
**Konstruktivski les z zobatimi stiki - Zahteve za uporabo in minimalne zahteve
za proizvodnjo**

Finger jointed structural timber - Performance requirements and minimum
production requirements

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ICS

English Version

Finger jointed structural timber - Performance requirements and minimum production requirements

Aboutages à entures multiples dans les bois de construction - Exigences de performance et exigences minimales de fabrication

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 124.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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

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Foreword

This document (prEN 15497:2006) has been prepared by Technical Committee CEN/TC 124 "Timber structures", the secretariat of which is held by SFS.

This document is currently submitted to the CEN Enquiry.

This document will not replace any existing standard.

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.

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Introduction

1 Scope

This standard specifies requirements for structural timber with rectangular cross-section with bonded finger joints and minimum requirements for the manufacture of cut, interlocking, bonded finger joints in structural timber members.

This standard is only applicable to finger joints between timber members of the same species type.

The standard covers coniferous species as well as broad-leaved species where information is available to enable them to be satisfactorily bonded.

This standard does not cover impressed (die-formed) joints.

Individual laminations for glued laminated timber are covered by EN 385.

Large finger joints in glued laminated timber members are covered by EN 387.

Structural timber treated against biological attack or fire is not covered in this standard.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 301	Adhesives, phenolic and aminoplastic for load-bearing timber structures - Classification and performance requirements
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 densities
EN 408	Timber structures - Structural timber and glued laminated timber - Determination of some physical and mechanical properties
EN 13501-1	Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire tests
prEN 14081-1	Timber structures – Strength graded structural timber with rectangular cross section – Part 1: General requirements
EN 14358	Structural timber – Calculation of characteristic 5-percentile values
EN/ISO 9001	Quality management systems - requirements

3 Terms and definitions

For the purposes of this standard, the following definitions apply:

3.1

characteristic strength:

population 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 %.

3.2

finger joint:

self-locating end joint formed by machining a number of similar, tapered, symmetrical fingers in the ends of timber members, which are then bonded together. See figure 1.

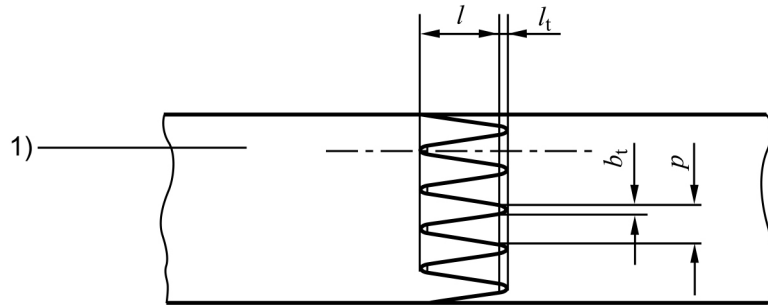


Figure 1: Typical profile of finger joint showing finger length l , pitch p , tip width b_t , and tip gap l_t . 1) grain direction

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3.2

finger length:

distance between the finger base and the tip of the finger, measured along the centre line of the finger.

3.3

grade:

strength grade or strength class.

3.4

pitch:

distance between fingers, centre to centre.

3.5

producer:

legal entity responsible for finger jointing the timber.

3.6

production batch:

joints, all of which have the same profile, manufactured from the same species of timber, the same strength class, having the same nominal cross section, bonded with the same adhesive and made during a continuous run on one production line.

3.7

service class 1:

service class characterized by a moisture content in the materials corresponding to a temperature of 20 °C and the relative humidity of the surrounding air only exceeding 65 % for a few weeks per year.

NOTE: In service class 1 the average equilibrium moisture content in most softwoods will not exceed 12 %.

3.8

service class 2:

service class characterized by a moisture content in the materials corresponding to a temperature of 20 °C and the relative humidity of the surrounding air only exceeding 85 % for a few weeks per year.

NOTE: In service class 2 the average equilibrium moisture content in most softwoods will not exceed 20 %.

3.9

service class 3:

service class characterized by climatic conditions leading to higher moisture contents than service class 2.

3.10

strength class

classification of timber based on particular values of mechanical properties.

3.11

tip gap:

distance between finger tip and slot base in a bonded finger joint.

3.12

tip width:

distance between finger faces, measured at the tip of the finger.

4 Symbols and abbreviations

A	area, in square millimetres;
A_W	area of one wane, in square millimetres;
a_W	diagonal length of wane, in millimetres;
b	width of cross section, in millimetres;
b_t	tip width, in millimetres;
d	diameter, in millimetres;
f_m	bending strength, in newtons per square millimetre;
$f_{m,k}$	characteristic bending strength, in newtons per square millimetre;
$f_{m,15,k}$	characteristic bending strength of 15 specimens, see 6.3.4.2, in newtons per square millimetre;
$f_{m,15,mean}$	mean value of bending strength of 15 specimens, see 6.3.4.2, in newtons per square millimetre;
$f_{m,dc,k}$	characteristic bending strength, declared by the manufacturer, in newtons per square millimetre;
h	depth of cross section, in millimetres;
k_f	factor, see 6.2.4.3,
k_{15}	statistical factor, see 6.3.4.2;
l	finger length, in millimetres;
l_t	tip gap, in millimetres;
p	pitch, in millimetres;
s	standard deviation (the variable is given in parenthesis).

5 Requirements

5.1 General

The cutting and the bonding operations of finger joints shall result in reliable and durable bonds of required strength.

These general requirements shall be considered satisfied if both the requirements in this clause and the minimum production requirements in clause 6 and Annex A are fulfilled.

5.2 Timber

5.2.1 Strength

Timber shall fulfil the requirements of EN 14081-1.

5.2.2 Species

Sufficient information on the timber species shall be available to enable the timber to be satisfactorily bonded.

5.2.3 Knots and fissures

For the following requirements knots with a diameter not greater than 6 mm shall be disregarded. There shall be no knots, fissures or pronounced grain disturbance within the joint itself. Outside the joint the distance between a knot and the end of the cross-cut timber shall be not less than $l + 3d$ where d is the diameter of the knot measured perpendicular to the grain direction (longitudinal direction), see figure 2.

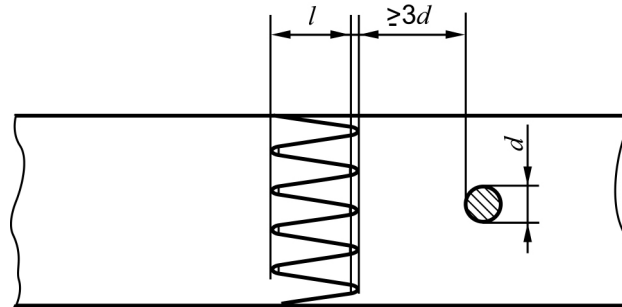


Figure 2 - Minimum distance from the end of the timber to a knot
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Where a member is cross-cut to remove a knot, the cut shall be made at a distance from the knot at least equal to a length of $3d$, see figure 3.

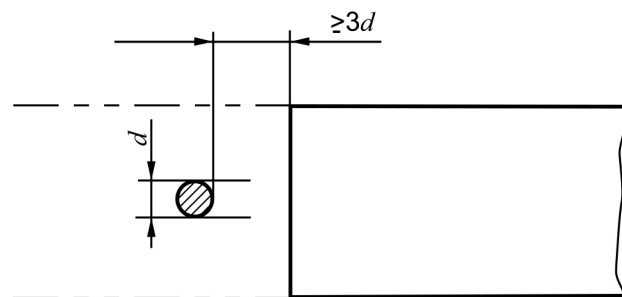


Figure 3 - Minimum distance for a cross-cut to remove a knot

5.2.4 Wane or edge damage

There shall be no wane or edge damage affecting more than two corners at the joint within the finger length and within 75 mm of the root of the fingers. The area, A_w , of the wane at any corner shall not exceed 1 % of the cross-sectional area, see figure 4.

NOTE: Conformity with this requirement can be verified by measuring the diagonal a_w of the wane and demonstrating that it is less than the maximum diagonal given in figure 5 as a function of the cross-sectional area A .

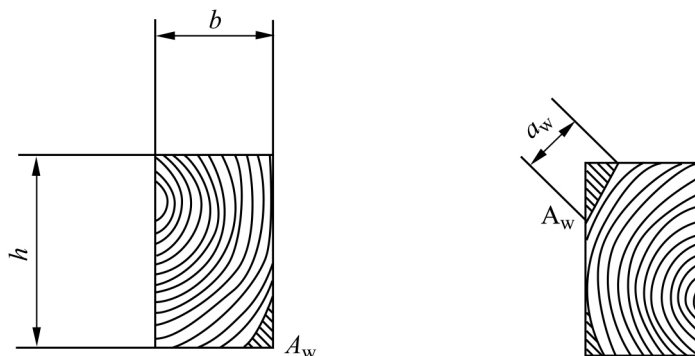


Figure 4 - Cross section of timber with wane

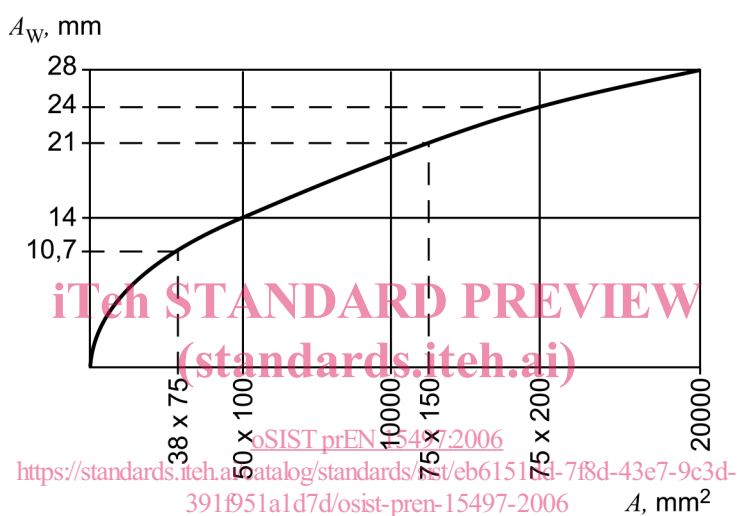


Figure 5 - Maximum diagonal of wane $a_{w,max} = \sqrt{A}/5$

5.3 Adhesives

The adhesive shall enable joints of such strength and durability to be produced that the integrity of the bond is maintained throughout the intended lifetime of the structure.

The adhesive shall meet the requirements of

either

EN 301 type I, or for structures in service class 1 or 2 provided the temperature of the member in the structure will always be below 50 °C, an adhesive of type II,

or

provide a bond with equivalent durability and strength as adhesives covered by EN 301, special considerations being given to creep failure, the ability to maintain structural integrity during fire and elevated temperature and moisture conditions in ordinary service.

NOTE 1: The adhesive should be chosen considering the climatic conditions in service, the timber species, the preservative used (if any) and the production methods.

NOTE 2: Such strength and durability can be achieved by a polycondensation adhesive of the phenolic or aminoplastic type as defined in EN 301.