



# SLOVENSKI STANDARD

## SIST EN 14250:2010

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**Lesene konstrukcije - Zahteve za proizvodnjo predhodno izdelanih konstrukcijskih elementov s kovinskimi ježastimi ploščami**

Timber structures - Product requirements for prefabricated structural members assembled with punched metal plate fasteners

Holzbauwerke - Produktanforderungen an vorgefertigte tragende Bauteile mit Nagelplattenverbindungen

Structure en bois - Exigences de produit relatives aux éléments de structures préfabriqués utilisant des connecteurs à plaque métallique emboutie

**Ta slovenski standard je istoveten z: EN 14250:2010**

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EUROPEAN STANDARD

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## Timber structures - Product requirements for prefabricated structural members assembled with punched metal plate fasteners

Structure en bois - Exigences de produit relatives aux éléments de structures préfabriqués utilisant des connecteurs à plaque métallique emboutie

Holzbauwerke - Produktanforderungen an vorgefertigte tragende Bauteile mit Nagelplattenverbindungen

This European Standard was approved by CEN on 3 December 2009.

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## Foreword

This document (EN 14250:2010) has been prepared by Technical Committee CEN/TC 124 “Timber structures”, the secretariat of which is held by SFS.

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of an identical text or by endorsement, at the latest by July 2010, and conflicting national standards shall be withdrawn at the latest by July 2010.

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 14250:2004.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

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.

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**EN 14250:2010 (E)****1 Scope**

This European Standard specifies material, product and documentation requirements for prefabricated structural members (e.g. trusses for roofs, walls and floors, frames, composite beams and girders) for use in buildings made from solid structural timber according to EN 14081-1 with or without finger joints assembled with punched metal plate fasteners.

This document is valid for trusses with lengths up to 35 m and for other prefabricated structural members with spans up to 12 m.

The standard also covers tests and/or calculation methods to carry out the evaluation of conformity, requirements for the marking of these members, and external conditions (service class 3 in accordance with EN 1995-1-1 or use classes 3, 4 and 5 in accordance with EN 335-1).

As regards resistance to biological organisms, this standard covers prefabricated structural members manufactured from either untreated timber or timber treated to improve its natural durability.

This standard does not cover prefabricated timber structural members intended to be used in constructions under predominantly dynamic loads (e.g. bridges) or for use in unprotected external conditions (i.e. use class 3 in accordance with EN 335-1).

Furthermore, it does not cover members treated to improve their fire performance.

**2 Normative references**

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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. [SIST EN 14250:2010](https://standards.iteh.ai/catalog/standards/sist/d8e3499b-775b-4acd-89bf-2d1901f55101)

[https://standards.iteh.ai/catalog/standards/sist/d8e3499b-775b-4acd-89bf-](https://standards.iteh.ai/catalog/standards/sist/d8e3499b-775b-4acd-89bf-2d1901f55101)

EN 335-1, *Durability of wood and wood-based products — Definition of use classes — Part 1: General*

EN 335-2, *Durability of wood and wood-based products — Definition of use classes — Part 2: Application to solid wood*

EN 336:2003, *Structural timber — Sizes, permitted deviations*

EN 350-2, *Durability of wood and wood-based products — Natural durability of solid wood — Part 2: Guide to natural durability and treatability of selected wood species of importance in Europe*

EN 844-3, *Round and sawn timber — Terminology — Part 3: General terms relating to sawn timber*

EN 844-9:1997, *Round and sawn timber — Terminology — Part 9: Terms relating to features of sawn timber*

EN 1310, *Round and sawn timber — Method of measurement of features*

EN 1990, *Eurocode — Basis of structural design*

EN 1991 (all parts), *Eurocode 1 — Actions on structures*

EN 1995-1-1, *Eurocode 5: Design of timber structures — Part 1-1: General — Common rules and rules for buildings*

EN 1995-1-2, *Eurocode 5: Design of timber structures — Part 1-2: General — Structural fire design*

EN 13183-2, *Moisture content of a piece of sawn timber — Part 2: Estimation by electrical resistance method*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

EN 13501-2, *Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance tests, excluding ventilation services*

EN 13823, *Reaction to fire tests for building products — Building products excluding floorings exposed to the thermal attack by a single burning item*

EN 14081-1, *Timber structures — Strength graded structural timber with rectangular cross section — Part 1: General requirements*

EN 14545, *Timber structures — Connectors — Requirements*

EN 15228, *Structural timber — Structural timber preservative treated against biological attack*

prEN 15497, *Finger jointed structural timber — Performance requirements and minimum production requirements*

EN ISO 9001:2008, *Quality management systems — Requirements (ISO 9001:2008)*

### 3 Terms and definitions

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

#### 3.1

##### **anchorage area**

surface area of timber occupied by the plate projections in any particular member

#### 3.2

##### **batch**

all the structural members produced according to the same specifications in one shift

#### 3.3

##### **dead knot**

knot that on the considered surface is intergrown with the surrounding wood for less than one quarter of the cross-sectional perimeter, as defined in EN 844-9:1997

#### 3.4

##### **effective thickness/width**

actual thickness/width as defined in EN 336:2003 minus any wane present on the edge being considered

#### 3.5

##### **internal bracing**

element to prevent lateral buckling of a compression member

#### 3.6

##### **live knot**

##### **intergrown knot**

knot that on the considered surface is intergrown with the surrounding wood for more than three quarters of the cross-sectional perimeter as defined in EN 844-9:1997

#### 3.7

##### **plate projection**

plate tooth, plate nail or burst used for the purpose of transferring forces between members

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**3.8 punched metal plate fastener**  
metal plate having integral projections punched out in one direction perpendicular to the base of the plate, being used to join two or more pieces of timber of the same thickness in the same plane

**4 Material requirements****4.1 Timber****4.1.1 Structural timber**

The following requirements shall apply:

- a) Structural timber shall be strength graded using grading standards and methods complying with EN 14081-1.
- b) In addition to the specified grade requirements, structural timber shall also meet the following criteria for geometrical defects, i.e. spring, bow, twist and cup as defined in EN 844-3 and measured in accordance with EN 1310:
  - 1) spring: 4 mm maximum per 2 m length;
  - 2) bow: 6 mm maximum per 2 m length;
  - 3) twist: 2 mm maximum per 25 mm width per 2 m length;
  - 4) cup: 2 mm maximum per 100 mm of face.

**4.1.2 Finger jointed timber**

Finger jointed timber shall meet the requirements of prEN 15497.

**4.1.3 Dimensional stability**

Timber complying with EN 14081-1 shall be deemed to satisfy requirements for performance of this characteristic. In addition preventive structural measures suitable for the protection from biological infestation with fungi and insects should be taken into account.

**NOTE** Dimensional stability of the member is given as the swelling and shrinkage of timber due to changes of its moisture content in perpendicular to grain and parallel to grain direction.

**4.1.4 Reaction to fire**

The class of reaction to fire performance of the structural timber used for the prefabricated member (including the additional classification on smoke production and flaming droplets/particles, if any) shall be determined and declared according to EN 13501-1:

- a) either without the need for further testing (CWFT), as given in Table 1<sup>1)</sup>, if the timber is proved to meet the requirements of the class given therein for timber without preservative treatment as well as for preservative treated timber when the preservative treatment does not result, when dry, in an addition in the analytical zone of the treated timber of more than 2 % by mass of organic material; or

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1) This table is the same as given in the Decision of the Commission 2003/43/EC of 2003-01-17 (see OJEU L 13 of 2003-01-18), as amended firstly by 2003/593/EC of 2003-08-07 (see OJEU L 201 of 2003-08-08), secondly by 2006/673/EC of 2006-10-05 (see OJEU L 276 of 2006-10-07) and thirdly by 2007/348/EC of 2007-05-15 (see OJEU L 131 of 2007-05-23), and corrected by the Corrigendum (see OJEU L 33 of 2003-02-08).



- b) based on testing of the timber according to the standards referred to in EN 13501-1, when the timber does not meet the requirements of Table 1 or where a higher classification than the one in a) is sought.

When option b) is applied and where required by the test method, the structural member shall be mounted and fixed in a manner representative of its intended end use.

When tested according to EN 13823, the timber shall be mounted in accordance with the following:

- c) the whole area of both wings in the SBI apparatus shall be covered with timber pieces mounted edge to edge (butt jointed), without jointing or bonding and orientated horizontally or vertically, supported by
- d) timber battens, minimum 40 mm × 40 mm, fixed to the test backing boards at 400 mm to 600 mm centres horizontally or vertically (perpendicular to the orientation of the timber pieces).

**Table 1 – Structural timber considered as classified without the need for further testing (CWFT)**

Product <sup>a</sup>	Product details	Minimum mean density <sup>c</sup> kg/m <sup>3</sup>	Minimum overall thickness mm	Class <sup>b</sup> (excluding floorings)
Structural timber	Visual and machine graded structural timber with rectangular cross-sections shaped by sawing, planing or other methods	350	22	D-s2, d0
<p><sup>a</sup> Applies to all species covered by the product standards.</p> <p><sup>b</sup> Class as provided for in Table 1 of the Annex to Decision 2000/147/EC.</p> <p><sup>c</sup> Conditioned according to EN 13238.</p>				

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#### 4.1.5 Resistance to biological organisms

##### 4.1.5.1 Timber without preservative treatment

The timber shall have adequate natural durability in accordance with EN 350-2 for the intended use class as defined in EN 335-1 and EN 335-2 and the durability class shall be declared.

##### 4.1.5.2 Timber with preservative treatment

If preservative treated timber is used, the durability class, type of preservative, critical retention value and penetration class in accordance with EN 15228 shall be declared.

## 4.2 Punched metal plate fasteners

The fasteners used for prefabricated timber structural members shall comply with EN 14545.

In addition, if the timber is preservative treated against biological organisms, the fasteners treatment against corrosion shall be compatible with the preservative used.

NOTE When timber is treated with substances which cause corrosion (e.g. copper salts or organic substances) connectors made of austenitic stainless steel or galvanized (Z275 or Z350) can be used in use classes 1 and 2.

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## 5 Prefabricated member requirements

### 5.1 Mechanical resistance

#### 5.1.1 General

The mechanical resistance shall be determined and declared in terms of:

- load-bearing capacity; and
- stiffness (declared normally as deflection for a specified load/unit load).

Influence of preservative treatment on mechanical resistance shall be assessed according to EN 15228.

#### 5.1.2 Determination and declaration

The mechanical resistance (i.e. load-bearing capacity and stiffness) of the prefabricated structural member shall be determined and declared according to one of the following methods:

- a) Method 1: By reference to dated drawings of the structural member with information on the geometrical data and reference to the material properties of the structural components and punched metal plate fasteners used, necessary to calculate characteristic load-bearing capacities and stiffness according to method(s) valid in the Member State of the intended use of this structural member.

NOTE 1 This method is assumed to reflect Method 1 in Guidance Paper L. By this method the characteristic mechanical resistance is indirectly declared. It may be relevant for a structural member manufactured according to the manufacturer's specification and put on the market, e.g. on the retailer shelves, without necessarily knowing the works where the member is going to be used.

- b) Method 2: Directly, by calculating the characteristic values or design values for the load-bearing capacities and stiffness of the structural member according to the method(s) given in EN 1995-1-1 with possibly reference to the used sets of National Determined Parameters (NDPs), if any, valid in the Member State of the intended use of the structural member.

NOTE 2 This method is assumed to reflect Method 2 in Guidance Paper L. By this method the characteristic mechanical resistance is directly declared. It may be relevant for a structural member manufactured according to the manufacturer's specification and put on the market without necessarily knowing the works where the member is going to be used, e.g. for catalogue products, like trussed beams.

- c) Method 3a: By declaring compliance with the given production documents of the structural member, together with the information on the purchaser and the party responsible for the structural design of the member.

NOTE 3 This method is assumed to reflect Method 3a in Guidance Paper L. By this method the characteristic mechanical resistance is indirectly declared. It may be relevant for a structural member made to measure according to the purchaser's order.

- d) Method 3b: By declaring compliance with a given structural design specification of the structural member produced and held by the manufacturer showing that the member is able to resist all the relevant actions affecting it in the ultimate limit state and satisfies specified serviceability requirements in a specific part of works. Structural design specification of the member is based on information (e.g. actions and deflection limits) from a specific part of works according to the design requirements in the Member State of its intended use (EN 1990, EN 1991 and EN 1995-1-1), with possibly reference to the relevant National Annexes defining the National Determined Parameters/method(s) valid in the Member State of the intended use of the structural member.

NOTE 4 This method is assumed to reflect Method 3b in Guidance Paper L. By this method the characteristic mechanical resistance is indirectly declared. It may be relevant for a structural member made to measure according to the structural design specification prepared by the manufacturer when the works where the member will be used is known.

## 5.2 Reaction to fire

Reaction to fire performance shall be as those of the material (timber) according to 4.1.4.

NOTE It is assumed that metal plate fasteners do not influence the reaction to fire performance of the assembled component.

## 5.3 Fire resistance

Where required, the fire resistance performance shall be declared according to EN 13501-2, after being:

- tested in end-use condition in accordance with test standards given in EN 13501-2; or
- calculated according to EN 1995-1-1 and EN 1995-1-2.

## 5.4 Other member characteristics

### 5.4.1 Timber sizes and tolerances

Size tolerances of the structural member shall as a minimum be in accordance with tolerance class 2 given in EN 336:2003.

Timber sizes shall be not less than:

- thickness (width), all members: 35 mm;
- depth, external (chord) members: 68 mm;
- depth, internal (web or diagonal) members: 58 mm.

The effective thickness, as defined in 3.4, of the outer face of any chord member shall not be less than 35 mm.

Any damage due to handling of the structural member shall be prevented:

- either by applying EN 1995-1-1; or
- by using the following minimum thickness requirement "b", in millimetres (mm), for the members:

$$b = \frac{1,8 l^2}{f_{m,k}}$$

where

$l$  is the overall length of the member, in metres (m);

$f_{m,k}$  is the characteristic bending strength of the member, in Newtons per square millimetre (N/mm<sup>2</sup>).

NOTE Attention should be drawn on the influence of thickness of structural members on their out-of-plane behaviour. This aspect should be addressed in the design, especially when the structural members are subject to high loads.

### 5.4.2 Wane

Wane shall not occur within the area of any jointing device or within support areas of the prefabricated timber structural member.

### 5.4.3 Joint gaps

Within the area of the fastener, the average gap between two adjacent parts of the prefabricated timber structural members at the time of fabrication shall not exceed 1,5 mm.

**EN 14250:2010 (E)****5.4.4 Moisture content**

The maximum moisture content of the timber and of timber wedges, if any, at the time of fabrication of the prefabricated timber structural member shall not exceed 22 %. The moisture content shall be estimated in accordance with EN 13183-2 using a calibrated electric resistance moisture meter.

**5.4.5 Dimensional accuracy of member**

The overall horizontal and vertical dimensions of the structural member shall not deviate from the specified dimensions by more than:

- dimensions up to and including 10 m:  $\pm 10$  mm;
- dimensions more than 10 m:  $\pm 1$  mm/m.

The dimensional variation between members within the same batch shall not differ by more than 10 mm.

**5.4.6 Dimensional stability**

If required, swelling and shrinkage of prefabricated structural members shall be calculated according to EN 1995-1-1, using the material properties given in 4.1.3.

NOTE Dimensional stability of the member is given as the swelling and shrinkage of timber due to changes of its moisture content in perpendicular to grain and parallel to grain direction.

**5.4.7 Camber**

At the time of fabrication of the timber structural member, camber shall be within a tolerance of 25 % of the camber specified in the design.

**5.4.8 Live knots**

Live knots shall be permitted within the anchorage area of the prefabricated timber structural member, provided that the plate projections are satisfactorily embedded without visible distortion of the fasteners or splitting of the timber outside the knot.

**5.4.9 Dead knots, knot holes or fissures**

Where a dead knot, knot hole, or fissure occurs within the anchorage area of the prefabricated timber structural member, the area of effective plate projections, disregarding those in the dead knot, knot hole or on the line of the fissure shall be in accordance with that specified in the design. Fissures which do not extend more than 50 mm from the tooth, burst or plate nail which apparently caused them, shall be disregarded.

**5.4.10 Fastener positioning**

Fasteners used for the prefabricated timber structural member shall not be misplaced by more than the amount considered in the structural design and not more than 10 mm in any direction in relation to the design position.

**5.4.11 Fastener embedment**

The plate projections of the fastener shall be inserted perpendicular to the embedment surface of the timber and the plate surface shall be free of distortion. Any gap between the timber surface and the underside of a punched metal plate fastener shall not exceed 1 mm and shall not occur over more than 25 % of the anchorage area in any prefabricated timber structural member in any joint.

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