SLOVENSKI STANDARD
SIST EN 594:2011

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Lesene konstrukcije - Preskusni postopki - Natezna trdnost in togost lesenih stenskih okvirjev s ploščami (panelov)

Timber Structures - Test methods - Racking strength and stiffness of timber frame wall panels

Holzbauwerke - Prüfverfahren - Wandscheiben-Tragfähigkeit und -Steifigkeit von Wänden in Holztafelbauart

Structures en bois - Méthodes d'essai - Essai de raideur et résistance au contreventement des murs à ossature en bois

Ta slovenski standard je istoveten z: **EN 594:2011**

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91.080.20	Lesene konstrukcije	Timber structures

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Timber structures - Test methods - Racking strength and stiffness of timber frame wall panels

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Foreword

This document (EN 594:2011) has been prepared by Technical Committee CEN/TC 124 “Timber structures”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2011, and conflicting national standards shall be withdrawn at the latest by December 2011.

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

This document supersedes EN 594:1995.

The changes compared to the previous version are:

1) the test standard opened the scope for more types of panels;

2) the test protocol is changed to allow a more straight forward comparison between results of different panels.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies the test method to be used in determining the racking strength and stiffness of timber frame wall panels.

The test method is intended primarily for panels as described, to provide:

comparative performance values for the materials used in the manufacture of the panels, and

data information for use in structural design.

The principle of the test method is suited to other sizes and shapes of panels and to other methods of hold down as well as panels which are partially sheathed and to combinations of panels.

NOTE The method is detailed for a general situation where the client for the test knows the materials to be used in the construction, which may cover a range of different panels and walls and therefore wishes to test a standard configuration of panel. Where specific details are fixed they may be incorporated into the test but any additions or changes to the standard configuration are indicated in the test report and, later, can lead to limitations on the use of the test data.

2 Normative references

EN 322, *Wood-based panels — Determination of moisture content*

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

EN 14358, *Timber structures — Calculation of the characteristic 5-percentile values and acceptance criteria for a sample*

ISO 3130, *Wood — Determination of moisture content for physical and mechanical tests*

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

3 Terms and definitions

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

3.1
timber frame wall panel
structural wall panel consisting of timber framing with sheathing material fixed to one or both faces and are referred to herein as 'panels'

3.2
head binder
piece of timber fixed to the top of the panel for test purposes

3.3
packer
piece of timber fixed to the base of the test rig for test purposes

3.4
racking strength
capacity of a panel to resist a horizontal load in the plane of the panel

3.5
racking stiffness
calculated stiffness of a panel when it is loaded to approximately 40 % of its racking strength

4 Symbols

F applied racking load, in newtons;

F_{max} maximum racking load, in newtons;

$F_{max,est}$ estimated maximum racking load, in newtons;

F_v applied vertical load, in newtons;

R racking stiffness, in newtons per millimetre;

v panel deformation, in millimetre.

5 Requirements for test panels

The dimensions of panels shall be as given in Figure 1. The requirements for other panel sizes and shapes and their testing are given in Annex A.

The edges of all sheathing materials shall be fixed or partly fixed.

Frame fixings should be those used in practice but where this is not known, two 3,87 mm diameter nails of any type with adequate pointside penetration should be used at each rail to stud joint. Frame material should be that recommended for use in practice. Care should be taken to use timber of a quality no better than could be expected in practice. Special care should be taken to ensure that the bottom rail and centre stud timbers (and leading stud if a holding down restraint is attached) are not above average for the timbers used in the tests.

The specification of the timber should follow that used in practice but where this is not known C16 timber with a nominal size of 90 mm × 40 mm is recommended.

NOTE 1 2,4 m is the recommended height of the panel if the height to be used in practice is not known or can vary. The test method is appropriate for panel heights between 2,1 m and 3,0 m.

NOTE 2 If the sheathing is unsuitable for joining two sheets on a single stud, that stud may be replaced by two studs adequately connected along their length. Gaps between sheets should be typical of that used in practice. Where this is unknown a 3 mm gap is recommended.

The standard configuration is for studs at nominal 600 mm centres.

NOTE 3 The number, location and orientation of intermediate studs are not critical to the test panel, and should reflect the normal construction practice except with relation to vertical load. If the construction requires the sheets to be laid with the long edge horizontal, the vertical joint shown in Figure 1 can be replaced by a mid height horizontal joint. The sheathing to one face of the panel will normally consist of two sheets approximately 1,2 m × 2,4 m. Where other sizes of sheet are used in practice they may be substituted and suit the size of the timber frame.

NOTE 4 Test panels may include sheathing on both faces of the panel or more than one layer of sheathing on one face if required by construction practice and if all sheets are considered to contribute to the racking strength or stiffness.

The position and spacing of fixings shall be consistent and follow the specification for the panel.

NOTE 5 Sheathing thickness, sheathing fixings and their spacing are all related directly to test performance. Variation from specification can limit the use of the test results.

6 Test method

6.1 Principle

The test method measures the resistance to racking load of panels which can deform both vertically and horizontally in the plane of the panel.

In this test method, the panel is either fixed to the test rig in the same manner as that used in practice or, if the site fixing arrangement is unknown, the bottom rail of the panel is bolted (or similar) to the test rig and uplift is resisted by the sheathing fixings and also by the vertical loads on the top rail of the panel or holding down restraints.

NOTE 1 Different panels should be tested for each condition of vertical load (see 6.4.2 and 6.4.3). Normally, it is sufficient to test the maximum and minimum conditions of vertical load appropriate to the design of the panel.

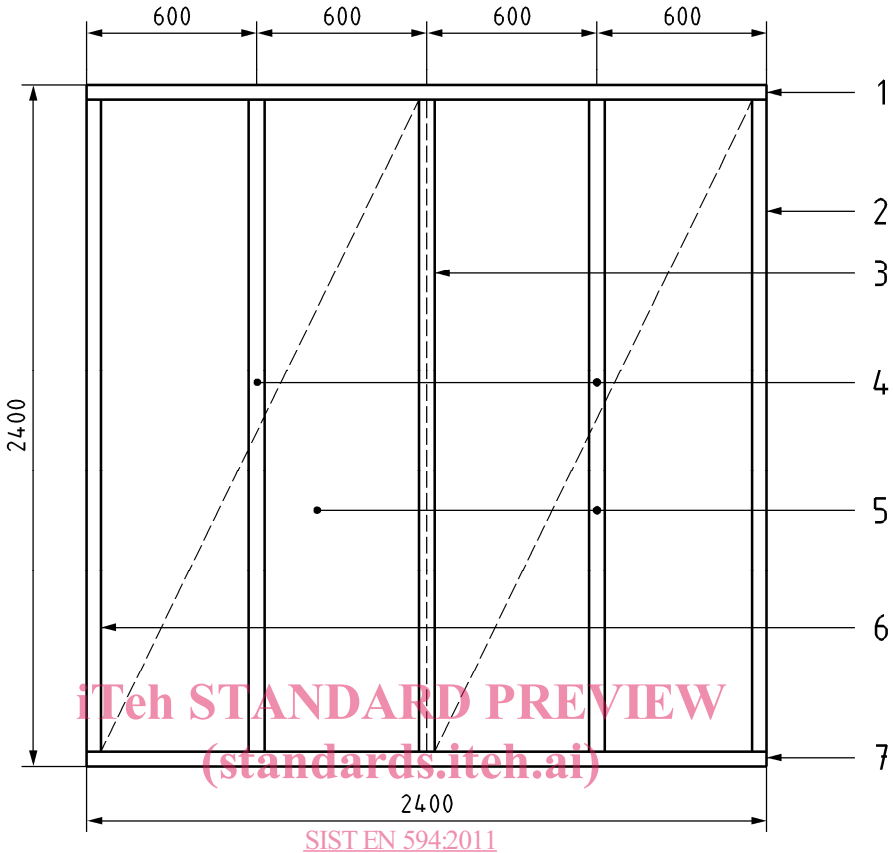
NOTE 2 The number of panels tested will depend on the variability in materials and manufacture, the required level of confidence and the number of loading conditions to be applied. Wherever possible more than three panels of the same design and loading regime should be tested to permit the assessment of the likely variability in performance.

6.2 Apparatus

The test apparatus shall be as shown in Figure 3, and shall be capable of applying separately both racking load F and vertical load F_v. The method of application of loads shall be such that no significant resistance to the in plane racking deformation of the panel is induced.

The apparatus shall be capable of continuously recording the loads F and F_v with an accuracy of ± 3 % of the load applied, or, for loads of less than 0,1 F_{max} with an accuracy of ± 0,3 % F_{max}. The panel displacements shall be measured to the nearest 0,1 mm.

Dimensions in millimetres



Key
1 top rail
2 trailing stud
3 centre stud
4 intermediate studs
5 two 1 200 mm wide sheets joined on centre stud
6 leading stud
7 bottom rail

Figure 1 — Details of test panel

6.3 Base and loading frame

6.3.1 General

The base of the test rig shall provide a level bed to receive the test panel and packer. The base shall be sufficiently stiff so as not to distort during the test. A rigid point reference (independent of the test rig) shall be provided for the measurement of the deformation of the panel.

6.3.2 Mounting of test panel

The panel should be mounted on a packer and secured through the packer to the base of the test rig in such a way that the base fixing detail models that used in practice.

Where the site fixing is unknown or may vary in practice, the bottom rail may be fixed in a manner so as to restrain the bottom rail from sliding, rotating and cupping under uplift forces in order to provide an upper bound datum such that the maximum racking capacity of the panel and its components can be tested.