
Timber structures — Testing of punched metal plate fasteners and joints

Structures en bois — Essai des connecteurs à plaque métallique emboutie et des assemblages



Reference number
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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8969 was prepared by Technical Committee ISO/TC 165, *Timber structures*.

This second edition cancels and replaces the first edition (ISO 8969:1990), which has been technically revised.

Introduction

The first edition of this International Standard was based on the recommendations of the joint committee RILEM/CIB 3TT (Working Commission W 18, *Timber structures*, of the International Council for Building Research, Studies and Documentation, and Commission 3TT, *Testing methods for timber*, of the International Union of Testing and Research Laboratories for Materials and Structures respectively) published (in English and French) in *Materiaux et Constructions*, Vol. 15, No. 88, 1982.

Timber structures — Testing of punched metal plate fasteners and joints

1 Scope

This International Standard specifies test methods for determining the strength and stiffness of joints made with punched metal plate fasteners in load-bearing timber structures, as follows:

- a) load-slip characteristics and maximum load resulting from the lateral resistance of the embedded projections, at various angles between the direction of the applied force and
 - the axis of the plate (load-plate angle, α),
 - the direction of the grain of the timber (load-grain angle, θ);
- b) the tensile strength of the plate at various angles, α ;
- c) the compression strength of the plate at various angles, α (optional test);
- d) the shear strength of the plate at various angles, α .

This International Standard is linked to ISO 6891, which gives general test requirements.

In addition, a method for testing the nail root in alternate bending is specified in Annex A.

2 Normative references

The following referenced documents are indispensable for the application 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 3130, *Wood — Determination of moisture content for physical and mechanical tests*

ISO 3131, *Wood — Determination of density for physical and mechanical tests*

ISO 6891, *Timber structures — Joints made with mechanical fasteners — General principles for the determination of strength and deformation characteristics*

ISO 8970, *Timber structures — Testing of joints made with mechanical fasteners — Requirements for wood density*

ASTM E8/E8M, *Standard Test Methods for Tension Testing of Metallic Materials*

3 Terms and definitions

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

3.1

punched metal plate fastener

fastener made of metal plate of thickness not less than 0,9 mm and not more than 2,5 mm, having integral projections punched out in one direction and bent perpendicular to the plane of the plate, being used as a splice plate to join two or more pieces of timber of the same thickness

NOTE For this purpose, the projections of the plate are fully embedded in the timber, using a press or roller, so that the contact surface of the plate is flush with the surface of the timber.

3.2

major axis of plate

direction giving the highest tensile strength of the plate

NOTE In many cases the punching pattern of the plate gives rise to two main directions perpendicular to each other with different strength properties.

3.3

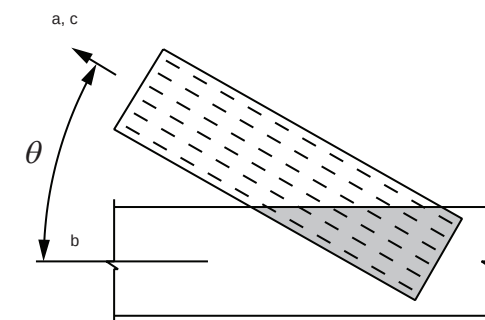
keeper nails

nails driven through the metal plate fasteners, during assembly of joints, to hold its location on the timber members before pressing

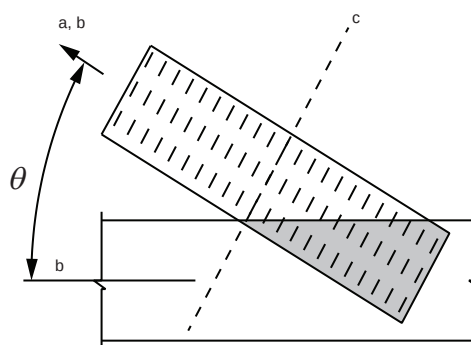
4 Symbols

The following symbols are used in this International Standard.

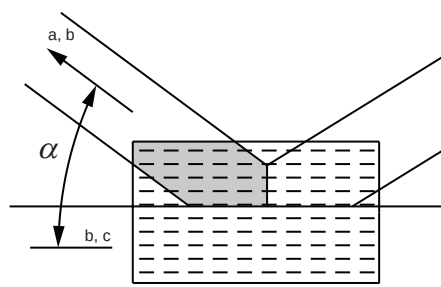
A_{gc}	cross-sectional area
A_{gp}	average gross cross-sectional area
F	force, expressed in newtons
F_{cc}	ultimate compression strength
F_{sc}	ultimate shear stress
F_{sp}	ultimate shear strength
F_{tc}	ultimate tensile strength
L_p	length of the plate in the direction parallel to the long dimension of the tooth slots, expressed in millimetres
l	length covered by plate at the interface of the two pieces of timber measured parallel to the timber grain direction (see Figure 6), expressed in millimetres
l'	plate dimension parallel to the loading direction for test specimens used to develop lateral resistance strength of metal connector plate teeth
P_{cc}	maximum compression load
P_{sp}	maximum shear load
P_{tc}	maximum tensile load
R_s	shear resistance effectiveness ratio
t_{net}	minimum thickness
W_p	width of the plate in the direction perpendicular to the long dimension of the tooth slots, expressed in millimetres
α	angle between the direction of the applied force and the major axis of the plate [see Figure 1 c)]
θ	angle between the direction of the applied force and the direction of the grain of the timber [see Figures 1 a) and b)]



a) Tooth slot direction parallel to load



b) Tooth slot direction perpendicular to load



c) Tooth slot direction at angle to load

- a Load direction.
- b Grain direction.
- c Tooth slot direction.

Figure 1 — Relationship between the loading direction and the major axis of the plate or the timber grain direction

5 Materials

5.1 Timber

5.1.1 The timber shall be selected in accordance with ISO 8970.

5.1.2 For determination of the tensile strength, compression strength and shear strength of the plate, the timber shall be sufficiently strong for failure to occur in the plate.

5.1.3 The timber shall have a thickness consistent with the timber being used in production.