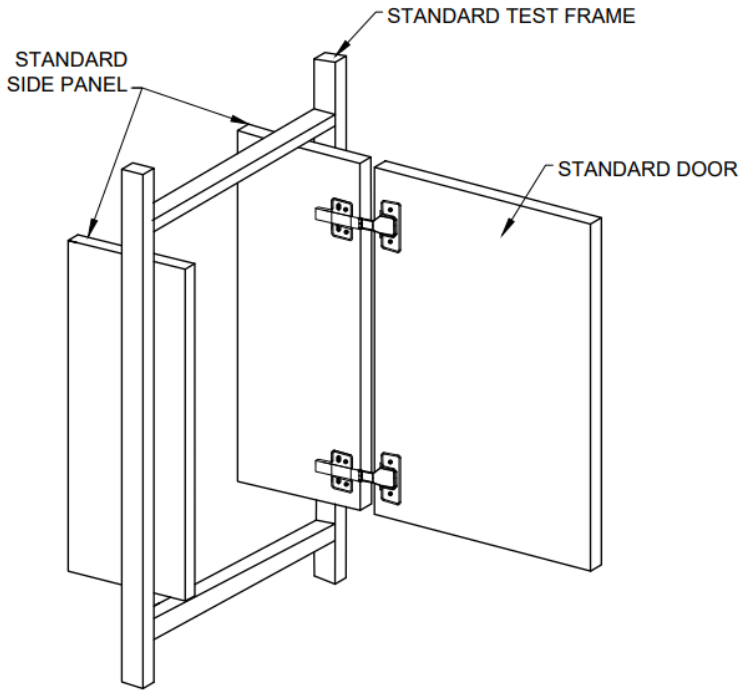


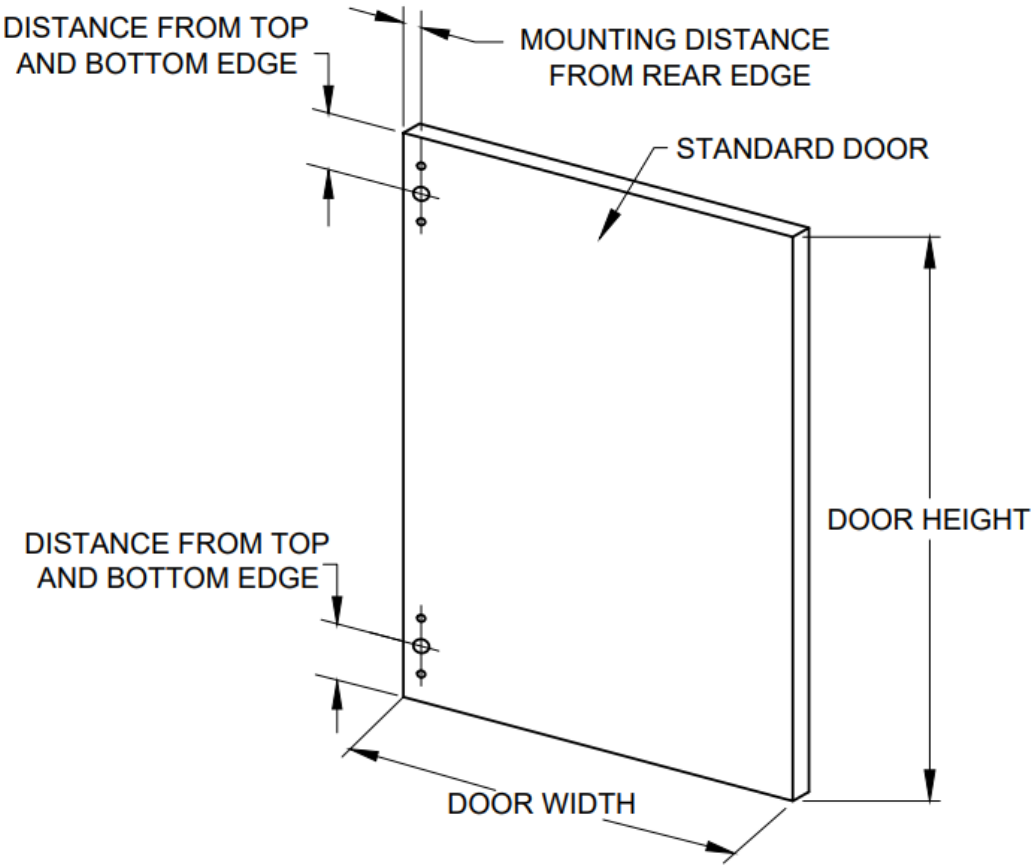
FIG. 3 TEST FRAME AND TEST DOOR

Table 3 Standard Door Dimensions and Masses

(*Clause* 7.1.5.3)

Sl No.	Door Material	Test Door Parameters				
		Height	Width	Thickness	Distance from Top to Bottom Edges	Mass
		mm	mm	mm	mm	kg
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Particle board	500	400	20	60	–
ii)	Glass	500	400	–	60	2.7 + 0.1

NOTE — Glass may be replaced by aluminium or other material. However mass shall be as given in col (7) of Table 3.



All dimensions in millimetres.

FIG. 4 STANDARD DOOR DIMENSIONS

7.2 Overload Tests

7.2.1 *Vertical Static Overload Test*

7.2.1.1 *Test set-up and procedure*

The vertical static overload test shall be conducted in a test jig as shown in Fig. 5. Loading of the door shall be done with the mass specified as given below at 100 mm from the edge furthest from the hinge:

Sl No.	*Level*	*Load kg*
(1)	(2)	(3)
i)	Level 1	–
ii)	Level 2	20
iii)	Level 3	30

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 for closing.

7.2.1.2 *Requirement*

The door and/or hinges shall not become detached.

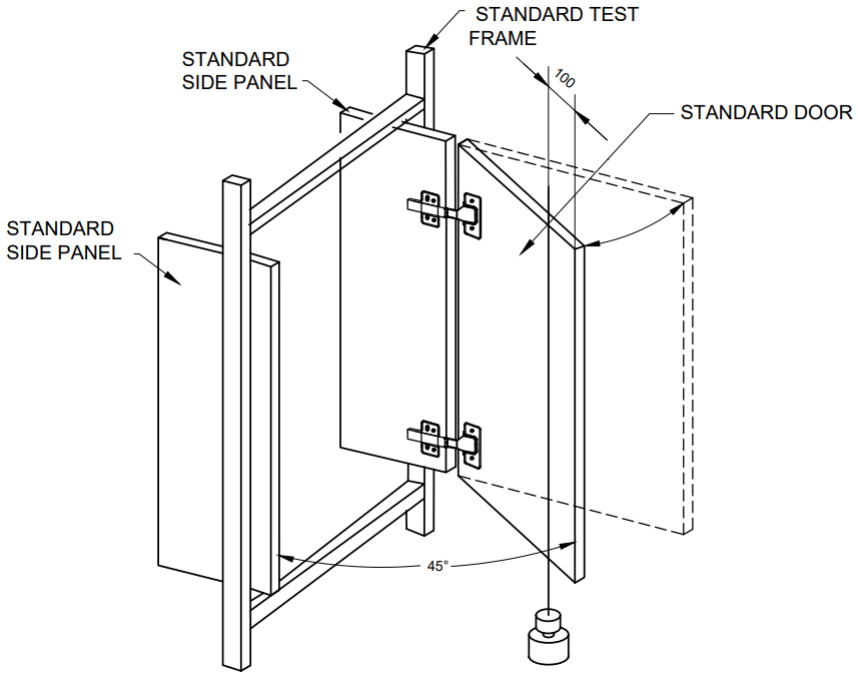
7.2.2 *Horizontal Static Overload Test*

7.2.2.1 *Test set-up and procedure*

This test applies only to hinges with an opening angle less than 135°. The horizontal static overload test shall be conducted in a test jig as shown in Fig. 6. Loading of the door shall be done with the horizontal load specified as given below:

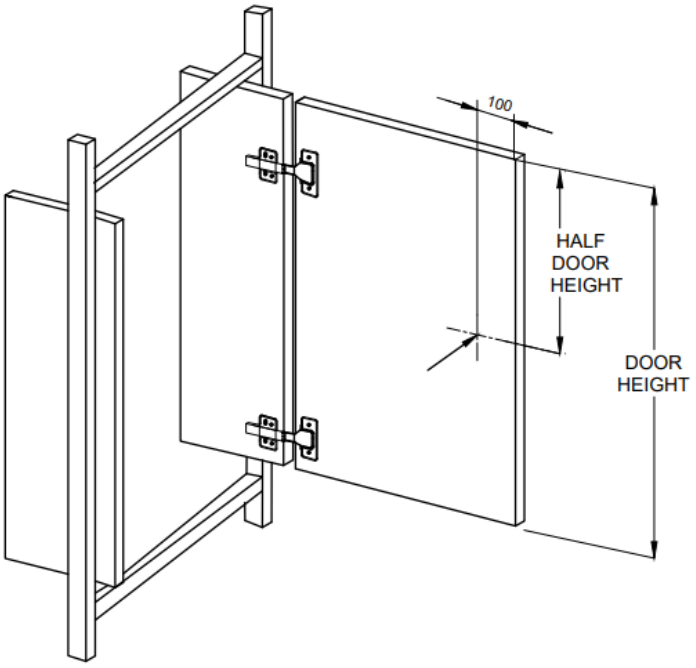
Sl No.	*Level*	*Horizontal Load N*
(1)	(1)	(2)
i)	Level 1	–
ii)	Level 2	60
iii)	Level 3	80

Apply the horizontal static load specified in table above 10 times perpendicular to the plane of the door on its horizontal centreline 100 mm from the edge furthest from the hinge, as shown in Fig. 6.



All dimensions in millimetres.

FIG. 5 VERTICAL STATIC OVERLOAD



All dimensions in millimetres.

FIG. 6 HORIZONTAL STATIC OVERLOAD

7.2.2.2 *Requirement*

The door, hinges or their components shall not become detached.

7.3 Functional Tests

7.3.1 *Operating Forces*

7.3.1.1 *General*

The operating forces shall be measured before and after the durability test. The measurements of operating forces shall be made with the door unloaded.

7.3.1.2 *Closing force, hinges with self-closing mechanisms*

The closing force of hinges with self-closing mechanisms shall be measured as shown in Fig. 7. Before measuring the closing force F_0, the door shall be fully opened 10 times by hand. The door shall be moved slowly towards the closed position. The static closing force shall be measured at a position (1 ± 0.5) mm before the fully closed position.

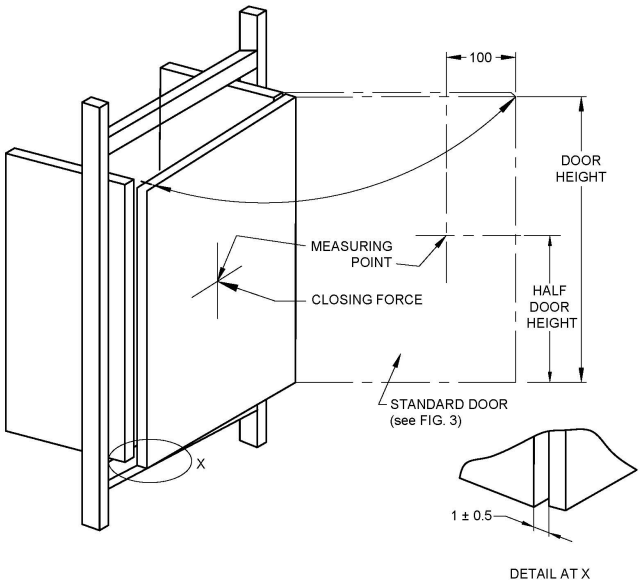
NOTE — The closing speed can have an influence on the measured closing force. It is suggested to keep it as slow as possible, approx 1 mm/s. In case of damper mechanisms, it can be necessary to reduce the closing speed to obtain the maximum self-closing force.

During the measurement, the opening and closing forces shall be applied perpendicular to the front. The closing force of hinges with self-closing spring mechanism shall not be less than 0.5 N before and after the durability test.

7.3.1.3 *Opening and closing forces*

The opening and closing forces F, shall be measured at the measuring point (*see* Fig. 7) through the full opening angle using a constant and slow opening/closing speed. The opening and closing forces shall not be more than 20 N before and after the durability test.

NOTE — In case of damper mechanisms, it may be necessary to reduce the opening/closing speed to obtain the forces.



All dimensions in millimetres.

FIG. 7 MEASURING THE CLOSING FORCE F_0

7.3.2 *First Vertical Static Load Test*

7.3.2.1 *Test set-up and procedure*

The first vertical static load test shall be conducted in a test jig as shown in Fig. 5. Loading of the door shall be done with the mass specified as given below at 100 mm from the edge furthest from the hinge:

Level	*Load* *kg*
(1)	(2)
Level 1	10
Level 2	15
Level 3	20

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 for closing.

7.3.2.2 *Requirement*

After the test, the hinges and their components shall fulfil their functions.

7.3.3 *First Horizontal Static Load Test*

7.3.3.1 *Test set-up and procedure*

This test applies only to hinges with a maximum opening angle less than 135°. The first horizontal static test shall be conducted in a test jig as shown in Fig. 6. Loading of the door shall be done with the horizontal load specified as given below:

Level	*Horizontal Load* *N*
(1)	(2)
Level 1	25
Level 2	30
Level 3	40

Apply the horizontal static load specified in table above 10 times perpendicular to the plane of the door on its horizontal centreline 100 mm from the edge furthest from the hinge, as shown in Fig. 6. Carry out inspection and assessment without the test load.

7.3.3.2 *Requirement*

After the test, the hinges and their components shall fulfil their functions.

7.3.4 *Slam Shut Test*

7.3.4.1 *Test set-up and procedure*

The door shall be closed by means of a string or cord attached to the back of the door. The cord shall act at the point '*A*', perpendicular to the face of the door, when it is fully closed and shall not change direction by an angle greater than 20° during movement as illustrated in Fig. 8. The test mass shall act until 10 mm before the door is fully closed. The mass shall fall through a distance of 300 mm. The test shall be carried out as shown in Fig. 8. Open the door

to starting position. Determine the mass, m_1, required to initiate moving the door. The mass, m_2 or mass, m_3, in case dampers are used, are given as under:

Level	*Mass* (m_2) *kg*	*Mass where Dampers are used* (m_3) *kg*
(1)	(2)	(3)
Level 1	2	Minimum 1 and maximum 2
Level 2	3	Minimum 1 and maximum 2
Level 3	4	Minimum 1 and maximum 2

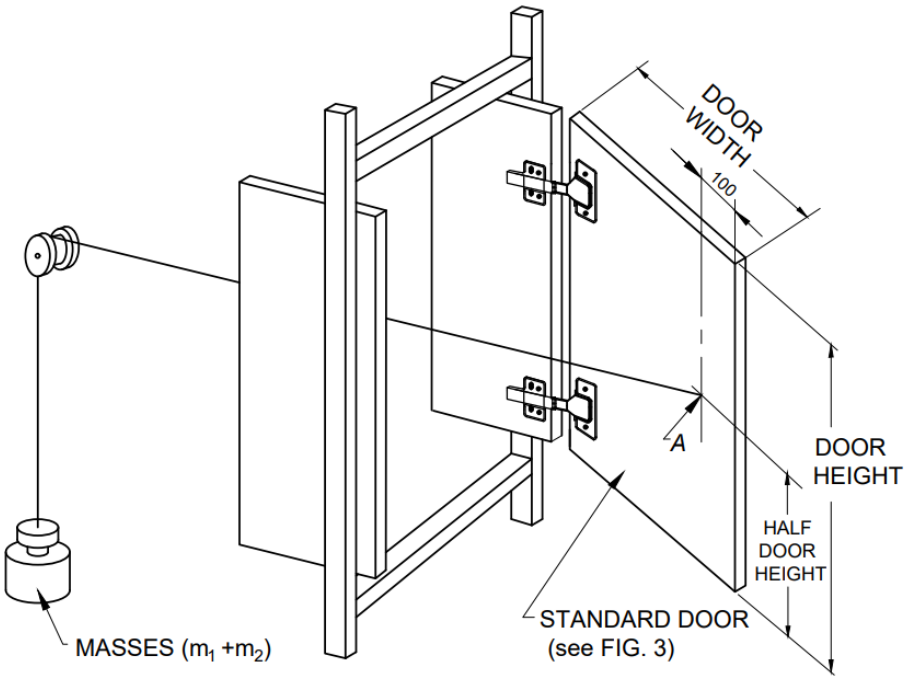
Slam shut the door 10 times using the masses (m_1 + m_2). Where dampers are used, slam shut the door for additional 100 times using the masses (m_1 + m_3). If the minimum mass of m_3 does not cause the slam to override the damper function, increase the value of m_3 in increment of 100 g until this happens, with the condition that m_3 should not exceed the maximum value given in table of **7.3.4.1**.

7.3.4.2 *Requirement*

After the test, the hinges and their components shall fulfil their function and damages such as ruptures and cracks shall not be observed.

7.3.5 *Determination of Reference Point for the Door Sagging*

Before the durability test as per **7.3.6**, the reference point on the closed test door shall be determined as per Fig. 9.



All dimensions in millimetres.

FIG. 8 SLAM SHUT AT POINT '*A*'

7.3.6 *Durability*

7.3.6.1 *Test set-up and procedure*

Attach two masses of 1 kg each, one on each side of the door at the middle of the vertical centreline as shown in Fig. 10. Fully open the door to a maximum of 130° and fully close it for the number of cycles (back and forth) as given below, without forcing built-in stops in the open position.

Sl No. (1)	*Level* (2)	*Number of Cycles* (3)
i)	Level 1	20 000
ii)	Level 2	40 000
iii)	Level 3	80 000

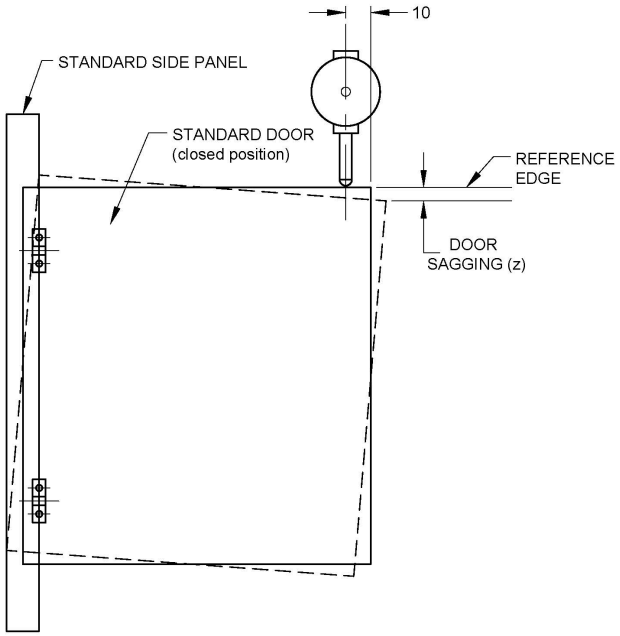


FIG. 9 MEASUREMENT OF DOOR SAGGING

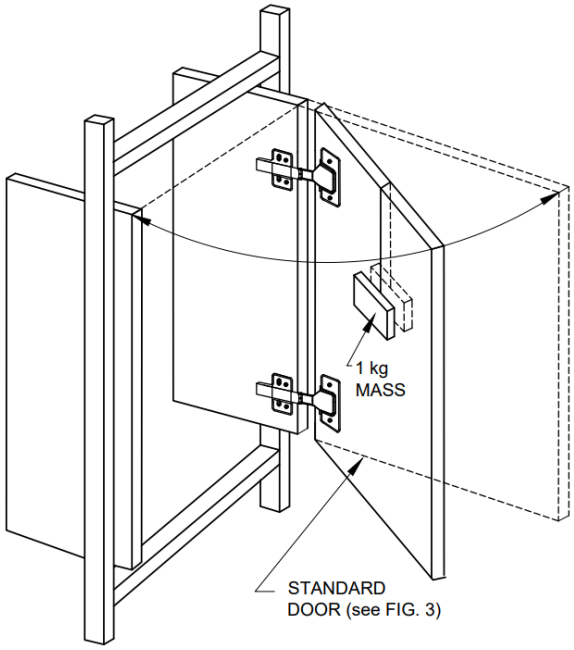


FIG. 10 DURABILITY TEST OF PIVOTED DOORS

The door shall be gently opened and closed at each cycle without forcing dampers and/or catch devices including self-opening and self-closing mechanisms. If the hinges have dampers and/or catch devices, including self-opening and self-closing mechanisms, these shall be allowed to operate correctly according to their function at each cycle. The rate shall be a maximum of 6 cycles per minute with the pause in the closed position. When dampers start to function, the angular velocity can be (45 ± 20) °/s.

7.3.6.2 *Requirement*

After the test, the hinges and their components shall fulfil their function and damages such as ruptures and cracks shall not be observed.

7.3.7 *Deflection* (*Sagging Test*)

7.3.7.1 *Test procedure and set-up*

After the durability test and after removing the two 1 kg masses, the sagging, z, in Fig. 9 shall be determined before and after using adjustment systems. The accuracy of the measurement shall be ± 0.1 mm.

7.3.7.1.1 *Requirement*

The sagging before using adjustment systems shall not exceed 0.5 percent of the width of the door.

7.3.8 *Second Vertical Static Load*

7.3.8.1 *Test procedure and set-up*

The second vertical static load test shall be conducted in a test jig as shown in Fig. 5. Loading of the door shall be done with the mass specified as given below at 100 mm from the edge furthest from the hinge:

Sl No.	*Level*	*Load kg*
(1)	(2)	(3)
i)	Level 1	10
ii)	Level 2	15
iii)	Level 3	20

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 for closing. Carry out inspection and assessment without the test load.

7.3.8.2 *Requirement*

After the test, the hinges and their components shall fulfil their functions.

7.3.9 *Second Horizontal Static Load*

7.3.9.1 *Test set-up and procedure*

This test is applicable only to hinges with an opening angle less than 135°. The second horizontal static test shall be conducted in a test jig as shown in Fig. 6. Loading of the door shall be done with the horizontal load specified as given below:

Sl No.	*Level*	*Horizontal Load N*
(1)	(2)	(3)
i)	Level 1	25
ii)	Level 2	30
iii)	Level 3	40

Apply the horizontal static load specified in table above 10 times perpendicular to the plane of the door on its horizontal centreline 100 mm from the edge furthest from the hinge, as shown in Fig. 6. Carry out inspection and assessment without the test load.

7.3.9.2 *Requirement*

After the test, the hinges and their components shall fulfil their functions.

7.4 *Corrosion Resistance*

Unless otherwise specified, corrosion resistance test shall be carried out on the third set of hinges and shall pass minimum 72 h salt spray test as per IS 9844. With the exception of cutting edges, screw slots, rivet heads, aluminium and moulded parts of zinc, all parts, which are visible when the hinges are mounted shall show no corrosion and shall fulfill their functions.

7.5 Finish

Unless otherwise specified, cabinet hinges shall be finished bright with smooth surfaces.

8 MARKING

8.1 Each cabinet hinge or box shall be legibly and indelibly marked with the following:

a) Manufacturer's name and registered trade-mark, if any;
b) Type of material (grade/type/variety/class of material as per relevant Indian Standard) and finish;
c) Type and size;
d) Level category (whether 1, 2 or 3); and
e) Date of manufacture and batch/lot number.

8.2 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 the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

9 PACKING

Ten, twenty or thirty cabinet hinges may be packed in corrugated box or in any other approved packing material as agreed to between the manufacturer and the purchaser. The manufacturer shall provide mounting instructions in a sheet and other accessories such as mounting screws, plastic dowel, to be placed in the packing.

10 SAMPLING AND CRITERION FOR CONFORMITY

10.1 Scale of Sampling

10.1.1 *Lot*

In any consignment, all the cabinet hinges of the same type, size, level and finish manufactured from similar raw materials under similar conditions of manufacture shall constitute a lot.

10.1.2 Cabinet hinges shall be selected from a lot at random. In order to ensure the randomness of selection, the procedure given in IS 4905 may be followed. The number of cabinet hinges to be selected from the lot depends upon the lot size and shall be in accordance with Table 4.

10.2 Number of Tests and Criteria for Conformity

All the cabinet hinge selected in accordance with col (2) and (3) of Table 4 shall be subjected to tests, if the selected sample conform to the requirement of this standard as per **7.2** to **7.5**, the lot shall be considered conforming.

Table 4 Scale of Sampling and Criterion for Conformity

(*Clause* 10)

Sl No.	Lot Size	Sample Size for Performance Test
(1)	(2)	(3)
i)	Up to 500	1
ii)	501 to 2 000	2
iii)	2 001 to 5 000	3
iv)	5 001 and above	4

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Builder's Hardware Sectional Committee, CED 15

Organization	*Representative(s)*
In Personal Capacity (*1421 Sector A, Pocket B & C, Vasant Kunj, New Delhi - 110070*)	SHRI B. MAJUMDAR **(*Chairperson*)**
Allied Anodisers, Kolkata	SHRI SUSHIL TAWAR
Argent Industries, New Delhi	SHRI ANIL CHADHA SHRIMATI VANITA CHADHA (*Alternate*)
Builders' Association of India, New Delhi	SHRI NEERAV PARMAR SHRI H. S. PSRICHA (*Alternate*)
Central Public Works Department, New Delhi	SHRI M. K. MALLICK SHRI DIVAKAR AGRAWAL (*Alternate*)
CSIR - Central Building Research Institute, Roorkee	SHRI S. K. NEGI SHRI CHANDAN SWAROOP (*Alternate* I) SHRI V. CHAKRADHAR (*Alternate* II)
D. P. Garg & Company Pvt Ltd, Noida	SHRI S. M. GARG SHRI R. C. MALHOTRA (*Alternate*)
Dormakaba India Pvt Ltd, New Delhi	SHRI HANISH ARORA SHRI TAPAN CHUGH (*Alternate*)
Godrej & Boyce Mfg Co Limited, Mumbai	SHRI KSHITIJ R. GAIKAR SHRI VINAYAK G. NALGIRKAR (*Alternate*)
Hettich India Pvt Ltd, Mumbai	SHRI VIRENDRA KUMAR SHRI INDU KUMAR SHARMA (*Alternate*)
Hindalco Industries Limited, Sonbhadra	SHRI JAYANTA RANASINGH DR SAIKAT ADHIKARI (*Alternate*)
Intertek India Pvt Ltd, Gurugram	SHRI POORNESH KUMAR CHATURVEDI SHRI GARISH MALHOTRA (*Alternate*)
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