INTERNATIONAL STANDARD

ISO 19323

First edition
2018-09

Timber structures — Joist hangers — Test methods

Structures en bois — Étriers à solive — Méthodes d'essai

Reference number
ISO 19323:2018(E)

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Published in Switzerland

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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 165, *Timber structures*.

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.

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Introduction

Joist hangers are an integral part of timber constructions in that they provide a necessary means of connection between timber elements and also between timber elements and other materials such as metal, concrete and masonry. Hangers are made predominantly from light gauge steel sheet which is electrolytically or hot-dipped galvanised and which is bent into a formed three-dimensional element – mostly U-shaped to allow for a bearing seat and lateral support to the joist. For high corrosion zones, stainless steel is often used in lieu of galvanised steel sheet. Hangers may also be made from welded steel plates.

To provide a suitable connection, the joist hangers are capable of transferring forces in a range of directions depending on the make-up of the joint. Fasteners (e.g. nails, screws, bolts and dowels and proprietary fasteners) are inserted in the pre-punched or pre-drilled holes of the joist hanger plates (bearing seat, face and top plate) to secure the connection between the joint elements. The purpose of this document is to provide standard test procedures that can be used to determine the strength of a joint incorporating a joist hanger.

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Timber structures — Joist hangers — Test methods

1 Scope

This document provides standard test methods for determining the vertical load, axial load and torsional moment capacity as well as deflection characteristics of preformed three-dimensional joist hangers that are used primarily for securing one timber member to another (the header can be concrete or masonry). The joist hangers primarily transfer vertical loads from the supported member to the supporting member, but they can also be required to transfer axial loads from the supported member to the supporting member.

NOTE 1 Structural steel sections can also be substituted as the header, but are not covered in this document.

NOTE 2 One secondary mechanism to be considered is the effect of rotation of the supported member about its longitudinal axis on the joist hanger.

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 1920-4, *Testing of concrete — Part 4: Strength of hardened concrete*

ISO 1920-6, *Testing of concrete — Part 6: Sampling, preparing and testing of concrete cores*

ISO 7500-1, *Metallic materials — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system*

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

ISO 9652-4, *Masonry — Part 4: Test methods*

ISO 10984-1, *Timber structures — Dowel-type fasteners — Part 1: Determination of yield moment*

ISO 10984-2, *Timber structures — Dowel-type fasteners — Part 2: Determination of embedding strength*

ISO 13061-1, *Physical and mechanical properties of wood — Test methods for small clear wood specimens — Part 1: Determination of moisture content for physical and mechanical tests*

ISO 13061-2, *Physical and mechanical properties of wood — Test methods for small clear wood specimens — Part 2: Determination of density for physical and mechanical tests*

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:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

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3.1
supporting member
header
member supporting a joist hanger

3.2
supported member
joist
bending or a tension member supported by a joist hanger

3.3
joist hanger
metal device, usually cold-formed from light-gauge steel sheet, used to transfer loads from a joist to a header member or wall in building construction

Note 1 to entry: Face-mounted joist hangers contact the side surface of the header and do not contact the top of the header. Top-mounted hangers are joist hangers that contact the side and top surface of the header.

Note 2 to entry: Joist hangers may also be constructed from welded steel plate. Joist hangers may also fit within a vertical recess in the joist (concealed). Joist hangers may also consist of two interacting brackets, one connected to the header and one connected to the end of the joist.

4 Symbols

P_t mean of the maximum loads achieved in the vertical load test

5 Materials

5.1 Timber

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

NOTE When timber is selected in accordance with ISO 8970 the measured load carrying capacities need not be modified, provided that the coefficient of variation of the density of the selected timber reflects the natural variation of density.

5.1.2 For the determination of the vertical load strength, tensile strength (along the line of the supported member axis) and torsional strength of the joist hanger, the timber shall be sufficiently strong for failure to occur in the joist hanger and/or its fixings.

5.1.3 The supported member timber width shall match the manufacturer's specified width for the joist hanger being tested.

5.1.4 The timber used as joist and headers shall be consistent with the timber being used in construction, i.e. sawn timber or structural composite lumber (SCL) or glue laminated timber. Installation (including web stiffeners, filler blocks and backer blocks for I-joists) shall also replicate the manufacturer's specifications.

5.1.5 The joist and the header members for the specimens shall be cut so that the area where the joist hanger is located are free from knots, local grain disturbance, fissures (such as shakes, checks and splits) and wane. Elsewhere, the members shall be free from major defects that can lead to premature failure in the timber.

5.1.6 The moisture content of the timber shall be determined in accordance with ISO 13061-1, and its density in accordance with ISO 13061-2. When measuring the moisture content of manufactured wood products, care shall be taken to avoid the effect of adhesives or other non-wood material on readings.

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