EUROPEAN ASSESSMENT DOCUMENT

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GLUED LAMINATED TIMBER WITH FULL CROSS SECTION FINGER JOINT

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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).

Contents

1 Scope of the EAD

1.1 Description of the construction product

The EAD covers glued laminated timber with full cross section finger joint (in the following referred to as glued laminated timber) made of solid Norway spruce (*Picea abies*) and/ or Scots pine redwood (*Pinus sylvestris)* laminations graded according to EN 14081-1[1] with full cross section finger joint.

The glued-laminated timber is built up of one species only (in the following called “homogeneous lay-up”) or with a mixture of the two species spruce and pine within one cross-section (in the following called “hybrid lay-up”).

The laminations of the glued laminated timber are assigned to a T-class according to EN 338. They are not finger jointed before they are face glued.

The EAD covers glued laminated timber with full cross section finger joint type “D” and type “S” which differ in terms of the intended use (see clause 1.2.1).

The product is not fully covered by the following harmonised technical specification: EN 14080. The EAD on hand covers glued laminated timber with a geometry of the full cross section finger joint and an adhesive used for gluing this joint that differ from the provisions in EN 14080. Additionally, the EAD also includes hybrid glulam and full cross section finger joints in hybrid glulam, which is not covered by EN 14080.

In terms of geometry the glued laminated timber with full cross section finger joint is widely in accordance to EN 14080. The EAD covers glued laminated timber with a depth h up to 300 mm, a width b up to 220 mm and the following geometry, whereby the full cross section finger joint is always arranged according to Figure 1.1:

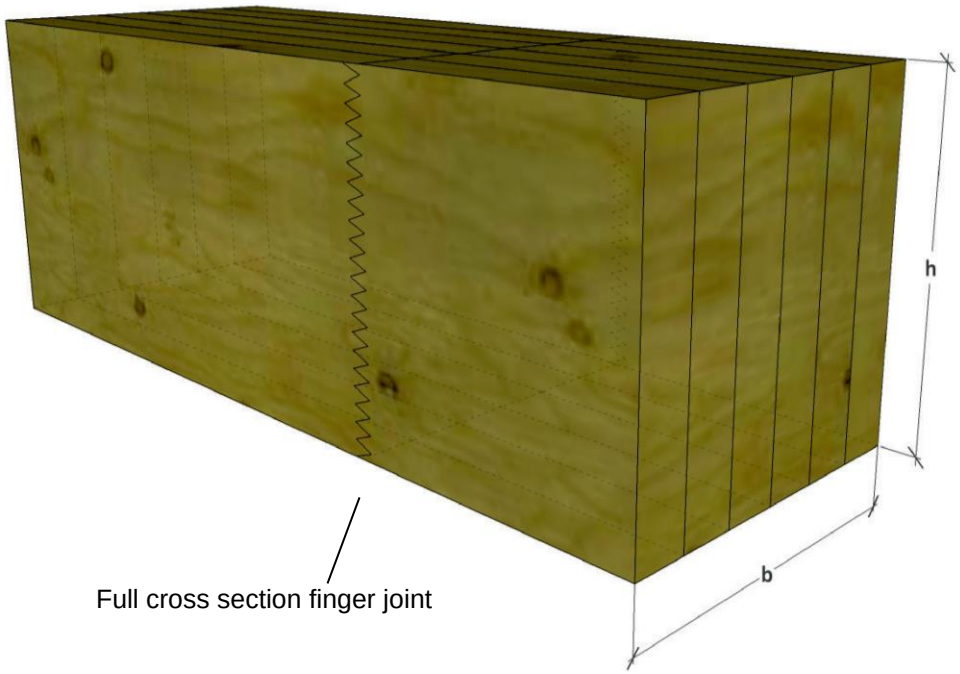

Figure 1.1: Basic structure of glued laminated timber with full cross section timber joint - homogeneous lay-up

The cutting direction of the fingers of the full cross section finger joint is parallel to the smaller side of the lamination. The length of the fingers in the full cross section finger joint is 15 mm ≤ l_j ≤ 20 mm. The finger length lj, the pitch p, the tip width b_t, the reduction factor v = b_t / p and the finger angle α fulfil Formulae (1.1) and (1.2), respectively:

[1] All undated references to standards or to EADs in this EAD are to be understood as references to the dated versions listed in clause 4.

$l_j \geq 4 \cdot p\,(1 - 2 \cdot \nu)$ (1.1)

$\alpha \leq 7.1°$ (1.2)

The reduction factor ν is $\nu \leq 0{,}18$.

There are no knots or pronounced grain disturbances within the full cross section finger joint, whereby knots with a diameter smaller than 6 mm are disregarded.

Adhesives of type I with the letter "w" in the designation according to EN 301 or EN 15425 are used to produce the glued laminated timber. For gluing of the full cross section finger joint adhesives of type I with the letter "w" in the designation according to EN 15425 are used. The maximum glue line thickness is 0.1 mm.

The full cross section finger joint is produced by means of a cyclic automated finger joint facility.

The EAD covers glued laminated timber with full cross section finger joint:

- fulfilling the minimum production provisions according to EN 14080, Annex I, unless otherwise specified in this EAD,
- with an edgewise bending strength of the full cross section finger joint that is $f_{m,ffj,edge,k} \geq 0.8 \cdot f_{m,g,k}$, where $f_{m,g,k}$ is the bending strength of the glued laminated timber.

The EAD does not cover glued laminated timber made of

- softwood preservative treated against biological attack
- softwood treated with flame retardants
- recycled softwood.

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 according to the manufacturer's instructions or (in absence of such instructions) according to the usual practice of the building professionals.

Relevant manufacturer's stipulations 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.

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

1.2.1 Intended use(s)

Glued laminated timber with full cross section finger joint type "D" is used in load-bearing timber structures in service classes 1 and 2 according to EN 1995-1-1, clause 2.3.1.3.

Glued laminated timber with full cross section finger joint type "S" is used in load-bearing timber structures in service class 1 according to EN 1995-1-1, clause 2.3.1.3.

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 Glued laminated timber with full cross section finger joint for the intended use of 50 years when installed in the works provided that the Glued laminated timber with full cross section finger joint 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.

[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.

2 Essential characteristics and relevant assessment methods and criteria

2.1 Essential characteristics of the product

Table 2.1 shows how the performance of the glued laminated timber with full cross section finger joint is assessed in relation to the essential characteristics.

Table 2.1 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, stiffness and density properties of the glued laminated timber with full cross section finger joint	2.2.1.1	Class
2	Characteristic bending strength of the full cross section finger joint with edgewise bending of the laminations	2.2.1.2	Level $f_{m,ffj,edge,k}$ [N/mm²]
3	Characteristic bending strength of the full cross section finger joint with flatwise bending of the laminations	2.2.1.3	Level $f_{m,ffj,flat,k}$ [N/mm²]
4	Tensile strength parallel to the grain of the full cross section finger joint	2.2.1.4	Level $f_{t,0,ffj,k}$ [N/mm²]
Basic Works Requirement 2: Safety in case of fire			
5	Reaction to fire	2.2.2	Class
Basic Works Requirement 3: Hygiene, health and the environment			
6	SVOC and VOC	2.2.3.1	Level, description
7	Formaldehyde emission	2.2.3.2	Class
Aspects of durability			
8	Durability of bonding strength of the glued laminated timber with full cross section finger joint	2.2.4	Description
9	Durability against biological attack	2.2.5	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.

For all tests the timber used for the specimens shall be sampled as a representative mixture from all relevant timber sources.

2.2.1 Strength, stiffness and density properties of the glued laminated timber with full cross section finger joint

2.2.1.1 Strength, stiffness and density properties of the glued laminated timber

Depending on the strength class of the laminations the glued laminated timber shall be assigned to a strength class according to Table 3 in EN 14080. If laminations of different T-classes are arranged within one cross-section, the lowest T-class shall be used for assignment to a strength class according to Table 3 in EN 14080. The strength, stiffness and density properties shall be taken from Table 5 in EN 14080 for the respective strength class.

The strength class shall be given in the ETA.

2.2.1.2 Characteristic bending strength of the full cross section finger joint - edgewise bending of the laminations

a) Full cross section finger joints in homogeneous glulam made from one wood species only

The characteristic bending strength of the full cross section finger joint with edgewise bending of the laminations shall be determined for each glulam strength class. Edgewise 4-point bending tests shall be performed in accordance with EN 408, clause 19. The testing may be determined without conditioning the specimens as described in EN 408, clause 8 if the specimens have a moisture content of u = (12 ± 3) %. Two sets of 15 specimens of each of the minimum and the maximum cross-section shall be tested.

The characteristic values according to EN 14358 (a lognormal distribution assumed) of each set shall be determined. The smaller of the two values $f_{m,ffj,edge,k,min}$ shall be determined. The characteristic full cross section finger joint bending strength for a reference depth of 600 mm shall be calculated from $f_{m,ffj,edge,k,min}$ by multiplication with the depth-factor k_h according to equation (2.1).

$$k_h = \max \begin{cases} \left(\frac{h}{600}\right)^{0.1} \\ 0.90 \end{cases} \qquad (2.1)$$

b) Full cross section finger joints in hybrid glulam made from spruce and pine wood

In the case of hybrid glulam additionally to the tests under 2.2.1.2 a) the characteristic bending strength of the full cross section finger joints shall be determined for the following wood species configurations. In all cases the maximum cross-section shall be tested:

- 15 full cross section finger joints with one joining part homogeneously made of spruce wood and the other joining part made homogeneously of pine wood
- 15 full cross section finger joints with both joining parts made of glulam with alternating lay-up (spruce/pine/spruce/pine/…, see Figure 2.1 a)). The orientation of the joining parts in the finger joint press shall be chosen in such a manner, that each time two different wood species are directly connected in the full cross section finger joint.

- 15 full cross section finger joints with both joining parts made of “blockwise” alternating wood species (i.e. 50% of laminations homogeneously made of spruce wood and ca. 50% homogeneously made of pine wood, see Figure 2.1 b)). The orientation of the joining parts in the finger joint press shall be chosen in such a manner, that each time two different wood species are directly connected in the full cross section finger joint.

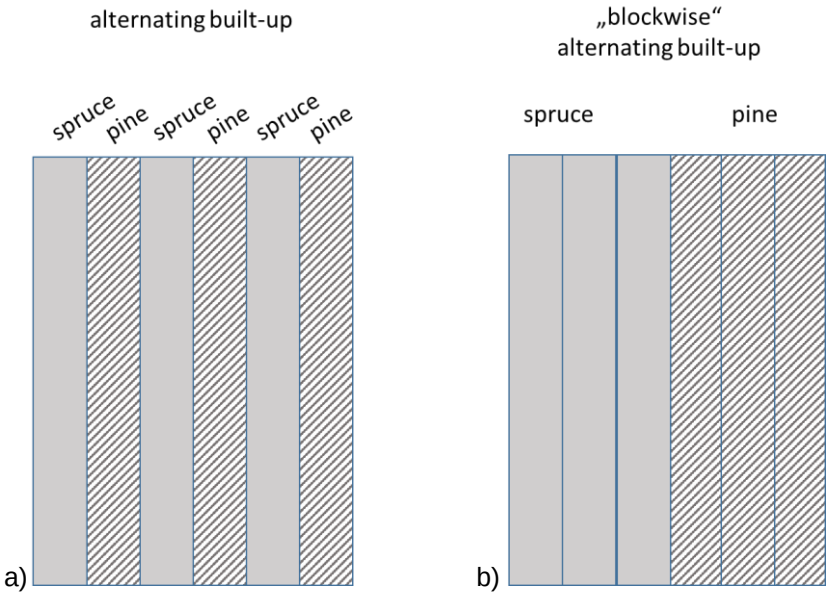

Figure 2.1: Illustration of different lay-ups of hybrid glulam:
a) alternating lay-up, b) “blockwise alternating” lay-up

As in 2.2.1.2. a) edgewise 4-point bending tests shall be performed in accordance with EN 408, clause 19. The testing may be done without conditioning the specimens as described in EN 408, clause 8 if the specimens have a moisture content of u = (12 ± 3) %.

The characteristic value of all hybrid specimens shall be determined according to EN 14358 (a lognormal distribution assumed) and multiplied with k_h according to equation (2.1).

The lowest characteristic bending strength of the full cross section finger joint resulting from the assessment of the individual configurations shall be given in the ETA for a reference depth of 600 mm.

2.2.1.3 Characteristic bending strength of the full cross section finger joint - flatwise bending of the laminations

2.2.1.3.1 Determination from full scale tests – Reference method

a) Full cross section finger joints in homogeneous glulam made from one wood species only

The characteristic bending strength of the full cross section finger joint with flatwise bending of the laminations shall be determined for each glulam strength class. Edgewise 4-point bending tests shall be performed in accordance with EN 408, clause 19. The testing may be determined without conditioning the specimens as described in EN 408, clause 8 if the specimens have a moisture content of u = (12 ± 3) %. Two sets of 15 specimens of each of the minimum and the maximum cross-section shall be tested.

The characteristic values according to EN 14358 (a lognormal distribution assumed) of each set shall be determined. The smaller of the two values $f_{m,ffj,flat,k,min}$ shall be determined.

The characteristic full cross section finger joint bending strength for a reference depth of 600 mm shall be calculated from $f_{m,ffj,flat,k,min}$ by multiplication with the width-factor k_b according to equation (2.2).

$$k_b = max\begin{cases}\left(\frac{b}{600}\right)^{0.1} \\ 0.9\end{cases} \qquad (2.2)$$

b) Full cross section finger joints in hybrid glulam made from spruce and pine wood

In the case of hybrid glulam additionally to the tests under 2.2.1.3 a) the characteristic bending strength of the full cross section finger joints with flatwise bending shall be determined for the following wood species configurations. In all cases the maximum cross-section shall be tested:

- 15 full cross section finger joints with one joining part homogeneously made of spruce wood and the other joining part made homogeneously of pine wood
- 15 full cross section finger joints with both joining parts made of glulam with alternating lay-up (spruce/pine/spruce/pine/…, analogously to Figure 2.1 a)). The orientation of the joining parts in the finger joint press shall be chosen in such a manner, that each time two different wood species are directly connected in the full cross section finger joint.
- 15 full cross section finger joints with both joining parts made of "blockwise" alternating wood species (i.e. 50% of laminations homogeneously made of spruce wood and ca. 50% homogeneously made of pine wood, see Figure 2.1 b)). The orientation of the joining parts in the finger joint press shall be chosen in such a manner, that each time two different wood species are directly connected in the full cross section finger joint.

2.2.1.3.2 Determination by calculation – simplified method

As simplified method the characteristic bending strength of the full cross section finger joint with flatwise bending of the laminations $f_{m,ffj,flat,k}$ shall be determined according to equation (2.3).

$$f_{m,ffj,flat,k} = \frac{f_{m,ffj,edge,k}}{1.2} \quad (2.3)$$

where

$f_{m,ffj,flat,k}$ is the characteristic bending strength of the full cross section finger joint in edgewise bending of the laminations determined according to clause 2.2.1.2.

2.2.1.4 Tensile strength parallel to the grain of the full cross section finger joint

The characteristic tensile strength parallel to fibre of the full cross-section finger joint is determined as 80% of the characteristic bending strength of the full cross-section finger joint.

The characteristic tensile strength parallel to the grain of the full cross section finger joint for a reference depth of 600 mm shall be given in the ETA.

2.2.2 Reaction to fire

One of the following options shall apply for assessing the reaction to fire performance of the glued laminated timber with full cross finger joints:

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

   Therefore, the performance of the product is D-s2, d0.

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

   For the mounting and fixing conditions of the specimens of the tests according to EN 13823 (SBI) the provisions in EN 14080, clause 5.8, shall apply. Tests according to 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 a full cross 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 according to EN ISO 11925-2 a full cross finger joint shall be taken into account in the vertical middle axis of at least two specimens.

Results of these tests are valid for glued laminated timber with full cross finger joints produced

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

2.2.3 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 will be assessed on the basis of the information provided by the manufacturer[3] after identifying the release scenarios taking into account 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 intended release scenarios for this product and intended use with respect to dangerous substances are:

IA 1[4]: Product with direct contact to indoor air.

IA 2[5]: Product with indirect contact to indoor air (e.g covered products) but possible impact on indoor air.

2.2.3.1 SVOC and VOC

For the intended use covered by the release scenario IA1 and/or IA2 semi-volatile organic compounds (SVOC) and volatile organic compounds (VOC) shall be determined in accordance with EN 16516. The respective loading factor [m^2/m^3] used for emission testing can be taken from the following table:

Table 2.2 Loading factor L, depending on the product type (in accordance with EN 16516)

Intended use	Loading factor [m^2/m^3]
Walls	1,0
Floor, ceiling	0,4
Small surfaces, e.g. door, window, heating system	0,05

The preparation of the test specimen is performed by using a representative sample of the product installed in accordance with the manufacturer's product installation instructions or in absence of such instructions

[3] The manufacturer may be asked to provide to the TAB the REACH related information which he must accompany the DoP with (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
- to 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.

Any information provided by the manufacturer regarding the chemical composition of the products may not be distributed to EOTA or to TABs.

[4] 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.

[5] 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 usual practice of the product installation. The size of the test specimen has to be chosen in consideration of the test chamber size and the intended loading factor (see above).

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

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

The product performance shall be expressed in [µg/m³ or mg/m³] and stated as tested/described in the ETA.

2.2.3.2 Formaldehyde emission

If a formaldehyde-containing adhesive for bonding the glued laminated timber with full cross section finger joint is used, the release of formaldehyde has to be determined according to EN 14080, Annex A.
If a formaldehyde-free adhesive is used to produce glued laminated timber with full cross section finger joint, the release of formaldehyde can be assigned to class E1 without testing according to EN 14080, Annex A.

The release of formaldehyde is stated as class E1 or E2.

2.2.4 Durability of bonding strength of the glued laminated timber with full cross section finger joint

The suitability of the adhesive for gluing the glued laminated timber with full cross section finger joint shall be assessed in accordance with EN 301 and EN 15425.

The durability of the bonding strength of the glued laminated timber with full cross section finger joint shall be determined by tests according to Table 2.3.

Table 2.3 Durability of the bonding strength of the glued laminated timber with full cross section finger joint – Assessment methods

Type of the glued laminated timber with full cross section finger joint	Test method	Provisions to be fulfilled
D	EN 14080, Annex C, method A	EN 14080, Table 9 method A, provisions for glulam
S	EN 14080, Annex C, method B	EN 14080, Table 9 method B, provisions for glulam

Depending on the glulam lay-up (homogeneous or hybrid) following configurations shall be tested:

a) Homogeneous glulam made from one wood species only

10 test samples (one sample per glulam beam) for each species/adhesive combination and press type

b) Hybrid glulam made from spruce and pine wood

Additionally, to the tests of 2.2.4 a) the following configurations shall be tested:

- 10 specimens with alternating lay-up (i.e. cross-section with laminations made of spruce/pine/spruce/pine, see Fig. 2.a))
- 10 specimens with “blockwise” alternating lay-up (i.e. 50% of laminations homogeneously made of spruce wood and ca. 50% homogeneously made of pine wood, see Fig. 2.b))

2.2.5 Durability against biological attack

The natural durability against biological attack shall be assessed according to EN 350, clause 5.2 and Annex B. In the case of hybrid glulam the lower durability class of the two wood species is decisive. The durability classes according to EN 350, clause 5.2 of the glued laminated timber with full cross section finger joint shall be given in the ETA.

3 Assessment and verification of constancy of performance

3.1 System(s) 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 3.1.

Table 3.1 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**]					
Mechanical resistance, stiffness and density					
1	Strength, stiffness and density properties of the laminations	EN 14081-1, clause 6.3	EN 14081-1, clause 6.3	-	Once per shift
2	Species, adhesives	Control plan	Check whether the species and adhesives are within the conditions given in clause 1.1	-	For each delivery
3	Moisture content of timber to be jointed	EN 14080: Annex G	EN 14080, Annex I.4.4	Each lamination before bonding	Continuously during production
4	Temperature of the timber	EN 14080, Annex I.4.8 and I.5.10	EN 14080, Annex I.4.8 and I.5.10	-	Continuously during production
5	Glue line thickness of the full cross section finger joint	EN 14080, Annex I.6.6	≤ 0.1 mm	2 taken at random	weekly
6	Cramping pressure for full cross section finger joints and for face-gluing	Control plan	EN 14080, Annex I.4.7 and I.5.9	-	daily
7	Bending strength of full cross section finger joints	EN 14080, Annex F	Control plan	2 samples taken at random for each strength class and adhesive	2 per shift and production line

No	Subject/type of control		Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
8	Geometrical data		EN 14080, 5.11.1	EN 14080, 5.11.1	2 taken at random	2 per shift
9	Bonding strength	Type "D"	EN 14080, Annex C, method B	EN 14080, clause 5.5.5.2.2	one full cross sectional specimen for each 20 m^3 of production	1 per shift
		Type "S"	EN 14080, Annex D or EN 14080, Annex C, method B	EN 14080, clause 5.5.5.2.3 respectively EN 14080, clause 5.5.5.2.2	one full cross sectional specimen for each 20 m^3 of production	1 per shift
Safety in case of fire						
10	Reaction to fire		2.2.2 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
			2.2.2 b) Check that all relevant indirect parameters, e.g.: • minimum thickness • apparent minimum density • wood type • type of adhesive and its coverage • kind of full cross finger joint as determined within the reaction to fire tests are fulfilled.	Control plan		
Content, emission and/or release of dangerous substances						
11	SVOC and VOC		2.2.3.1	Control plan	1	With production start and every 5 years
12	Formaldehyde emission		EN 14080, Annex A, A 2.1.2	Control that only adhesives for which an initial classification has been carried out within the assessment of the performance are used. Class E1 or E2	-	at any reception of adhesives

3.3 Tasks of the notified body

The cornerstones of the actions to be undertaken by the notified body of the product in the procedure of assessment and verification of constancy of performance are laid down in Table 3.2.

Table 3.2 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	Ascertain that the factory production control with the staff and equipment is suitable to ensure a continuous and orderly manufacturing of the product considering particularly the following inspections and in accordance with EN 14080, Annex I clauses I.1 to I.3, I.4.4 to I.4.8, I.5.5 to I.6.1 and I.6.3 to I.6.7: – Suitable premises – Suitable technical equipment – Qualified personnel – Suitability of the factory production control established by the manufacturer Full implementation of the control plan	Verification of the complete FPC, to be implemented by the manufacturer as defined in the control plan	According to control plan	According to control plan	When starting the production process, after its modification or when starting a new production line
Continuous surveillance, assessment and evaluation of factory production control					
2	Ascertain that the system of factory production control and the specified manufacturing process are maintained according to EN 14080, Annex I clauses I.1 to I.3, I.4.4 to I.4.8, I.5.5 to I.6.1 and I.6.3 to I.6.7 and as defined in the control plan	Verification of the controls carried out by the manufacturer on the raw materials, on the manufacturing process and on the product as indicated in Table 3.1 and as defined in the control plan	According to control plan	According to control plan	Twice a year

4 Reference documents

EN 301:2017	Adhesives, phenolic and aminoplastic, for load-bearing timber structures – Classification and performance requirements
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 408:2010+A1:2012	Timber structures – Structural timber and glued laminated timber – Determination of some physical and mechanical properties
EN 1995-1-1: 2004+AC: 2006+A1:2008+A2:2014	Eurocode 5: Design of timber structures – Part 1-1: General – Common rules and rules for buildings
EN 13501-1:2018	Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests
EN 13823:2010+A1:2014	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 of characteristic 5-percentile values and acceptance criteria for a sample
EN 15425:2017	Adhesives – One component polyurethane for load bearing timber structures – Classification and performance requirements
EN 16516:2017	Construction products – Assessment of release of dangerous substances – Determination of emissions into indoor air
EN ISO 11925-2:2010	Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test (ISO 11925-2:2010)