



SLOVENSKI STANDARD
SIST EN 14080:2005
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Lesene konstrukcije – Lepljeni lamelirani les – Zahteve

Timber structures - Glued laminated timber - Requirements

Holzbauwerke - Brettschichtholz - Anforderungen

Structures en bois - Bois lamellé collé - Exigences

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Ta slovenski standard je istoveten z: EN 14080:2005

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This European Standard was approved by CEN on 25 April 2005.

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Foreword

This European Standard (EN 14080:2005) 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of an identical text or by endorsement, at the latest by December 2005, and conflicting national standards shall be withdrawn at the latest by March 2007.

This European Standard 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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1 Scope

This European Standard specifies the requirements for glued laminated timber for use in load bearing structures.

It also specifies the requirements for large finger joints in the glued laminated timber.

This European Standard specifies the requirements for glued laminated timber produced from untreated timber or from timber treated against biological attack.

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.

EN 301:1992, *Adhesives, phenolic and amino plastic, for load-bearing timber structures – Classification and performance requirements*

EN 302-1, *Adhesives for load-bearing timber structures – Test methods – Part 1: Determination of bond strength in longitudinal tensile shear strength*

EN 302-2, *Adhesives for load-bearing timber structures – Test methods – Part 2: Determination of resistance to delamination*

EN 302-3:2004, *Adhesives for load-bearing timber structures – Test methods – Part 3: Determination of the effect of acid damage to wood fibres by temperature and humidity cycling on the transverse tensile strength*

EN 302-4, *Adhesives for load-bearing timber structures – Test methods – Part 4: Determination of the effect of wood shrinkage on the shear strength*

ENV 302-5, *Adhesives for load-bearing timber structures – Test methods – Part 5: Determination of the conventional assembly time*

EN 302-6:2004, *Adhesives for load-bearing timber structures – Test methods – Part 6: Determination of the conventional pressing time*

EN 302-7, *Adhesives for load-bearing timber structures – Test methods – Part 7: Determination of the conventional working life*

EN 350-1, *Durability of wood and wood-based products – Natural durability of solid wood – Part 1: Guide to the principles of testing and classification of the natural durability of wood*

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 384, *Structural timber – Determination of characteristic values of mechanical properties and density*

EN 385:2001, *Finger jointed structural timber – Performance requirements and minimum production requirements*

EN 386:2001, *Glued laminated timber – Performance requirements and minimum production requirements*

EN 387:2001, *Glued laminated timber – Large finger joints – Performance requirements and minimum production requirements*

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EN 390, *Glued laminated timber – Sizes – Permissible deviations*

EN 408, *Timber structures – Structural and glued laminated timber – Determination of some physical and mechanical properties*

EN 717-1, *Wood-based panels – Determination of formaldehyde release – Part 1: Formaldehyde emission by the chamber method*

EN 1194:1999, *Timber structures – Glued laminated timber – Strength classes and determination of characteristic values*

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

EN 13238, *Reaction to fire tests for building products – Conditioning procedures and general rules for selection of substrates*

EN 14358, *Timber structures - Fasteners and wood-based products - Calculation of characteristic 5-percentile values and acceptance criteria for a sample*

prEN 15228, *Structural timber – Structural timber preservative treated against biological attack*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 385:2001, EN 386:2001 and EN 387:2001 together with the following apply.

3.1

characteristic density

population lower 5-percentile value with mass and volume corresponding to equilibrium moisture content at a temperature of 20 °C and a relative humidity of 65 %

3.2

characteristic strength

population lower 5-percentile value obtained from the results of tests with a duration of 300 s using test pieces at an equilibrium moisture content resulting from a temperature of 20 °C and a relative humidity of 65 %

3.3

characteristic bending strength of glued laminated timber

strength related to a depth of 600 mm

3.4

characteristic tensile strength of glued laminated timber

strength parallel to the grain related to a width of 600 mm

3.5

characteristic compression strength of glued laminated timber

strength parallel to the grain

3.6

characteristic shear strength of glued laminated timber

strength related to a specimen with a uniformly stressed volume of 0,000 5 m³

3.7

characteristic modulus of elasticity of glued laminated timber

population mean value obtained under the same climate conditions as defined in 3.1

4 Requirements

4.1 Performance requirements

Glued laminated timber shall comply with the performance requirements given in Clause 5 of EN 386:2001.

All products shall have deviations from target sizes within the tolerances of EN 390.

Large finger joints in glued laminated timber shall comply with the performance requirements given in Clause 5 of EN 387:2001.

4.2 Strength and stiffness properties of glued laminated timber

4.2.1 General

Characteristic values for strength in bending, tension parallel to the grain, compression parallel to the grain and shear, and modulus of elasticity in bending shall be verified by one of the following methods:

- a) tests as described in 4.2.2;
- b) calculations based on documented strength and stiffness properties as described in 4.2.3;
- c) classification from the properties of the laminations as described in 4.2.4.

Where glued laminated timber has been produced to meet the requirements of a strength class in EN 1194, the above characteristic values shall be taken from the tables in EN 1194:1999.

4.2.2 Verification from tests with glued laminated timber

When testing glued laminated timber for strength, the tests shall be in accordance with EN 1194:1999, 6.2. The characteristic values shall be derived in accordance with the methods given in Annex A of this document.

The representative sample shall be of a size n not less than 30 selected from at least three batches.

The declared characteristic tensile or bending strength of the laminate end joints shall be documented from at least 100 specimens.

End joints in all lamination grades shall be tested. The sample of each grade shall be at least 200 taken from at least three batches. If the end joint strength is within 20 % of the value predicted from the equations in 6.3.2 and Annex A of EN 1194:1999 the sample size may be reduced to at least 100.

4.2.3 Verification from calculations and documented properties of the laminations

When using calculations to determine strength properties, the characteristic strength properties and the mean value of the modulus of elasticity of the glued laminated timber shall be determined from calculations based on documented properties of the laminations and their end joints.

The representative sample of timber from at least three different sources shall be of a size n in accordance with EN 384 and shall be not less than a total of 300.

The declared characteristic tensile or bending strength of the laminate end joints shall be documented. End joints in all lamination grades shall be tested. The sample size of each grade shall be at least 100.

For horizontally laminated glued laminated timber with four or more laminations the calculation method given in 6.3 of EN 1194:1999 shall be used.

4.2.4 Classification from lamination properties

When classifying from lamination properties, the glued laminated timber shall be allocated to a strength class based on lamination properties as described in EN 1194.

NOTE EN 1194:1999, Annex B gives the glulam strength class for a given strength class of the timber.

4.3 Bonding strength of large finger joints

The bonding strength of large finger joints shall be evaluated as the bending strength of the joints.

For large finger joints with a specific geometry in the glued laminated member made from a specific species the characteristic bending strength of the joints in straight beams shall be derived from tests in accordance with EN 408.

The sample size n shall be not less than 20 selected from at least four batches.

The specimens and the testing of large finger joints shall be in accordance with Clause 8 of EN 387:2001.

The characteristic bending strength shall be calculated from Annex A of this document.

For the initial type testing of large finger joints produced with a finger geometry and a wood species for which the characteristic bending strength has been determined previously, the number of finger joint samples shall be at least five and they shall be taken from joints in glued laminated timber of the highest strength to be produced.

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4.4 Durability against biological attack

4.4.1 Natural durability

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The natural durability of the wood, from which the glued laminated timber is manufactured, against biological attacks shall be assessed in accordance with EN 350-1 and EN 350-2.

4.4.2 Glued laminated timber treated against biological attack

Provisions related to preservative treated timber against biological attack are given in prEN 15228.

4.5 Bonding strength of end joints and glue lines

4.5.1 General

The adhesive shall be capable of producing strong and durable joints so that the integrity of the bond is maintained throughout the intended lifetime of the structure for the defined service class.

Acceptable strength and durability can be achieved by the use of:

- polycondensation adhesive of the phenolic or aminoplastic type as defined in EN 301;
- polyurethane adhesive tested and assessed in accordance with the requirements given in Annex C of this document.

Adhesives of type I according to EN 301 may be employed for structural members to be used in all Service Classes.

Adhesives of type II according to EN 301 may only be used for Service Class 1 and 2 provided the temperature of the member in the structure will always be below 50 °C.

4.5.2 End joints in the laminations

The bonding strength of the end joints shall be tested in flat wise bending or tension as described in EN 408.

The characteristic bending strength shall be in accordance with Annex A of this document.

The compliance criteria of EN 1194:1999, 6.3.2 shall be fulfilled.

4.5.3 Glue lines

The bonding strength of the glue lines shall be tested as a glue line integrity test according to one of those defined in EN 386:2001, 5.5.

The compliance criteria of EN 386:2001, 5.5 shall be fulfilled.

4.6 Reaction to fire

Where the manufacturer wishes to claim performance (e.g. when the product is subject to regulatory requirements), the glued laminated timber with or without large finger joints shall be either:

- tested and classified in accordance with EN 13501-1. Testing shall be carried out as specified by the relevant test standards cited in EN 13501-1;
- classified without further testing (CWFT) for glued laminated timber covered by Annex E.

4.7 Formaldehyde emission

The glued laminated timber produced using a formaldehyde-containing adhesive shall be classified in accordance with EN 717-1 and Annex B of this document. Testing shall be carried out with the relevant wood species.

According to Annex B of this document, glued laminated timber may be classified into Class E1 or E2.

5 Evaluation of conformity

5.1 General

The compliance of glued laminated timber, with or without large finger joints, with the requirements of this document and the declared values (including classes) shall be demonstrated by:

- initial type testing or assessment;
- factory production control by the manufacturer.

5.2 Initial type testing or assessment

Initial type testing or assessment shall be performed to demonstrate conformity to this document. Properties which shall be tested and/or assessed are stated in Table 1.

For initial type testing, the bonding strength of end joints in the laminations, glue lines and large finger joints shall be verified by testing and evaluating specimens from a representative sample drawn from the production of the manufacturer. One sample shall be drawn from each production line.

For glued laminated timber the strength properties (bending, tensile, compression and shear), modulus of elasticity and durability shall be verified either from tests of samples drawn from the production of the manufacturer, or from tests of glued laminated timber produced from the same species, grades and adhesives.

For large finger joints the bending strength and durability shall be verified either from tests of samples drawn from the production of the manufacturer, or from tests of large finger joints in glued laminated timber produced from the same species, grades, adhesives and finger profile in the large finger joint.

Where testing has previously been performed according to the requirements of this document (same product, same characteristics, test method, sampling procedure, system of attestation of conformity, etc.), such testing may be taken into account for the purpose of initial testing.

Initial type testing or assessment shall also be carried out on products when a change in the basic materials or manufacturing procedures affects the declared properties. New tests or assessments shall only be performed for those characteristics affected by the change, not necessarily all characteristics.

Where evaluation is by calculation (4.2.3) or classification from lamination properties (4.2.4), the lamination properties shall be determined according to 4.2.3. If a change of lamination properties is such as to change the calculated strength or classification, the calculation or classification shall be repeated.

5.3 Factory production control

The manufacturer shall establish, document and maintain a factory control scheme to ensure that the products placed on the market conform to the stated performance characteristics. Subsequently, any fundamental changes in basic materials, manufacturing procedures or the control scheme that affects the properties or use shall be recorded in a manual.

The manual shall include the factory production control procedures relevant to the declared properties, as confirmed by the initial tests or calculations. The factory control procedures shall consist of a system for the permanent internal control of the production of the products to ensure that the products subsequently placed on the market comply with this document and the declared values.

The continuous internal control shall consist of:

- inspections, checks and tests and the utilisation of the results to control equipment, raw or incoming materials and the production process;
- inspections, checks and tests on samples from the finished products or parts of them.

The scheme for the factory production control for a traditional production of glued laminated timber in Clause 7 of EN 386:2001 can be used.

The scheme for the production control for large finger joints in glued laminated timber in Clause 7 of EN 387:2001 can be used.

These schemes will need to be supplemented to take into consideration any special production methods, conditions, materials or functional requirements.

The factory production control defined in these two standards shall be documented and implemented. Any deviations shall be noted and recorded.

Procedures to be followed when control values and criteria are not met shall be established.

The manufacturer shall document from calibration tests his capability to select specimens and to conduct the tests prescribed by EN 386 and/or EN 387. The sample size is given in Table 1.

Table 1 – Properties to be tested or assessed

Properties to be tested or assessed	Testing and assessment method given in clause	Number of specimens	Compliance criteria
Glued laminated timber: bending strength, compressive strength, tensile strength, shear strength and modulus of elasticity	4.2	According to 4.2	The characteristic values estimated according to 4.2 shall be larger than the declared values
Bonding strength: bending strength of large finger joints	4.3	According to 4.3	The characteristic bending strength according to 4.3 shall be larger than the declared value
Natural durability	4.4.1	According to EN 350-1	The requirement for the declared durability Class 1, 2, 3, 4 or 5 shall be fulfilled. See 4.4.1
Glued laminated timber treated against biological attack	4.4.2	see prEN 15228	The requirements for the declared use class number shall be fulfilled. See 4.4.2
Bonding strength			
– End joints in laminations	4.5.2	15	According to 4.5.2
– Glue line integrity	4.5.3	10 full cross sectional specimens	According to 4.5.3
Reaction to fire	4.6	CWFT or according to EN 13501-1	The requirements for the declared class shall be fulfilled
Formaldehyde emission	4.7	According to EN 717-1	The requirements for the declared class shall be fulfilled

6 Marking and labelling

Products complying with this document shall be clearly marked on the product or on a durable label with the following information:

- number of this document;
- identity of the manufacturer, logo or name;
- characteristic values. This may be done by reference to a documented strength profile or a strength class defined in EN 1194;
- adhesive type, e.g. I or II according to EN 301;
- production week and year.