



SLOVENSKI STANDARD
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Pohištveno okovje - Preskusna metoda za preskuse trdnosti in preobremenitve povezovalnih elementov za pohištvo, sestavljeno iz plošč

Hardware for furniture - Test method for strength and overload tests of connectors for furniture constructed from panel material

Möbelbeschläge - Prüfverfahren zur Durchführung von Festigkeits- und Schwellbelastungstests von Korpuseckverbindern für Möbel aus Holzwerkstoffplatten

Quincaillerie d'ameublement - Méthodes d'essai pour détermination de la résistance mécanique et rigidité de ferrures d'assemblage de corps de meuble

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97.140 Pohištvo Furniture

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Hardware for furniture - Test method for strength and overload tests of connectors for furniture constructed from panel material

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European foreword

This document (prEN 17869:2022) has been prepared by Technical Committee CEN/TC 207 “Furniture”, the secretariat of which is held by UNI.

This document is currently submitted to the CEN Enquiry.

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1 Scope

This document specifies test methods for the strength and overload tests of connectors for furniture constructed from panel material and procedures for evaluating test results.

This document is specifically intended for assessing cabinet connectors for carcasses made of wood-based panel materials. The methods described can, however, be used to assess the relative performance of other types of connectors, e.g. some types of connectors for beds.

The strength and overload tests only apply to the connectors and their components, as well as the mounting to and in the cabinet carcass. They do not apply to additional functions that the connector can have, e.g. covering of the connector.

The tests described in this document are carried according to a test setup with specified properties and characteristics.

The test results are only valid for the connector tested. The results can be used to represent the performance of production models, provided the tested model is representative of the production model.

Aging and the influences of temperature and humidity are not included. This document contains four informative annexes, providing additional methodologies for the detailed evaluation of the test results and a procedure for comparing the tested connector with a reference connector:

- Annex A (informative) — Reference connector — Glued dowel;
- Annex B (informative) — Ratio generation;
- Annex C (informative) — Stiffness calculation for further evaluation of the overload;
- Annex D (informative) — Evaluation by the characteristic value (5 % percentile).

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.

EN 312, *Particleboards - Specifications*

EN 320, *Particleboards and fibreboards - Determination of resistance to axial withdrawal of screws*

EN 323, *Wood-based panels - Determination of density*

3 Terms and definitions

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

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

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

3.1 clearance

L

force-free mobility of the connection, which occurs during the described tests due to repeated loading

Note 1 to entry: The clearance *L* is given in mm.

3.2 connector

connector for use in furniture constructed from panel materials, such as cabinet furniture and shelves

3.3 maximum torque

maximum achievable torque when screwing in the connectors without damaging the connector or the furniture

4 General test conditions

4.1 Preliminary preparation

The connector(s) shall be mounted according to the instructions of the manufacturer.

If mounting or assembly instructions are not supplied, or if different mounting positions of the connector are possible, the most adverse configuration shall be used and the mounting or assembly method shall be recorded in the test report.

Connectors shall be tightened to the manufacturer's defined torque before testing and shall not be re-tightened unless specifically required in the manufacturer's instructions. In case the torque is not specified by the manufacturer, the connectors are tightened to 80 % of the maximum torque or to any other reasonable value. The torque value shall be recorded in the report. Even if the configuration is to be changed to produce the worst-case conditions this shall be recorded in the test report.

The design of the test specimens and test equipment shall not influence the test results and shall be adjusted if necessary. Adjustments of the test specimens or the test equipment shall be recorded in the test report.

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

Connectors which include structural hardware parts made of hygroscopic plastic materials, e.g. polyamide in load-bearing function shall be conditioned at (23 ± 5) °C and a relative humidity of (50 ± 5) % for at least seven days before testing. Panel materials used for the test setting shall be kept in the standard climate for at least seven days before testing.

Before beginning the testing, visually inspect the connector(s) thoroughly. Record any defects so that they are not assumed to have been caused by the tests. Carry out measurements when specified.

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

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4.2 Test Equipment

4.2.1 Testing device

4.2.1.1 General

An apparatus which, by means of a loading device (Figure 1), allows the application of a compressive force at the force application points as shown in Figure 5.

4.2.1.2 Loading device

The loading device shall be rotatable and made of steel without any play as shown in Figure 1. The bearing shall be executed in such a way that the loading device can deflect by max. 0,1 mm transverse to the vertical plane of symmetry shown in Figure 1 b). A schematic illustration of a suitable bearing is shown in Figure 2.

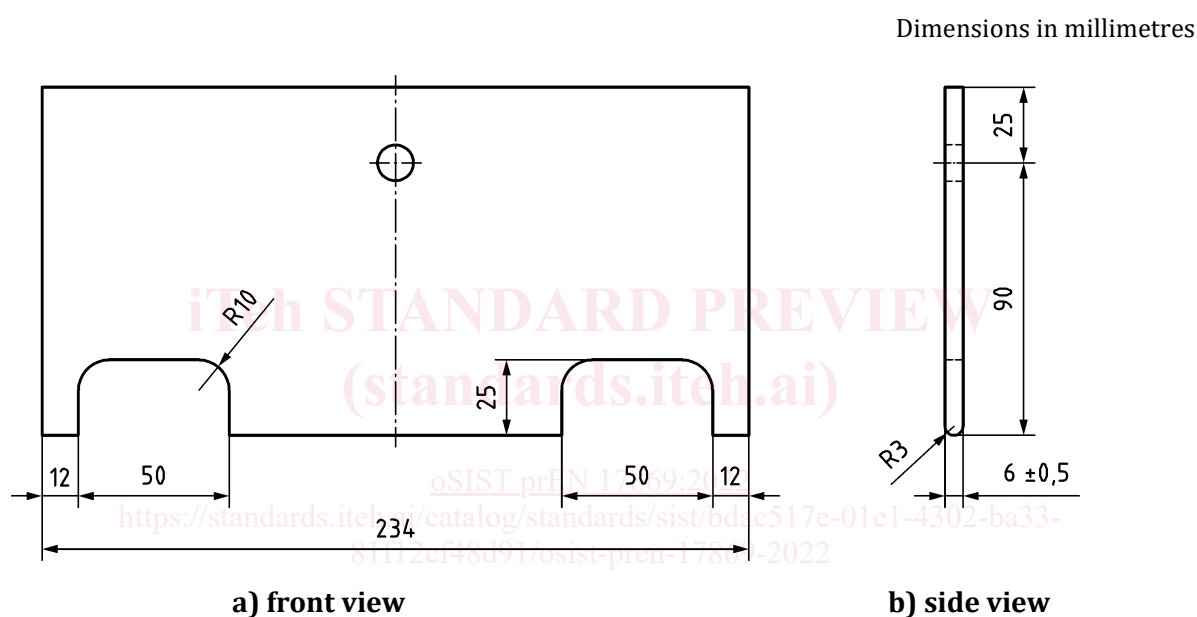
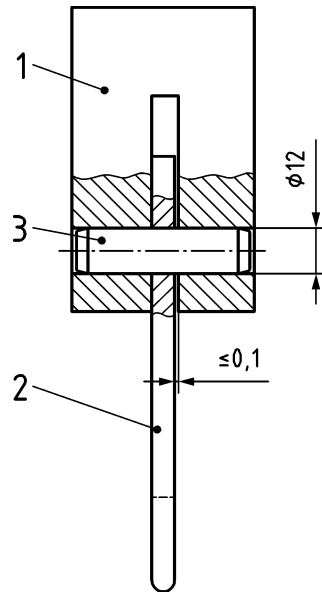


Figure 1 — Loading device

The diameter of the mandrel for mounting the loading device should be at least 12 mm, the mandrel shall be made of steel.

The loading device shall not prevent deformation of the test specimen or breaking of the connectors. The two recesses of the loading device shall be enlarged as required. The dimension of any enlargement shall be recorded in the test report.

Dimensions in millimetres

**Key**

- 1 illustration, schematic
- 2 loading device
- 3 mandrel

Figure 2 — Schematic illustration for the bearing of the loading device

4.2.1.3 Clamping device

The clamping device shall hold the test specimens and shall be mounted in accordance with Figure 5 and shall extend over the entire depth/length of the test specimens.

Clamping device 1 shall be applied to test specimen 1.

Clamping device 2 shall be applied to test specimen 2.

4.2.2 Default particle board properties

If the manufacturer does not specify the panel board used for the tests in Clause 5, the particle board shall comply with type P2 according to EN 312. The properties of the particle board shall be as specified in Table 1.

Table 1 — Default particle board properties

| Property | Referenced standard | Requirement |
|----------------------------|---------------------|------------------------------|
| Axial withdrawal of screws | EN 320 | (1 100 ± 100) N |
| Density | EN 323 | (650 ± 50) kg/m ³ |

4.3 Application of forces

The forces shall be applied sufficiently slowly to ensure that negligible dynamic force is applied.

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The forces may be replaced by masses. The relation $10 N = 1 \text{ kg}$ shall be used for this purpose.

4.4 Tolerances

Unless otherwise stated, the following tolerances are applicable:

- Forces: $\pm 5 \%$ of the nominal force;
- Masses: $\pm 1 \%$ of the nominal mass;
- Dimensions: $\pm 0,5 \text{ mm}$ of the nominal dimension;
- Velocities: $\pm 5 \%$ of the nominal velocity.

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

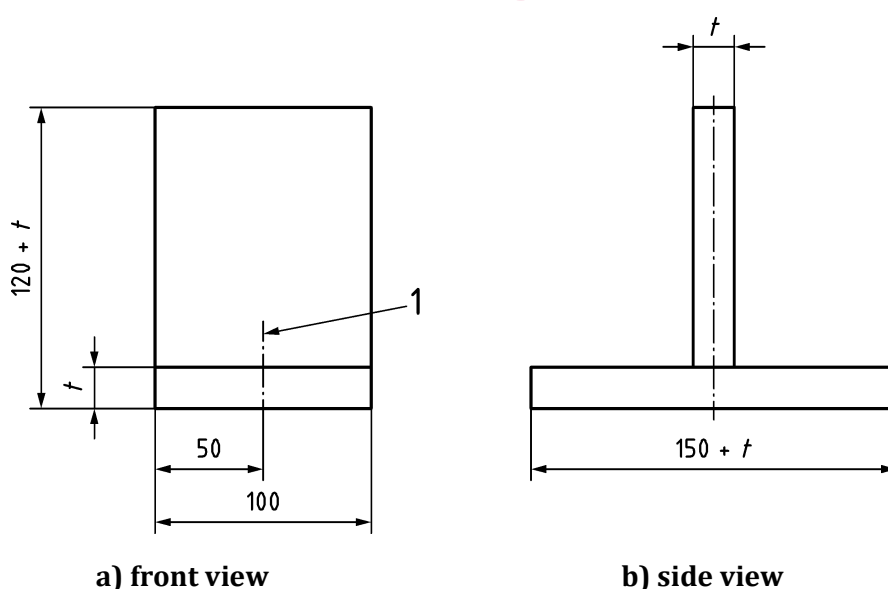
5 Test specimen**5.1 Test specimen 1 – perpendicular force**

The test specimen consists of one horizontal test part, one vertical test part and a connector. The test parts shall be made of panel board with a thickness t . The dimensions of the test specimen shall be as given in Figure 3.

The type of panel board and the specifications shall be specified in the test report. If no specific panel board is defined by the manufacturer, a default particle board according to 4.2.2 can be used.

If the geometry of the connectors makes it necessary to adapt the test specimens, this shall be indicated in the report.

The test parts shall be connected by the connectors according to Figure 3.

**Key**

- 1 position of connector
- t thickness of test part

Figure 3 — Test specimen 1

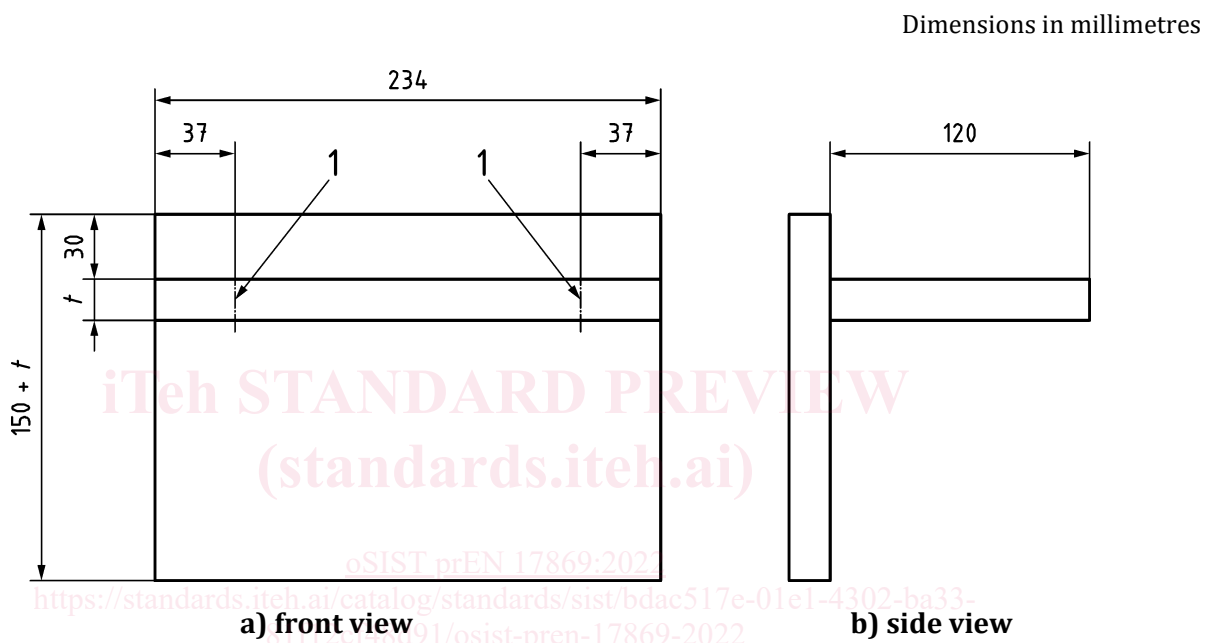
5.2 Test specimen 2 – lateral force and torque

The test specimen consists of one horizontal test part, one vertical test part and two connectors. The test parts shall be made of a panel board with a thickness t . The dimensions of the test specimen shall be according to Figure 4.

If the geometry of the connectors makes it necessary to adapt the test specimens, this shall be indicated in the report.

The type of panel board and the specifications shall be specified in the test report. If no specific panel board is defined by the manufacturer, a default particle board according to 4.2.2 can be used.

The test parts shall be assembled using the connectors, according to Figure 4.



Key

- 1 position of connector
- t thickness of test part

Figure 4 — Test specimen 2

6 Test procedures

6.1 General

For the tests according to 6.3 and 6.4, eight individual test specimens shall be used per test/connector.

The tests shall be carried out within one hour of the assembly of the test specimens. In the case of glued connections, the test is carried out after the adhesive has cured, in accordance with the manufacturer's instructions.

The test shall be carried out using a suitable displacement and force-controlled testing device for applying the force to the test specimens.

The test speed for all tests shall be between 10 mm/min and 25 mm/min.

The tolerance for the machine travel shall not exceed 0,1 mm.