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European Assessment Document for

Structural finger-jointed, wet, cold or wet and cold glued solid timber

This European Assessment Document (EAD) has been developed taking into account up-to-date technical and scientific knowledge at the time of issue and is published in accordance with the relevant provisions of Regulation (EU) 305/2011 as a basis for the preparation and issuing of European Technical Assessments (ETA).

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1 SCOPE OF THE EAD

1.1 Description of the construction product

The EAD covers structural finger-jointed, wet, cold or wet and cold glued solid timber (in the following referred to as “structural finger-jointed timber”) made of one of the following softwood species: Norway spruce (*Picea abies*, PCAB), Fir (*Abies alba*, ABAL) and Scots pine redwood (*Pinus sylvestris*, PNSY) graded in accordance with EN 14081-1[1].

The structural finger-jointed timber consists of only one species throughout. The assessment shall be carried out for every species. Norway spruce and Fir are considered as one species.

The timber members of structural finger-jointed timber are battens, boards, planks or square timbers.

The definitions of battens, boards, planks and square timbers are given in clause 1.3. Within this EAD the width b is always the larger dimension of the cross section and the depth h is always the smaller dimension of the cross section independent of the actual orientation of the timber when installed. The assessment methods as given in this EAD are based on the following limitations:

- The width b is not less than 50 mm and not more than 300 mm.
- The depth h is not less than 30 mm and not more than 160 mm.
- The dimensions refer to a moisture content of 20 %.
- The dimensions of the structural finger-jointed timber are within tolerance class 1 of EN 336, clause 4.3, Table 1.
- The maximum glue line thickness of the finger joints is 0,1 mm.

One component polyurethane formaldehyde-free adhesives type EN 15425 l 90 FJ 0,1, EN 15425 l 70 FJ 0,1, EN 15425 l 70 GP 0,3 and EN 15425 l 90 GP 0,3 in accordance with EN 15425, clause 4, Table 1 are used to glue the finger joints. The adhesives are tested in accordance with EN 15425, clauses 5.2 to 5.7.1, 5.8, 5.9 and 7.3. They fulfil the requirements given in these clauses.

Battens are either only wet glued (see clause 1.3.6), only cold glued (see clause 1.3.7) or wet and cold glued. Boards, planks and square timbers are only cold glued.

Structural finger-jointed timber treated with fire retardants and the use of recycled materials are not covered by this EAD.

The product is not fully covered by the following harmonised technical specification: EN 15497. With regard to the release of dangerous substances as volatile organic compounds no assessment method is given therein, and the assessment method with regard to formaldehyde emission derived from formaldehyde-containing adhesives given in Annex A is not appropriate for preservative-treated structured finger-jointed timber.

Battens with wet glued or wet and cold glued or cold glued finger joints

Deviating from EN 15497, Annex G.4.4, timber members with different moisture contents are used to bond the finger joints. This EAD covers timber members with a difference of the moisture content of up to 20 percentage points. Furthermore, the moisture content of the timber members can exceed 18 % but is not higher than 40 %.

Additionally, the timber and air temperature in the production facility and during the curing process can be lower than 15 °C but not lower than 5 °C.

Boards, planks and square timbers with cold glued finger joints

Deviating from EN 15497 the timber temperature during the gluing process is lower than 15 °C but is not lower than 5 °C. The air temperature in the production facility at gluing and during the curing process can be lower than 18 °C but is not lower than 5 °C.

1 All undated references to standards in this EAD are to be understood as references to the dated versions listed in chapter 4.

Hence, due to the introduction of lower temperatures and possible different moistures of adherends as well as the use of timber members with high moisture content, other assessment methods as those given in EN 15497 are necessary.

The product is not fully covered by EAD 130089-00-0304. Compared to the previous version of the EAD, the following changes are introduced: This EAD covers also structural, only cold glued finger-jointed timber with larger dimensions up to a width b of 300 mm and up to a depth h of 160 mm.

The structural finger-jointed timber is manufactured in accordance with the provisions given in EN 15497, Annex G, clauses G.4.1 to G.4.3, G.4.5, G.4.6 and G.4.7.

The scope of this EAD is limited to:

- structural finger-jointed timber with a minimum moisture content of the timber members of 8 %,
- structural finger-jointed timber that is manufactured in a maximum timber and air temperature of 30 °C in the production facility and during the curing process,structural finger-jointed timber with $k_{cold} \geq 0,7$ assessed in accordance with equation (2.2.2.3.2),
- structural finger-jointed timber, that is applied with a moisture content of ≤ 20 % in use,
- battens made of structural finger-jointed wet and cold glued solid timber with a maximum span of 1,0 m,
- structural finger-jointed timber without and with preservative treatment,
- structural finger-jointed battens with a characteristic value of the bending strength assessed as given in clause 2.2.2.1, item 2 and 3 and clause 2.2.2.2 higher than or equal to the reference value, here taken as the characteristic bending strength of the solid, unjointed timber with corresponding cross section and moisture content, as provided in EN 15497, clause 5.1.3.

Concerning product packaging, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport, storage, maintenance, replacement and repair of the product as he considers necessary.

It is assumed that the product will be installed in accordance with the manufacturer's instructions or (in absence of such instructions) in accordance with the usual practice of the building professionals. The structural finger-jointed timber is intended to be installed with a moisture content of ≤ 20 %.

Relevant manufacturer's stipulations, e.g., with regard to the intended end use conditions, having influence on the performance of the product covered by this European Assessment Document shall be considered for the determination of the performance and detailed in the ETA as long as the details of the assessment methods as laid down in this EAD are respected.

1.2 Information on the intended use(s) of the construction product

1.2.1 Intended use(s)

Structural finger-jointed timber such as boards, planks and square timbers are intended to be used in load-bearing timber structures in service classes 1 and 2 in accordance with EN 1995-1-1, clause 2.3.1.3.

Battens are intended to be used on top of rafters in wooden roof constructions as load-bearing component in service classes 1 and 2 in accordance with EN 1995-1-1, clause 2.3.1.3.

The intended use is limited to static and quasi-static (non-fatigue) actions.

1.2.2 Working life/Durability

The assessment methods included or referred to in this EAD have been written based on the manufacturer's request to take into account a working life of the structural finger-jointed timber for the intended use of 50 years when installed in the works (provided that the structural finger-jointed timber is subject to appropriate installation (see 1.1)). These provisions are based upon the current state of the art and the available knowledge and experience.

When assessing the product, the intended use as foreseen by the manufacturer shall be taken into account. The real working life may be, in normal use conditions, considerably longer without major degradation affecting the basic requirements for works[2].

The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by EOTA when drafting this EAD nor by the Technical Assessment Body issuing an ETA based on this EAD, but are regarded only as a means for expressing the expected economically reasonable working life of the product.

1.3 Specific terms used in this EAD

1.3.1 Battens

Battens are timber members with a depth h that is not less than 30 mm and not more than 40 mm. The width b of the battens is not less than 50 mm and less than 80 mm. They are usually used as substructure of roofing in timber roof constructions.

1.3.2 Boards

Boards are timber members with a depth h that is not more than 40 mm. The width b of the boards is at least 80 mm.

1.3.3 Planks

Planks are timber members with a depth h that is more than 40 mm. The width b of the planks is $b > 3 \cdot h$.

1.3.4 Square timbers

Square timbers are timber members with a width b of $h \leq b \leq 3 \cdot h$. The depth h of the square timbers is more than 50 mm.

1.3.5 Wet gluing

Wet gluing means that the moisture content of the timber members that shall be finger-jointed exceeds 18 % but not higher than 40 %. The difference of the moisture content of the timber members that shall be wet glued may be up to 20 percentage points.

1.3.6 Cold gluing

Cold gluing means that during the gluing process the temperature of timber members that shall be finger-jointed is lower than 15 °C but is not lower than 5 °C. The air temperature in the production facility at gluing and during the curing process may be lower than 18 °C but not lower than 5 °C.

1.3.7 Main symbols

b	width of timber members
b_{max}	largest produced width of the timber members
E	modulus of elasticity (MOE)

[2] The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works is subject, as well as on the particular conditions of the design, execution, use and maintenance of that works. Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than referred to above.

f	strength
G	shear modulus
h	depth of timber members
h_{max}	largest produced depth of the timber members
k_{cold}	reduction factor in accordance with equation (2.2.2.3.2)
k_f	divisor for flatwise bending, see EN 15497, Annex C.2.3
T_{min}	minimum temperature of the finger-jointed timber during gluing and curing used by the producer in the manufacturing
T_{timber}	timber temperature
u	moisture content
ρ	density

1.3.8 Subscripts

b	batten
cold	properties of specimen glued at cold temperatures, $T_{Timber} < 15$ °C
c	compression
edge	edgewise
flat	flatwise
j	properties of finger joints in timber members
k	characteristic
m	bending
mean	mean value
standard	properties of specimen glued at standard temperatures $T_{Timber} \geq 18$ °C
t	tensile
test	properties of tested specimen
v	shear
0	parallel to the grain
05	5 %-fractile
90	perpendicular to the grain

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential characteristics of the product

Table 2.1.1 shows how the performance of structural finger-jointed timber is assessed in relation to the essential characteristics.

Table 2.1.1 Essential characteristics of the product and methods and criteria for assessing the performance of the product in relation to those essential characteristics

No	Essential characteristic	Assessment method	Type of expression of product performance
Basic Works Requirement 1: Mechanical resistance and stability			
1	Strength and stiffness properties of timber members without finger-joints	2.2.1	Class
2	Bending strength of finger joints as bending strength of battens	2.2.2	Level $f_{m,b,flat,j,k}$, $f_{m,b,edge,j,k}$
3	Bending strength of finger joints as bending strength of boards, planks and square timbers and associated strength, stiffness and density properties	2.2.3	Level, class $f_{m,edge,j,k}$, $f_{t,0,j,k}$ and strength class or $f_{m,edge,j,k}$, $f_{t,0,j,k}$, $f_{t,90,j,k}$' $f_{c,0,j,k}$', $f_{c,90,j,k}$, $f_{v,j,k}$,, $E_{0,mean}$, $E_{0,05}$, $E_{90,mean}$, $E_{90,05}$, G_{mean}, ρ_{mean}, ρ_k
	Durability of bonding strength		
4	Longitudinal tensile shear strength	2.2.4.1	Level
5	Static load test of multiple bond line specimens in compression shear	2.2.4.2	Description
6	Creep deformation test at cyclic climate conditions with specimens loaded in bending shear	2.2.4.3	Description
7	Curing time	2.2.4.4	Level
8	Working life	2.2.4.5	Level
9	Delamination test of finger joints	2.2.4.6	Description
Basic Works Requirement 2: Safety in case of fire			
10	Reaction to fire	2.2.5	Class
Basic Works Requirement 3: Hygiene, health and the environment			
	Content, emission and/ or release of dangerous substances	2.2.6	
11	VOC/SVOC	2.2.6.1	Description, level
12	Formaldehyde emission	2.2.6.2	Class
Aspects of durability			
	Durability against biological attack		
12	Structural finger-jointed timber without preservative treatment	2.2.7.1	Class
13	Structural finger-jointed timber with preservative treatment	2.2.7.2	Description

2.2 Methods and criteria for assessing the performance of the product in relation to essential characteristics of the product

This chapter is intended to provide instructions for TABs. Therefore, the use of wordings such as “shall be stated in the ETA” or “it has to be given in the ETA” shall be understood only as such instructions for TABs on how results of assessments shall be presented in the ETA. Such wordings do not impose any obligations for the manufacturer and the TAB shall not carry out the assessment of the performance in relation to a given essential characteristic when the manufacturer does not wish to declare this performance in the Declaration of Performance.

2.2.1 Strength and stiffness properties of timber members without finger-joints

The timber members that shall be finger-jointed shall be strength graded in accordance with EN 14081-1. The strength class of the timber members without finger-joints shall be given in the ETA.

2.2.2 Bending strength of finger joints as bending strength of battens

2.2.2.1 Flatwise bending strength of finger joints as bending strength of timber

All tests described in points 1 to 3 shall be performed to assess the characteristic flatwise bending strength of the structural finger-jointed battens $f_{m,b,flat,j,k}$.

The specimens of the test described in point 1 and the specimens of the test described in point 2 shall be made with battens from the same timber batch.

The following tests shall be carried out:

1. Determination of reference bending strength of the solid timber

   The reference flatwise characteristic bending strength of the structural solid timber shall be assessed to compare this strength with the bending strength of finger jointed battens.
   The reference flatwise characteristic bending strength of the structural solid timber shall be determined as given in EN 408, clause 19, with the exception that the test specimens shall be conditioned as indicated in Table 2.2.2.1.1.
   Together with the bending strength the density of the test specimen determined as set out in EN 408, clause 7, and the moisture content in accordance with EN 13183-1 shall be recorded.

   Table 2.2.2.1.1 Test series for the determination of reference bending strength of battens made of solid timber

Test series	Moisture content at testing	Minimum number of test specimens	
		Smallest cross section	Largest cross section
	%		
1	12 ± 2	40	40
2	25 ± 5[1]	40	40
[1] At least 80 % of the moisture content values of all specimens shall be within the range of 25 % ± 5 %.			

   If only the gluing and curing temperature deviates from the provisions given in EN 15497, Annex G, clauses G.2.4 and G.4.8, only test series 1 specified in Table 2.2.2.1.1 shall be carried out.

   The reference flatwise characteristic bending strength of the solid timber shall be assessed in accordance with EN 14358 using a logarithmical normal distribution. The characteristic values of the test specimens act as references for the characteristic bending strength of the finger-jointed timber.

2. Determination of flatwise bending strength of the finger-jointed battens

The flatwise characteristic bending strength of the structural finger-jointed battens shall be determined in accordance with EN 15497, Annex C, with the exception that the test specimens shall be conditioned as given in Table 2.2.2.1.2. The provisions in EN 15497, Annex C, regarding type testing shall be followed. When producing the test specimens, the curing time assessed in accordance with clause 2.2.4.4 shall be used. After gluing the test specimens shall be stored for a minimum of 24 hours at the gluing and curing temperature indicated in Table 2.2.2.1.2.
Together with the bending strength the density of the test specimens determined in accordance with EN 408, clause 7, and the moisture content as set out in EN 13183-1 shall be recorded.

Table 2.2.2.1.2 Test series for the determination of the bending strength of the finger-jointed battens

Test series	Temperature of the finger-jointed timber during gluing and curing	Moisture content at gluing and testing		Minimum number of test specimens	
		Timber adherend 1	Timber adherend 2	Smallest cross section	Largest cross section
	°C	%			
1	20	12 ± 2	25 ± 5[1]	20	20
2		25 ± 5[1]	25 ± 5[1]	20	20
3	$T_{Timber} = T_{min} - 5$[2]	12 ± 2	12 ± 2	20	20
4		12 ± 2	25 ± 5[1]	20	20
5		25 ± 5[1]	25 ± 5[1]	20	20

T_{min} [°C] is the minimum temperature of the finger-jointed timber during gluing and curing used by the producer in the manufacturing.

[1] At least 80 % of the moisture content values of all timber adherends shall be within the range of 25 % ± 5 %.

[2] 80 % of the measured temperatures shall be within the range of ± 1 K and 90 % of the measured temperatures in the range of ± 2.5 K.

It shall be ensured that the moisture contents of the timber adherends given in Table 2.2.2.1.2, test series 1, 2, 4 and 5, are kept until testing. The time between storage and testing shall be as short as possible considering the required curing time. The time between storage at T_{min} - 5 °C and the testing (usually at standard ambient conditions) shall be chosen as short as possible and shall not exceed 30 min, where $T_{min}$is the minimum temperature of the finger-jointed timber during curing used by the producer in the manufacturing. . For the finger-jointed test series with one adherend with (12 ± 2) % and the other adherend with (25 ± 5) % (test series 1 and 4 in Table 2.2.2.1.2) the characteristic bending strength of the solid wood series with a moisture content of (25 ± 5) % (test series 2 in Table 2.2.2.1.1) shall be used as reference value. The above-described procedure shall be performed for each production line and each combination of adhesive and wood species. In case of curing at low temperatures the special test programme with cold storage of the specimens and testing of cold specimens needs to be performed only once per combination of adhesive and wood species.

For the finger-jointed test series with both adherend with (12 ± 2) % the characteristic bending strength of the solid wood series with a moisture content of (12 ± 2) % (test series 1 in Table 2.2.2.1.1) shall be used as reference value. For the finger-jointed test series with both adherend with (25 ± 5) % the characteristic bending strength of the solid wood series with a moisture content of (25 ± 5) % (test series 2 in Table 2.2.2.1.1) shall be used as reference value.

3. Determination of the residual bending strength of the finger-jointed battens glued of jointing components with maximum permissible moisture difference

The residual bending strength of the finger-jointed battens glued of jointing components with maximum permissible moisture difference shall be assessed. The effect of restraint stresses caused by the different moisture content of the components shall be assessed. Finger-jointed battens of the largest cross section shall be composed of a wet adherend with a moisture content of (25 ± 5) %[3] and two dry adherends with a moisture content of (12 ± 2) %. The wet adherend shall be located between the two dry adherends. The length of the adherends shall be 1 m to 2,5 m. The total length of the finger-jointed test specimen shall be 4 m to 5 m. The timber temperature of the finger-jointed test specimens shall be T_{min} - 5 °C[4] during gluing, where T_{min} is the temperature of the finger-jointed timber during gluing and curing used by the manufacturer in the manufacturing. The finger-jointed test specimen shall be fixed to a web of timber beams with a spacing of 1,00 m ± 5 cm by means of mechanical fasteners (screws or nails) as shown in Figure 2.2.2.1.1. The finger-jointed test specimens shall be arranged rectangular to the timber beams with a distance of 1,00 m ± 5 cm. The finger-jointed test specimens shall be loaded by dead loads of 0,75 kN/m². The loaded assembly of timber beams shall be dried in a climate of 20 °C / 30 % - 40 % relative air humidity (rh). When a moisture content of less than 10 % is achieved, the finger-jointed test specimens shall be removed from the web of timber beams and the residual flatwise bending strength of the finger-jointed timber shall be determined. 20 finger-jointed specimens shall be tested.

If only the gluing and curing temperature deviates from the provisions given in EN 15497, Annex G, clauses G.2.4 and G.4.8, this test is not necessary.

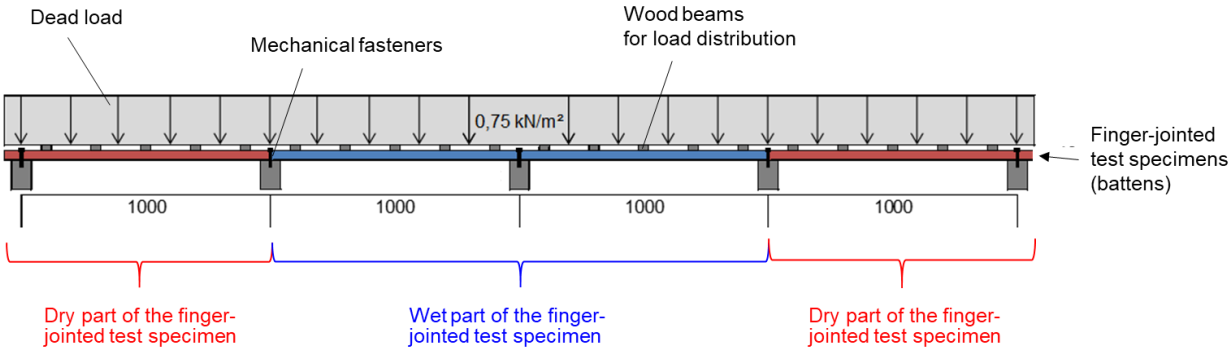

Figure 2.2.2.1.1: Example for the test set-up for the determination of residual bending strength

The flatwise bending strength of the finger-jointed battens after exposure to the above given drying climate shall be assessed in accordance with EN 15497, Annex C.

The lower value of the characteristic flatwise bending strengths of the structural finger-jointed battens $f_{m,b,flat,j,k}$ [N/mm²] assessed in accordance with points 2 and 3 shall be given in the ETA.

2.2.2.2 Edgewise bending strength of finger joints as bending strength of timber

For the assessment of edgewise bending strength of finger joints the influence of the finger joint orientation shall be assessed additionally: 30 specimens of the largest cross section shall be produced at standard conditions in accordance with the provisions given in EN 15497, Annex C.2.1. The edgewise characteristic bending strength of the structural finger-jointed battens shall be assessed in accordance with EN 15497, Annex C, whereby the finger joint orientation is considered as given in EN 15497, Annex C.2.3.

The characteristic edgewise bending strength of the structural finger-jointed battens $f_{m,b,edge,j,k}$ [N/mm²] shall be given in the ETA.

3 At least 80 % of the moisture content values of all timber adherends shall be within the range of 25 % ± 5 %.

4 At least 80 % of the measured temperatures shall be within the range of ± 1 K and 90 % of the measured temperatures in the range of ± 2.5 K.

2.2.3 Bending strength of finger joints as bending strength of boards, planks and square timbers and associated strength, stiffness and density properties

Two specimens of structural finger-jointed timber shall be produced, whereby the adherends shall be randomly chosen from one common batch of timber. The timber shall be of the highest produced strength class with given bending strength $f_{m,k}$ and of the largest produced cross section $h_{max} \times b_{max}$, i.e., the cross section with the largest width b_{max} and the largest produced depth h_{max} for this maximum width b_{max}.

The moisture content of the specimens shall correspond to the provisions given in EN 15497, Annex G, clause G.4.4. The moisture content distributions of the two samples shall be similar, i.e., the mean moisture values shall not differ more than 2 percentage points and the variations shall not differ more than 20 %.

- **Sample glued at standard temperature**: A minimum number of 30 specimens shall be produced at standard temperatures conforming with EN 15497, Annex C.2.1. The timber temperature T_{timber} shall be in accordance with the instructions for the used adhesive system but shall be $T_{timber} \geq 18$ °C.
- **Cold glued sample**: A minimum number of at least 30 specimens shall be produced at a timber temperature of $T_{timber} \leq T_{min,}$- 5 °C[4], whereby $T_{min,}$is the minimum timber temperature of the finger-jointed timber during gluing and curing used by the producer in the manufacturing. The minimum number of 30 specimens refers to the specimens with fracture in the vicinity of the finger joints. If there are specimens with fractures completely outside the finger joints further specimens shall be produced and tested to reach a number of 30 specimens.

Three cases of the production and curing conditions shall be differentiated:

- If the production and curing conditions of regular production conform to the provisions of EN 15497, i.e., only the timber temperature at gluing is smaller than 18 °C, the cold glued sample shall be glued and cured at standard conditions regarding ambient temperature. The time of exposure to standard ambient conditions prior to gluing shall be chosen as minimal as possible compared to regular production. No special provisions for production conditions, storage prior to testing or testing conditions are necessary.
- If the regular production is performed at ambient temperatures T_{min} lower than 18 °C, the ambient temperature at production of the cold glued sample shall be T_{min} - 5 °C[4] accordingly.
- If the curing of regular production is performed at ambient temperatures as low as $T_{min} < 18$ °C, the curing temperature shall not exceed T_{min} - 5 °C[4]. In this case the finger-jointed specimens of the cold glued sample shall be stored after curing at T_{min} - 5 °C[4] until testing. The bending tests shall be performed with the cold specimens. The time between storage at T_{min} - 5 °C[4] and the testing (usually at standard ambient conditions) shall be chosen as short as possible and shall not exceed 30 min.

After curing all specimens shall be tested in a four-point bending test in accordance with EN 408, clause 19, and EN 15497, Annex C, in edgewise orientation. For boards, planks and square timbers the larger dimension of the cross-section shall be upright during the tests. The bending strength test results of all specimens with fracture in the vicinity of the finger joints shall be evaluated. Results of specimens with fractures completely outside the finger joint shall be neglected. From the valid finger joint bending strength test results the characteristic strength values $f_{m,j,k,test,standard}$ (of the specimen glued at standard temperatures) and $f_{m,j,k,test,cold}$ (for the cold glued specimen) shall be determined in accordance with EN 14358 using a logarithmical normal distribution. Thereby the orientation of finger joints shall be recognised: Depending on the orientation of the fingers (visible on the wider face or on the smaller face) whilst testing, the divisor k_f given in Table C.1 of EN 15497 or derived from tests in accordance with EN 15497, Annex C, as for type testing, shall be used to determine the characteristic edgewise bending strength $f_{m,edge,j,k}$. The conversion shall be done in accordance with EN 15497, Annex C.2.3, last indent.
If the specimen glued at standard temperatures fulfils the provisions given in EN 15497, clause 5.1.3, i.e., $f_{m,j,k,test,\ standard} \geq f_{m,edge,k}$, the two finger joint bending strength distributions of the specimen glued at standard temperatures and the cold glued specimen shall be compared:

– If the distributions do not differ significantly or $f_{m,edge,j,k,test,cold} \geq f_{m,edge,j,k,test,\ standard}$, the characteristic finger joint bending strength of the cold glued finger-jointed timber $f_{m,edge,j,k}$ shall be given equal to the characteristic edgewise bending strength of the original solid timber $f_{m,edge,k}$:

$$f_{m,edge,j,k} = f_{m,edge,k}. \quad (2.2.2.3.1)$$

For determination of significant differences between the distributions appropriate methods of statistics, e.g., the (modified) Student-T-test method can be used. The usual significance level of 0,05 shall be applied. The finger-jointed timber shall be assigned to the same strength class as the original solid timber strength class. The strength assignment in accordance with equation (2.2.2.3.1) may be applied also for all produced strength classes, being lower than the strength class of the tested specimens. The assigned strength class shall be given in the ETA.

– If the distributions differ significantly and $f_{m,edge,j,k,test,cold} < f_{m,edge,j,k,test,\ standard}$ a reduction factor k_{cold} shall be used for the characteristic edgewise finger joint bending strength $f_{m,edge,j,k}$ and also for the characteristic finger joint tensile strength parallel to the grain $f_{t,0,j,k}$:

$$k_{cold} = f_{m,edge,j,k,test,cold} / f_{m,edge,j,k,test,standard} \quad (2.2.2.3.2)$$

$$f_{m,edge,j,k} = k_{cold} \cdot f_{m,edge,k} \text{ and } f_{t,0,j,k} = k_{cold} \cdot f_{t,0,k} \quad (2.2.2.3.3)$$

where:

$f_{m,edge,k}$ characteristic edgewise bending strength of the original solid timber

$f_{t,0,k}$ characteristic tensile strength parallel to the grain of the original solid timber.

If the cold glued finger-jointed timber is intended to be assigned to a strength class in accordance with EN 338, a strength class conforming to the assessed values $f_{m,edge,j,k}$ and $f_{t,0,j,k}$ determined in accordance with equations (2.2.2.3.2) and (2.2.2.3.3) shall be chosen. The strength assignments in accordance with equations (2.2.2.3.2) and (2.2.2.3.3) may be applied also for all used timber strength classes lower than the strength class of the tested specimens.

The above-described procedure shall be performed for each production line and each combination of adhesive and wood species.

In the case that the test series glued at standard temperature does not fulfil the provisions given in EN 15497, clause 5.1.3, both test series (glued at standard temperature and cold glued specimen) shall be discarded.
Either the characteristic edgewise bending strength $f_{m,edge,j,k}$ [N/mm²], the characteristic finger-joint tensile strength parallel to the grain $f_{t,0,j,k}$ [N/mm²] and the assigned strength class or the strength, stiffness and density properties $f_{m,edge,j,k,}$ $f_{t,0,j,k,}$ $f_{t,90,j,k'}$ $f_{c,0,j,k'}$, $f_{c,90,j,k}$, $f_{v,j,k,}$, $E_{0,mean,}$ $E_{0,05}$, $E_{90,mean}$, $E_{90,05}$, G_{mean}, [N/mm²] ρ_{mean}, ρ_k [kg/m³] in accordance with EN 384 of the boards, planks or square timbers with cold glued finger joints shall be given in the ETA. If the strength values of different production lines and combinations of adhesive and wood species vary either the different values or the lowest values shall be given in the ETA.

2.2.4 Durability of bonding strength

Tests in accordance with EN 15425, clauses 5.2 to 5.7.1, 5.8, 5.9 and 7.3 and additionally, the following tests shall be carried out.

In the case that the test series glued at standard temperature does not meet the requirements, both test series (glued at standard temperature and cold glued specimen) shall be discarded.

2.2.4.1 Longitudinal tensile shear strength

Regarding the preparation and number of test specimens the provisions given in EN 302-1, clauses 7.1 to 7.4, shall be followed whereby the deviations described hereafter shall be considered. At gluing the test pieces shall have a moisture content as given in Table 2.2.4.1. After gluing the test

specimens shall be stored for a minimum of 24 hours at the curing temperature indicated in Table 2.2.4.1. Before testing, the test specimens shall be conditioned to a moisture content of (12 ± 2) %. The longitudinal tensile shear strength test shall be carried out in accordance with EN 302-1, clauses 7.5 and 7.6, with the treatments prior to tensile shear testing A1 to A5 and A7 as given in EN 302-1, clause 7.5, Table 1. The test results shall be reported as described in EN 302-1, clause 8.

Table 2.2.4.1 Test series for the determination of longitudinal tensile shear strength

Test series	Glue line thickness	Temperature of the finger-jointed timber during gluing and/ or curing	Moisture content at gluing	
			Wood adherend 1	Wood adherend 2
	mm	°C	%	
1	0,1	20	12 ± 2	12 ± 2
2			12 ± 2	25 ± 5[1]
3			25 ± 5[1]	25 ± 5[1]
4		$T_{Timber} = T_{min} - 5$[2]	12 ± 2	12 ± 2
5			12 ± 2	25 ± 5[1]
6			25 ± 5[1]	25 ± 5[1]
7	0,3	20	12 ± 2	12 ± 2
8			12 ± 2	25 ± 5[1]
9			25 ± 5[1]	25 ± 5[1]
10		$T_{Timber} = T_{min} - 5$[2]	12 ± 2	12 ± 2
11			12 ± 2	25 ± 5[1]
12			25 ± 5[1]	25 ± 5[1]

T_{min} [°C] is the temperature of the finger-jointed timber during gluing and curing used by the manufacturer in the manufacturing.

[1] 80 % of the moisture content values of all timber adherends shall be within the range of 25 % ± 10 %.

[2] 80 % of the measured temperatures shall be within the range of ± 1 K and 90 % of the measured temperatures in the range of ± 2.5 K.

- If only the moisture content of the structural finger-jointed timber during manufacturing deviates from the provisions given in EN 15497 the test series specified in Table 2.2.4.1, test series 1 - 3 and test series 7 - 9, shall be carried out.

- If only the gluing and/ or curing temperature of the structural finger-jointed timber during manufacturing deviates from the provisions given in EN 15497 the test series specified in Table 2.2.4.1, test series 1, 4, 7 and 10, shall be carried out.

- If the moisture content and the gluing and curing temperature of the structural finger-jointed timber during manufacturing deviate from the provisions given in EN 15497 the test series specified in Table 2.2.4.1, test series 1, 4 - 6, 7 and 10 - 12, shall be carried out.

The mean tensile shear strength of the specimens with close contact glue line (0,1 mm) and thick glue line (0,3 mm) shall be not less than those given in EN 15425, clause 5.2, Table 3, for the respective treatment A1 to A5 and A7. It shall be stated in the ETA whether this provision is satisfied.

2.2.4.2 Static load test of multiple bond line specimens in compression shear

The test shall be carried out in accordance with EN 302-8, clause 6.2.1. Deviating from EN 302-8 the test specimens shall be made of the softwood that shall be used with a normal density (u = 12 %) in the range of 400 kg/m³ to 550 kg/m³ for Norway spruce and Fir and 500 kg/m³ to 650 kg/m³ for Scots pine redwood, respectively. The applied shear load shall be 3230 N instead of 3870 N The test specimens shall have a moisture content as given in Table 2.2.4.2 at gluing. After gluing the test specimens shall be stored for a minimum of 24 hours at the gluing and curing temperature shown in Table 2.2.4.2. Before testing the specimens shall be conditioned to a moisture content of (12 ± 2) %.

Table 2.2.4.2 Test series for the static load test of multiple bond line specimens in compression shear

Test series	Temperature of the finger-jointed timber during gluing and/ or curing	Moisture content at gluing	
		Outer lamella	Inner lamella
	°C	%	
1	20	12 ± 2	25 ± 5[1]
2		25 ± 5[1]	25 ± 5[1]
3	$T_{Timber} = T_{min} - 5$[2]	12 ± 2	12 ± 2
4		12 ± 2	25 ± 5[1]
5		25 ± 5[1]	25 ± 5[1]

T_{min} [°C] is the temperature of the finger-jointed timber during gluing and curing used by the producer in the manufacturing.

[1] 80 % of the moisture content values of all timber adherends shall be within the range of 25 % ± 10 %.

[2] 80 % of the measured temperatures shall be within the range of ± 1 K and 90 % of the measured temperatures in the range of ± 2.5 K.

- If only the moisture content deviates from the provisions given in EN 15497 the test series specified in Table 2.2.4.2, test series 1 - 2, shall be carried out.
- If only the gluing and/ or curing temperature deviates from the provisions given in EN 15497 the test series specified in Table 2.2.4.2, test series 3, shall be carried out.
- If the moisture content provisions and the gluing and curing temperature deviate from the provisions given in EN 15497 the test series specified in Table 2.2.4.2, test series 4 - 5, shall be carried out.

It shall be stated in the ETA whether the provisions given in EN 15425, clause 5.6, are satisfied.

2.2.4.3 Creep deformation test at cyclic climate conditions with specimens loaded in bending shear

The creep deformation at cyclic climate conditions shall be determined as specified in EN 15416-3. The test is not relevant for battens. Regarding the preparation and number of test specimens the provisions given in EN 15416-3, clause 6, shall be followed whereby the deviations described hereafter shall be considered. At gluing and curing the test specimens shall have a temperature as given in Table 2.2.4.3. After gluing the test specimens shall be stored for a minimum of 24 hours at the curing temperature shown in Table 2.2.4.3. The creep deformation at cyclic climate conditions shall be carried out in accordance with EN 15416-3, clause 7. The test results shall be reported as described in EN 15416-3, clause 7.2. In the ETA it shall be stated whether the provisions given in EN 15425, clause 5.7.1, are met.

Table 2.2.4.3 Test series for the creep deformation test

Test series	Glue line thickness	Temperature of the finger-jointed timber during gluing and/ or curing
	mm	°C
1	0,1	$T_{min} - 5$[1]
T_{min} [°C] is the temperature of the finger-jointed timber during gluing and curing used by the producer in the manufacturing. [1] 80 % of the measured temperatures shall be within the range of ± 1 K and 90 % of the measured temperatures in the range of ± 2.5 K.		

2.2.4.4 Curing time

The curing time of the adhesive shall be determined as specified in EN 302-6.
If the temperature during the gluing and curing process is lower than 15 °C, additional tests in accordance with EN 302-6 shall be carried out. The test specimens shall be made as given in Table 2.2.4.4.

Table 2.2.4.4 Test series for the determination of curing time

Test series	Glue line thickness	Temperature of the finger-jointed timber during gluing and/ or curing	Moisture content at gluing
	mm	°C	%
1	0,1	T_{min}	8
2			12
T_{min} [°C] is the temperature of the finger-jointed timber during gluing and curing used by the producer in the manufacturing.			

The test results shall be assessed in accordance with EN 302-6. The curing time shall be given in the ETA in connection with the tested temperature.

2.2.4.5 Working life

The working life of the adhesive shall be determined by a viscosity test in accordance with EN 302-7. If the temperature in the gluing and/ or curing process is lower than 15 °C tests in accordance with EN 302-7 shall be carried out, performed at the minimum gluing and/ or curing temperature used by the producer in the manufacturing T_{min}.

The test results shall be assessed as specified in EN 302-7. The working life shall be given in the ETA in connection with the tested temperature.

2.2.4.6 Delamination test of finger joints

Tests for finger joints based on EN 301, Annex A, shall be performed. The test is not relevant for battens.

Two specimens of finger-jointed specimens shall be produced, whereby the adherends shall be randomly chosen from one common batch of timber. The timber shall be of the highest produced strength class and the adherends shall have a thickness d of 85 mm as well as a width, which is the maximum produced width b_{max}. In case the maximum thickness is smaller than 85 mm specimens with the maximum thickness value shall be used.

The moisture content of the specimen shall correspond to the provisions given in EN 14080, Annex I, clause I.4.4, respectively for untreated and treated timber. The moisture content distributions of the two specimens shall be similar, i.e., the mean moisture values shall not differ more than 2 percentage points and the variations shall not differ more than 20 %.

- **Specimen glued at standard temperature**: A minimum number of 10 specimens shall be produced at standard temperatures conforming with EN 15497, Annex C.2.1. Depending on the instructions for the used adhesive system the timber temperature shall be $T_{Timber} \geq 18$ °C.
- **Cold glued specimen**: A minimum number of at least 10 specimens shall be produced at a timber temperature of $T_{Timber} \leq T_{min} - 5$ °C[4], whereby T_{min} is the minimum timber temperature for regular production.

The three cases of the production and curing conditions given in clause 2.2.3 shall be differentiated here as well.

After curing all specimens shall be tested according to EN 301, Annex A. All specimens of both test series (glued at standard temperature and cold glued specimen) shall meet the requirements for resistance to delamination given in EN 301, clause 5.7 (2). It shall be stated in the ETA whether this provision is satisfied.

The above-described procedure shall be performed for each combination of adhesive and wood species

2.2.5 Reaction to fire

One of the following options shall apply for assessing the reaction to fire performance of the structural finger-jointed timber:

a) The structural finger-jointed timber is considered to satisfy the requirements of class D-s2, d0 of the reaction to fire performance in accordance with the Commission Delegated Regulation (EU) 2017/1227 without the need for testing on the basis of it fulfilling the conditions set out in that Regulation and its intended use being covered by that Regulation.

   Therefore, when the conditions referred to above are fulfilled, the performance of the product is class D-s2, d0 which shall be given in the ETA.

b) If the structural finger-jointed timber is not covered by “a)” or a better classification is sought, the product shall be tested using the method(s) relevant for the corresponding reaction to fire class according to EN 13501-1. The product shall be classified in accordance with Commission Delegated Regulation (EU) 2016/364 in connection with EN 13501-1.

   The reaction to fire class shall be given in the ETA.

For both options a) and b) the influence of a preservative treatment against biological attack on the performance of reaction to fire shall be considered as prescribed in EN 15228, clause 4.4 (except provisions for SBI tests in clause 4.4.3 – for that see provisions below). The relevant analytical zone (depending on the penetration depth) for the judgement of a potential influence of a preservative treatment shall be determined in accordance with EN 351-1, clause 5.2.

If testing of the structural finger-jointed timber (with or without preservative treatment) is required (option b), the provisions in EN 15497, clause 5.5, shall apply for the mounting and fixing conditions of the specimens of the tests specified in EN 13823 (SBI). Tests in accordance with EN ISO 11925-2 shall be conducted on free-hanging specimens without using an additional substrate.

The specimens for the SBI tests shall be prepared in such manner, that the middle axis of a finger joint is positioned in vertical direction on the long wing of each test specimen with a distance of 200 mm to the inner corner of the specimens. For tests in accordance with EN ISO 11925-2 a finger joint shall be considered in the vertical middle axis of at least two specimens.

Results of these tests are valid for structural finger-jointed timber produced:

- with the same type of wood,
- with the same adhesive with equal or lower visible area per square meter of the glued finger joints as used for the preparation of the tested specimens,
- with the same kind of finger joints,
- with the same or higher thickness of the timber than tested,
- with the same or higher apparent minimum density ($\rho_{g,\,mean}$) of the timber, and
- with the same product for the preservative treatment with equal or lower retention rate.

2.2.6 Content, emission and/or release of dangerous substances

The performance of the product related to the emissions and/or release and, where appropriate, the content of dangerous substances shall be assessed on the basis of the information provided by the manufacturer[5] after identifying the release scenarios considering the intended use of the product and the Member States where the manufacturer intends his product to be made available on the market.

The identified release scenarios for this product and intended use with respect to dangerous substances are:

IA 1: Product with direct contact to indoor air. [6]

IA 2: Product with indirect contact to indoor air (e.g., covered products) but possible impact on indoor air. [7]

2.2.6.1 SVOC and VOC

For the intended use covered by the release scenarios IA1 and IA2 semi-volatile organic compounds (SVOC) and volatile organic compounds (VOC) shall be determined in accordance with EN 16516.

The loading factor to be used for emission testing is 0,05 m^2/m^3. Sampling, transport and storage of the specimen shall be handled in accordance with EN ISO 16000-11. Specimens shall be taken as close as possible to the time of production.

The preparation of the test specimen shall be performed by use of the structural finger-jointed timber with maximum depth, maximum width and for each adhesive using the maximum glue line thickness. The test specimen shall represent the maximum number of possible bond lines.

Once the test specimen has been produced, as described above, it shall immediately be placed in the emission test chamber. This time is considered the starting time of the emission test.

The test results shall be reported for the relevant parameters (e.g., chamber size, temperature and relative humidity, air exchange rate, loading factor, size of test specimen, used adhesive, conditioning, production date, arrival date, test period, test result) after 3 days and 28 days testing.

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5 The manufacturer may be asked to provide to the TAB the REACH related information which shall accompany the DoP (cf. Article 6(5) of Regulation (EU) No 305/2011).

The manufacturer is **not** obliged to:

- provide the chemical constitution and composition of the product (or of constituents of the product) to the TAB, or
- provide a written declaration to the TAB stating whether the product (or constituents of the product) contain(s) substances which are classified as dangerous according to Directive 67/548/EEC and Regulation (EC) No 1272/2008 and listed in the "Indicative list on dangerous substances" of the SGDS, taking into account the installation conditions of the construction product and the release scenarios resulting from there.

Any information provided by the manufacturer regarding the chemical composition of the products is not to be distributed to EOTA, to other TABs or beyond.

6 Scenario IA1 is applicable for products which are in contact with indoor air in a way that dangerous substances could be released directly out of the product.

7 Scenario IA2 is applicable for products which are covered with other products but nevertheless could release dangerous substances to indoor air (e.g., products covered with porous/unsealed coverings incapable of avoiding migration, such as gypsum panels).

The relevant product performances shall be expressed in [mg/m³] and given in the ETA.

2.2.6.2 Formaldehyde emission

For structural finger-jointed timber treated with formaldehyde containing preservatives the formaldehyde emission shall be assessed in accordance with EN 16516 or optionally EN 717-1, respectively. The formaldehyde emission shall be stated in mg/m^3 with regard to the test method and declared as class E1 or E2 in the ETA.

Table 2.2.6.2.1 Release of formaldehyde classes

Formaldehyde release classes	Maximum steady-state emission values in mg HCHO/m^3 air
E1	≤ 0,124
E2	> 0,124

The formaldehyde emission of structural finger-jointed timber produced with formaldehyde free adhesives, not treated with preservatives containing formaldehyde, shall be assigned to class E1 without testing.

2.2.7 Durability against biological attack

2.2.7.1 Structural finger-jointed timber without preservative treatment

The natural durability against biological attack shall be assessed in accordance with EN 350, clause 5.2 and Annex B. The durability classes specified in EN 350, clause 5.2, of the structural finger-jointed timber shall be given in the ETA.

2.2.7.2 Structural finger-jointed timber with preservative treatment

The durability of timber treated against biological attack shall be assessed in accordance with EN 15497, clause 5.3.2. Information in accordance with EN 15228, clause 6, shall be given in the ETA.

3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

3.1 System of assessment and verification of constancy of performance to be applied

For the products covered by this EAD the applicable European legal act is Commission Decision 97/176/EC, as amended by Commission Decision 2001/596/EC.

The system is 1.

3.2 Tasks of the manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of the product in the procedure of assessment and verification of constancy of performance are laid down in Table 3.2.1.

Table 3.2.1 Control plan for the manufacturer; cornerstones

No	Subject/ type of control		Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Factory production control (FPC) [including testing of samples taken at the factory in accordance with a prescribed test plan]						
1	Strength, stiffness and density properties of timber		2.2.1 and 2.2.2	EN 14081-1, clause 6.3	Each piece of structural solid timber	EN 14081-1, clause 6.3
2	Finger joints in timber	Battens	3.4.2	EN 15497, clause 5.1.3	4 samples taken at random for each strength class or given characteristic bending strength, species and adhesive	Per shift and production line
		Boards, planks and square timber	EN 15497, Annex C, provisions regarding FPC	EN 15497, clause 5.1.3	2 samples taken at random for each strength class or given characteristic bending strength, species and adhesive	Per shift and production line
3	Species		According to Control plan	Species as mentioned in clause 1.1	According to Control plan	For each delivery
4	Adhesive		According to Control plan	Adhesive as mentioned in clause 1.1	According to Control plan	For each delivery
5	Moisture content of timber to be jointed		3.4.1	Moisture content as mentioned in clause 1.1	Each structural solid timber	For each piece of solid timber before gluing
6	Temperature of timber to be jointed		Appropriate methods for measurement of the surface temperature of the end-grain faces	Temperature as mentioned in 1.1	Each structural solid timber	For each piece of solid timber before gluing
7	Reaction to fire		Clause 2.2.5 a): Check the relevant indirect parameters, e.g.: • minimum thickness, • apparent minimum density	The provisions of Delegated Regulation (EU) 2017/1227 shall be fulfilled	1	Per shift

No	Subject/ type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
		Clause 2.2.5 b): Check that all relevant indirect parameters, e.g.: • minimum thickness • apparent minimum density • wood type • type of adhesive and its coverage • kind of finger joint • type of preservative treatment • retention rate of the preservative treatment as determined within the reaction to fire tests are fulfilled	According to Control plan		
8	Species or preservative treatment of timber	Check the species or the pre-servative treatment in accordance with EN 15228, clause 5.3	According to Control plan	According to Control plan	For each delivery
9	Content, emission and/or release of dangerous substances	2.2.6	According to Control plan	1	With production start and every 5 years

3.3 Tasks of the notified body

The cornerstones of the actions to be undertaken by the notified body in the procedure of assessment and verification of constancy of performance for structural finger-jointed timber are laid down in Table 3.3.1.

Table 3.3.1 Control plan for the notified body; cornerstones

No	Subject/ type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Initial inspection of the manufacturing plant and of factory production control					
1	Notified Body will ascertain that the factory production control with the staff and equipment are suitable to ensure a continuous and orderly manufacturing of the structural finger-jointed timber considering particularly the following inspections and in accordance with EN 15497, Annex G, clauses G.1 to G.3 and G.4.5 to G.4.7: – Suitable premises – Suitable technical equipment – Qualified personnel – Suitability of the factory production control established by the manufacturer and as defined in the control plan.	Verification of the complete FPC as described in the control plan agreed between the TAB and the manufacturer	According to Control plan	According to Control plan	When starting the production or a new line
Continuous surveillance, assessment and evaluation of factory production control					
2	The Notified Body will ascertain that the system of factory production control and the specified manufacturing process are maintained taking account of the control plan and in accordance with EN 15497, Annex G, clauses G.1 to G.3 and G.4.5 to G.4.7.	Verification of the controls carried out by the manufacturer as described in the control plan agreed between the TAB and the manufacturer with reference to the raw materials, to the process and to the product as indicated in Table 3.2.1.	According to Control plan	According to Control plan	2 times per year

3.4 Special methods of control and testing used for the assessment and verification of constancy of performance

3.4.1 Measurement of moisture content of the structural solid timber

The moisture content of the structural solid timber shall be measured in accordance with EN 15497, Annex D. If the moisture content of the structural solid timber exceeds 20 % it is sufficient to use a moisture meter with an accuracy of ± 5 %.

3.4.2 Bending tests of finger-jointed battens

The flatwise bending tests shall be performed in accordance with EN 15497, Annex C. Deviating from EN 15497 the number of specimens shall be 4 per shift and production line and taken at random for each combination of strength class or manufacturer specific strength class, species and adhesive. The flatwise bending strength shall be taken as tested.

If the bending strength given in the ETA refers to the reference height of 150 mm, the required value is equal to the given value in the ETA multiplied by k_h in accordance with EN 384.

4 REFERENCE DOCUMENTS

EN 301:2023	Adhesives, phenolic and aminoplastic, for load-bearing timber structures – Classification and performance requirements
EN 302-1:2023	Adhesives for load-bearing timber structures – Test methods – Part 1: Determination of longitudinal tensile shear strength
EN 302-6:2023	Adhesives for load-bearing timber structures – Test methods – Part 6: Determination of the minimum pressing time under referenced conditions
EN 302-7:2023	Adhesives for load-bearing timber structures – Test methods – Part 7: Determination of the working life under referenced conditions
EN 302-8:2023	Adhesives for load-bearing timber structures – Test methods – Part 8: Static load test of multiple bond line specimens in compression shear
EN 336:2013	Structural timber – Sizes, permitted deviations
EN 338:2016	Structural timber – Strength classes
EN 350:2016	Durability of wood and wood-based products – Testing and classification of the durability to biological agents of wood and wood-based materials
EN 351-1:2023	Durability of wood and wood-based products – Preservative-treated solid wood – Part 1: Classification of preservative penetration and retention
EN 384:2016+A1:2022	Structural timber – Determination of characteristic values of mechanical properties and density
EN 408:2010+A1:2012	Timber structures – Structural timber and glued laminated timber – Determination of some physical and mechanical properties
EN 717-1: 2004	Wood-based panels – Determination of formaldehyde release – Part 1: Formaldehyde emission by the chamber method
EN 1995-1-1:2004+A1:2008+A2:2014	Eurocode 5: Design of timber structures – Part 1-1: General – Common rules and rules for buildings
EN 13183-1:2002+AC:2003	Moisture content of a piece of sawn timber – Part 1: Determination by oven dry method
EN 13501-1:2018	Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests
EN 13823:2020+A1:2022	Reaction to fire tests for building products – Building products excluding floorings exposed to the thermal attack by a single burning item
EN 14080:2013	Timber structures - Glued laminated timber and glued solid timber - Requirements
EN 14081-1: 2005+A1:2011	Timber structures – Strength graded structural timber with rectangular cross section – Part 1: General requirements
EN 14358:2016	Timber structures – Calculation and verification of characteristic values
EN 15228:2009	Structural timber – Structural timber preservative treated against biological attack
EN 15416-3:2017+A1:2019	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 15425:2023	Adhesives – One component polyurethane (PUR) for load-bearing timber structures – Classification and performance requirements
EN 15497:2014	Structural finger jointed solid timber – Performance requirements and minimum production requirements
EN 16516:2017+A1:2020	Construction products: Assessment of release of dangerous substances – Determination of emissions into indoor air
EN ISO 11925-2:2020	Reaction to fire tests – Ignitability of products subjected to direct impingement of flame – Part 2: Single-flame source test (ISO 11925-2:2020)
EN ISO 16000-11:2024	Indoor air - Part 11: Determination of the emission of volatile organic compounds from samples of building products and furnishing - Sampling, storage of samples and preparation of test specimens (ISO 16000-11:2024)
EAD 130089-00-0304	Structural wet and/or cold glued finger jointed solid timber