SLOVENSKI STANDARD
SIST EN 16351:2015

01-december-2015

Lesene konstrukcije - Križno lamelirani les - Zahteve

Timber structures - Cross laminated timber - Requirements

Holzbauwerke - Brettsperrholz - Anforderungen

Structures en bois - Bois lamellé croisé - Exigences

Ta slovenski standard je istoveten z: EN 16351:2015

ICS:

79.060.10	Vezan les	Plywood
91.080.20	Lesene konstrukcije	Timber structures

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English Version

Timber structures - Cross laminated timber - Requirements

Structures en bois - Bois lamellé croisé - Exigences

Holzbauwerke - Brettsperrholz - Anforderungen

This European Standard was approved by CEN on 29 August 2015.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 16351:2015) 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of an identical text or by endorsement, at the latest by April 2016, and conflicting national standards shall be withdrawn at the latest by July 2017.

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This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports basic work requirements of Regulation (EU) No 305/2011.

For relationship with the EU Regulations, see informative Annex ZA, which is an integral part of this document.

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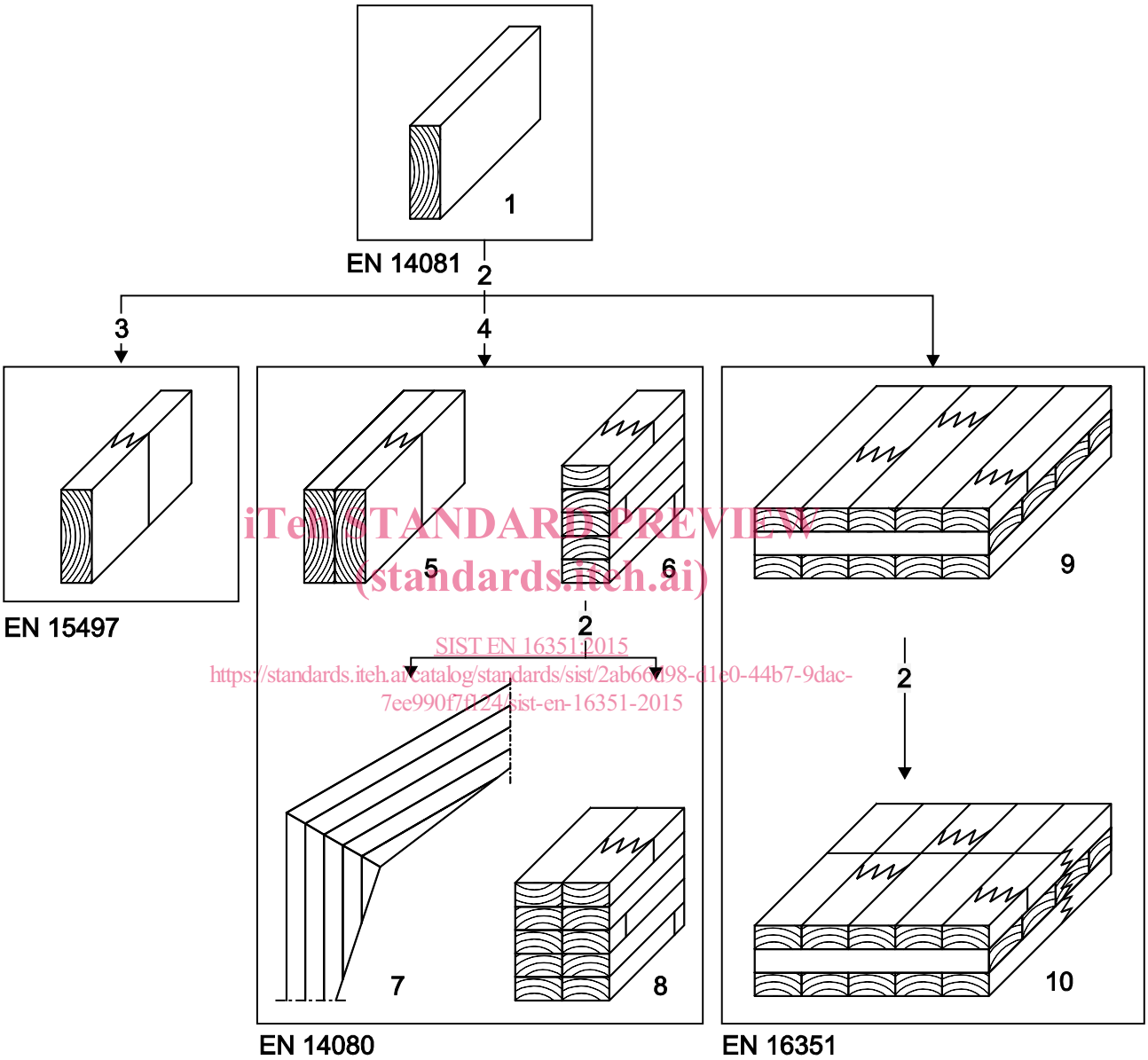
Introduction

Figure 1 shows the relation of European Standards prepared by CEN/TC 124.



Key

1	boards	6	glued laminated timber (glulam)
2	is a component for	7	glulam with large finger joints
3	structural finger jointed timber	8	block glued glulam
4	glued laminated products	9	cross laminated timber (X-Lam)
5	glued solid timber	10	cross laminated timber (X-Lam) with large finger joints

Figure 1 — Relation of European Standards prepared by CEN/TC 124

1 Scope

This European Standard sets out provisions regarding the performance characteristics for straight and curved structural cross laminated timber (X-Lam) both without and with large finger joints as a material for the manufacture of structural elements to be used in buildings and bridges.

This European Standard applies to cross laminated timber:

— to be used in service class 1 or 2 according to EN 1995-1-1;

— made of coniferous species and poplar listed in 5.1.5 of this standard;

— built up of at least three orthogonally bonded layers (at least two of them timber layers);

— having, depending on the number of layers, adjacent layers which may be bonded parallel to the grain;

— made of timber layers which are made of strength graded timber according to EN 14081-1;

— made of timber layers having thicknesses between 6 mm and 60 mm (including) taking into account the layup requirements given in this European standard;

— made of timber layers which may be edge bonded or which are not bonded and have spacing less than 6 mm between adjacent laminations;

— which may comprise wood based panel layers made of structural wood based panels specified in this European standard, fulfilling the requirements for use in service class 2 or 3 according to EN 1995-1-1, having no structural joints between the single panels and having thicknesses between 6 mm and 45 mm (including);

— bonded with adhesives, fulfilling the requirements given in this European standard;

— having overall thicknesses up to 500 mm;

— which is not made from reused timber or wood based panels comprising reused timber.

This European Standard also applies to cross laminated timber with large finger joints:

— made from cross laminated timber pieces having the same cross section and layup;

— made from cross laminated timber pieces having cross sectional thicknesses from 51 mm up to 345 mm (inclusive) and minimum thicknesses of the outermost layers not less than 17 mm.

— made from cross laminated timber pieces solely comprising timber layers;

— made from plane cross laminated timber pieces jointed so that no regular change between the grain directions of the layers occurs;

— with finger joints having a finger length of at least 45 mm and fingers which are visible at the two narrow sides of the components.

This European Standard applies to cross laminated timber treated against biological attack. Cross laminated timber treated with fire retardants is not covered.

It also sets out minimum production requirements and procedures for Assessment and Verification of Constancy of Performance.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 301:2013, *Adhesives, phenolic and aminoplastic, for load-bearing timber structures — Classification and performance requirements*

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

EN 302-2:2013, *Adhesives for load-bearing timber structures — Test methods — Part 2: Determination of resistance to delamination*

EN 302-3:2013, *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 effects of wood shrinkage on the shear strength*

EN 302-6, *Adhesives for load-bearing timber structures — Test methods —- Part 6: Determination of the minimum pressing time under referenced conditions*

EN 338, *Structural timber - Strength classes*

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 408, *Timber structures — Structural timber 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 789:2004, *Timber structures — Test methods — Determination of mechanical properties of wood based panels*

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

EN 13183-1, *Moisture content of a piece of sawn timber — Part 1: Determination by oven dry method*

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

EN 13183-3, *Moisture content of a piece of sawn timber — Part 3: Estimation by capacitance method*

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

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

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

EN 13986, *Wood-based panels for use in construction — Characteristics, evaluation of conformity and marking*

EN 14081-1:2005+A1:2011, *Timber structures — Strength graded structural timber with rectangular cross section — Part 1: General requirements*

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

EN 14374, *Timber structures — Structural laminated veneer lumber — Requirements*

EN 15228:2009, *Structural timber — Structural timber preservative treated against biological attack*

EN 15416-3, *Adhesives for load bearing timber structures other than phenolic and aminoplastic — Test methods — Part 3: Creep deformation test at cyclic climate conditions with specimens loaded in bending shear*

EN 15416-5, *Adhesives for load bearing timber structures other than phenolic and aminoplastic — Test methods — Part 5: Determination of conventional pressing time*

EN 15425:2008, *Adhesives — One component polyurethane for load bearing timber structures — Classification and performance requirements*

3 Terms and definitions

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

3.1
actual size
measured size of a cross laminated timber at a related measured/estimated moisture content

3.2
bonding strength
structural effectiveness of adhesives between timber pieces when subjected to stresses

3.3
corrected size
size of a cross laminated timber corrected by calculation from its actual size to its size at the reference moisture content

3.4
cross laminated timber
X-Lam
structural timber consisting of at least three layers of which a minimum of three are orthogonally bonded, which always comprise timber layers and may also comprise wood-based panel layers

Note 1 to entry: See also 5.2.2.7.

Note 2 to entry: Cross laminated timber in accordance with EN 16351 and multilayer solid wood panels in accordance with EN 13353 may have the same layup but the timber to be used in laminations is strength graded according to EN 14081–1 and the adhesives are tested according to 5.1.6 of this European Standard.

3.5
curved cross laminated timber
cross laminated timber having a precamber greater than 1% of the respective span

3.6
edge bonds
bonds between adjacent laminations within a timber layer

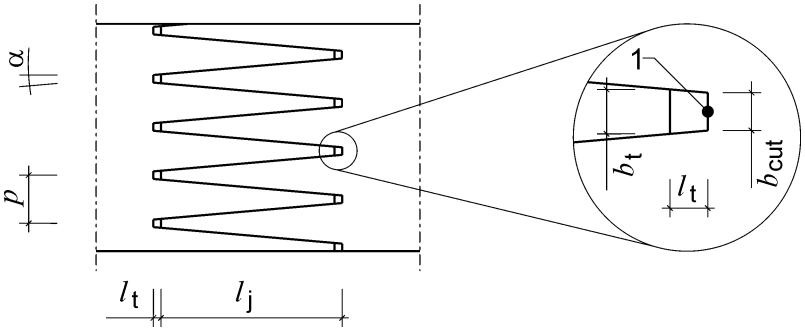
3.7
edge bonded layer
timber layer comprising structural edge bonds

3.8
finger angle
inclination α of each side of the fingers of a finger joint

Note 1 to entry: See Figure 2.

3.9
finger joint
interlocking end joint formed by machining a number of similar, tapered, symmetrical fingers in the ends of timber components using a finger joint cutter and then bonded together

Note 1 to entry: In this European Standard the term finger joint is used for finger joints in laminations whereas finger joints between cross laminated timber are defined as large finger joints (see 3.13).



Key

l_j finger length

p pitch

α finger angle

l_t tip gap

b_{cut} tip width of the cutter

b_t tip width

1 slot base

Figure 2 — Typical profile of a finger joint

3.10
finger length
distance l_j between the finger base and the tip of the finger, measured along the centre line of the finger

Note 1 to entry: See Figure 2.

3.11
finished thickness
thickness after planing

3.12
laminations
structural timber boards, finger jointed unless the length of a single board matches the lamination length, being part of timber layers in cross laminated timber

3.13
large finger joint
finger joint through the full cross sectional area of two cross laminated timber pieces

Note 1 to entry: See Figure 3.

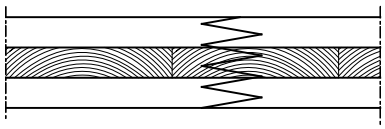


Figure 3 — Cross laminated timber with large finger joints

3.14
layup
cross sectional arrangement of timber layers or wood-based panel layers in which each layer may be made of different species and may have different strength classes, manufacturer specific strength classes or technical classes

3.15
manufacturer specific strength class
set of characteristic strength, stiffness and density properties not tabulated in a standard

3.16
maximum delamination length
largest delamination length in any single glue line measured around the circumference of the test piece

3.17
mean moisture content
mean value of the moisture content of cross laminated timber calculated from at least two measurements

Note 1 to entry: See G.3.

3.18
minimum mean density
required density at reference moisture content, estimated as the weighted mean of the mean densities of the layers, if necessary

Note 1 to entry: Minimum mean density is used for the classification of the reaction to fire.

3.19
pitch
distance between centres of adjacent finger tips

Note 1 to entry: See Figure 2.

3.20
ratio of resin to hardener
proportion of resin to hardener by mass with the resin set at 100 parts

3.21
reduction factor
ratio between tip width and pitch

Note 1 to entry: See Figure 2.

3.22
reference moisture content
moisture content at which target sizes are established

3.23
relative tip gap
ratio between tip gap and finger length

Note 1 to entry: See Figure 2.