
**Hardware for furniture — Strength
and durability of hinges and their
components — Hinges pivoting on a
vertical axis**

*Quincaillerie d'ameublement — Solidité et durabilité des charnières
et de leurs composants — Charnières avec pivot vertical*

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 136, *Furniture*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The aim of this document is to provide furniture manufacturers, designers and developers with comparable information regarding the performance of all types of hinges pivoting on a vertical axis and their components.

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

With the exception of the corrosion test in [Clause 6.4](#), the tests are designed to evaluate properties without regard to materials, design/construction or manufacturing processes.

The strength and durability tests only relate to the hinges and the parts used for the attachment (e.g. mounting plates and screws).

The strength and durability tests are carried out in a test frame with specified properties.

The test results are only valid for the hinges tested. These results are used to represent the performance of production models provided that the tested model is representative of the production model.

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Hardware for furniture — Strength and durability of hinges and their components — Hinges pivoting on a vertical axis

1 Scope

This document specifies test methods and test parameters for the strength and durability of all types of hinges pivoting on a vertical axis and their components for all fields of application.

With the exception of corrosion, ageing and the influence of heat and humidity are not included.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6270-2, *Paints and varnishes — Determination of resistance to humidity — Part 2: Condensation (in-cabinet exposure with heated water reservoir)*

ISO 9427:2003, *Wood-based panels — Determination of density*

EN 320:2011, *Particleboards and fibreboards — Determination of resistance to axial withdrawal of screws*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

catch device

device that keeps or pulls a door in place, but does not require a second action in order to release it

EXAMPLE magnetic catch or a self-closing or self-opening mechanism

3.2

damper

mechanism which stops the movement of a door gently

4 Test conditions

4.1 General

The hinges shall be assembled/mounted/adjusted according to the instructions supplied with it.

If mounting, assembly or adjustment instructions are not supplied, the most adverse configuration shall be used and the mounting or assembly method shall be recorded in the test report. Fittings shall be tightened before testing and shall not be re-tightened unless specifically required in the manufacturer's instructions. If the configuration has to be changed to produce the worst-case conditions, this shall be recorded in the test report.

The tests shall be carried out in indoor ambient conditions at a temperature between 15 °C to 27 °C. If during a test the temperature is outside of the range of 15 °C to 27 °C, the maximum and/or minimum temperature shall be recorded in the test report.

Hinges which include structural hardware parts made of hygroscopic plastic materials (e.g. polyamide) shall be conditioned at (23 ± 2) °C and at a relative humidity of (50 ± 5) % for 7 days before testing.

NOTE For accelerating the conditioning process, ISO 1110 [1] can be used.

If a test cannot be carried out as specified, the test shall be carried out as closely as possible to that specified. Any modification to the test method shall be technically justified and recorded in the test report. Before beginning testing, visually inspect the hinges and components thoroughly. Record any defects to eliminate any assumption that they have been caused by the tests. Carry out measurements if specified.

4.2 Application of forces

The forces in the static load tests shall be applied sufficiently slowly to ensure that negligible dynamic force is applied. Unless otherwise specified, 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 may be replaced by masses. The relation $10 \text{ N} = 1 \text{ kg}$ shall be used for this purpose.

4.3 Tolerances

Unless otherwise stated, the following tolerances are applicable:

Forces: ± 5 % of the nominal force;

Velocities: ± 5 % of the nominal velocity;

Masses: ± 1 % of the nominal mass;

Dimensions: ± 1 mm of the nominal dimension;

Angles: $\pm 2^\circ$ of the nominal angle.

The accuracy for the positioning of forces shall be ± 5 mm.

NOTE For the purposes of uncertainty of test, test results are not considered to be adversely affected when the above tolerances are met.

4.4 Sequence of testing

The tests shall be carried out in the same sequence as the clauses are numbered in this document. If the clause sequence is not followed, the sequence shall be recorded in the test report.

4.5 Inspection and assessment of results

Before and after the completion of each test carry out the inspection as specified, after using adjustment device, if available.

Record any changes that have taken place since the initial inspection.

The inspection shall include at least the following:

- a) fracture of any component or joint;
- b) loosening of any joint intended to be rigid, which can be demonstrated by hand pressure;

- c) deformation or wear of any part or component such that its functioning is impaired;
- d) loosening of any means of fixing components;
- e) any impaired function of a component or part.

5 Test equipment

5.1 General

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

The equipment shall not inhibit deflection of the test door, i.e. it shall be able to move so that it will allow the deflection of the test door during testing.

5.2 Masses

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

5.3 Test frame

The tests specified in [6.2](#) and [6.3](#) shall be carried out in a test frame (see [Figure 1](#)), which is so constructed that the deformation under the applied loads is no more than 1 mm.

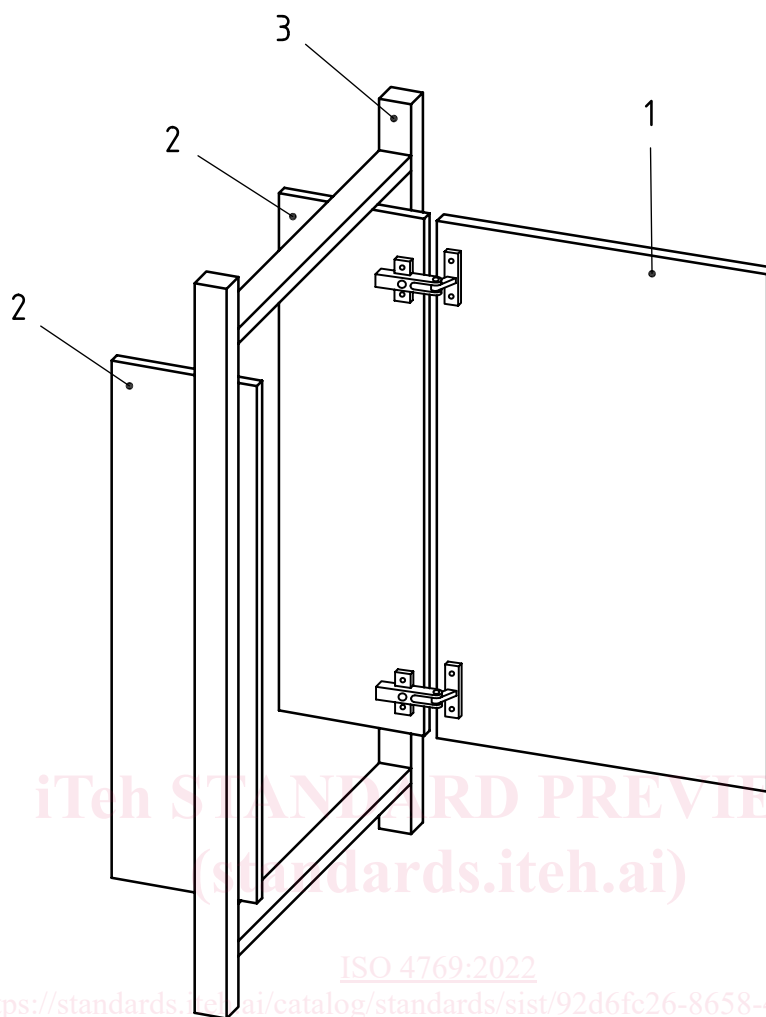
NOTE The test performance of the components in the test frame can only be used as a guide to the performance of the piece of furniture.

Hinges for wooden doors shall be mounted on particle board, [5.4](#), unless otherwise specified.

Hinges for other materials (e.g. glass, metal or plastic) shall be mounted according to the manufacturer's instructions.

The position of hinges and components on the door and the test frame as well as the size and weight of the door shall be as specified by the manufacturer, see [Annex A](#).

In cases where the door parameters (e.g. height, width, mass) are not specified by the manufacturer, record this situation in the test report and the tests may be carried out using the standard door sizes specified in [Annex B](#), see [Table B.1](#) and [Figure B.1](#).



Key

- 1 test door
- 2 test sides
- 3 test frame

Figure 1 — Test frame and test door

5.4 Particle board properties

The properties of the particle board shall be as specified in [Table 1](#).

Table 1 — Particle board properties

Property	Standard	Requirement
Face withdrawal of screws	EN 320:2011	1 100 ± 100 N
Density	ISO 9427:2003	0,65 ± 0,05 g/cm ³

6 Test procedures and requirements

6.1 General

For the following tests, three sets of hinges shall be used as follows:

The first set shall be used for the first test sequence specified in [6.2](#).

The second set shall be used for the second test sequence specified in [6.3](#).

The third set shall be used for the corrosion test specified in [6.4](#).

All overload and functional tests shall be carried out according to the same column (1, 2 or 3) in [Annex B](#).

6.2 Overload tests

6.2.1 General

Hardware or hinges that belong to level 1 (see [Table B.2](#)) shall not be tested.

6.2.2 Vertical static overload

Load the door as shown in [Figure 2](#) with the mass specified in [Annex B](#) (see [Table B.2](#)). 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 for closing.

The door and/or hinges shall not become detached.