EUROPEAN ASSESSMENT DOCUMENT

EAD 130484-00-0304

January 2019

TENSION PROOF LOADED STRUCTURAL FINGER JOINTED SOLID TIMBER WHICH MAY BE PROCESSED TO GLUED LAMINATED TIMBER AND 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) No 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 product “Tension proof loaded structural finger jointed solid timber which may be processed to glued laminated timber and glued solid timber”, named “tension proof loaded timber” hereinafter is comprised of finger jointed timber made of softwood in the following product types:

- The product type “mono” is tension proof-loaded strength graded structural finger jointed solid timber according to EN 15497[1]. The cross section is identical to standardized structural finger jointed solid timber according to EN 15497.
- The product types “duo, trio and quattro” are glued laminated or glued solid timber composed of 2 to 4 flatwise bonded laminations of product type “mono”. The cross section is identical to standardized glued laminated timber or glued solid timber according to EN 14080. The thickness t of the laminations corresponds to EN 14080.

The product is
- Strength graded according to the grading rules of EN 14081-1
- Without preservative treatment,
- Without flame retardant and

The EAD covers products of wood species European Spruce (Picea abies), Fir (Abies alba), Scots pine redwood (Pinus sylvestris), European larch (Larix decidua), Poplar (Applicable clones: Populus x euramericana cv “Robusta”, ”Dorskamp”, “I214” and “I4551”), RadiataPine (Pinus radiate).

The EAD covers products glued by the following structural adhesives (finger joints as well as surface gluing):
- Adhesives type I according to EN 301 and tested according to EN 302-6
- Adhesives type I according to EN 15425.

Gluing at temperatures higher than 30°C is not subject of the EAD.

The moisture content in mono beams is between 7 % and 18 % and in glued laminated timber and glued solid timber (duo, trio, quattro) between 6 % and 15 %.

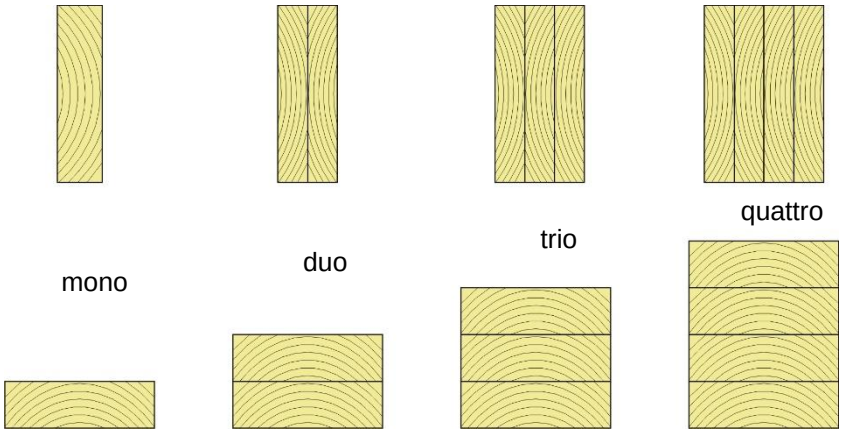

Figure 1.1.1: Possible cross sections of tension proof loaded timber “mono” and processed to glued laminated timber and glued solid timber “duo, trio and quattro”

The product is not fully covered by the following harmonised technical specifications:

- hEN 15497 because of tension proof loading procedure and deviating essential characteristics, and
- hEN 14080 because of tension proof loading procedure and deviating essential characteristics.

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

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)

Tension proof loaded timber is intended to be used as a structural element for load bearing applications (bridges and buildings).

The product is subjected to static and quasi static actions only.

The product is intended to be used in service classes 1 and 2 according to EN 1995-1-1.

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 tension proof loaded timber for the intended use of 50 years when installed in the works. 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 (if necessary in addition to the definitions in CPR, Art 2)

1.3.1 Tension proof loading

By tension proof loading every piece of timber, with or without finger joints, undergoes a loading procedure where it is loaded up to a certain stress below its characteristic strength (proof level). The minimum tensile proof load is 50 % of the characteristic tensile strength; the maximum tensile proof load is 85 % of the characteristic tensile strength.

All pieces not reaching a pre-set proof level due to premature failure are separated from those with greater strength. Proof loading is a recognized quality control technique to improve the characteristics of the lower tail of the strength distribution.

[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.

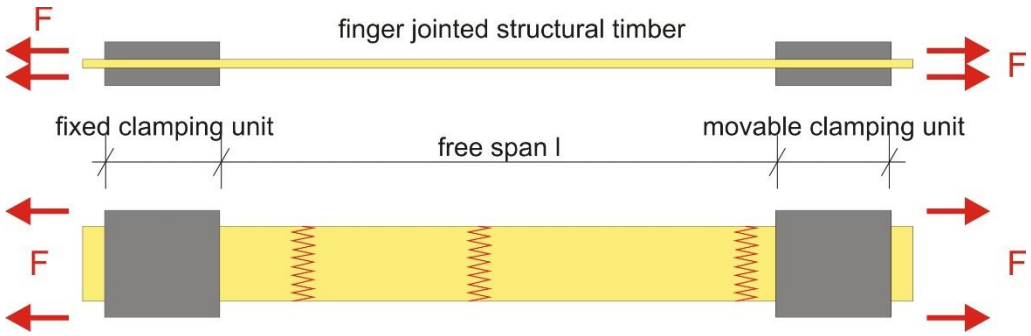

Figure 1.3.1.1: System sketch of a tensile proof loading device for industrial application

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 tension proof loaded 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	Mechanical strength, stiffness and density	2.2.1	Level
2	Mechanical TIME-resistance of finger joint	2.2.2	Level
3	Mechanical resistance against PRE-damaging due to first and second proof loading	2.2.3	Level
4	Proof load factor k_{pl}	2.2.4	Level
5	Bending strength and stiffness – system effect k_{sys} for timber elements stressed on edge	0	Level
6	Bond line integrity	2.2.6	Description, level
7	Creep and duration of the load	2.2.7	Level
8	Dimensional stability	0	Level
Basic Works Requirement 2: Safety in case of fire			
9	Reaction to fire	2.2.9	Class
10	Resistance to fire (Charring rate)	2.2.10	Level, class
Basic Works Requirement 3: Hygiene, health and the environment			
11	Content, emission and/or release of dangerous substances	2.2.11	Class
Aspects of durability			
12	Natural durability	2.2.12	Level

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 Mechanical strength, stiffness and density

Purpose of the assessment

Determination of the mechanical strength, stiffness and density of the tension proof loaded timber.

Assessment method

Assessment of the mechanical strength, stiffness and density of the product type “mono” is performed according to EN 338 for strength graded timber according to the grading rules of EN 14081-1 which can be assigned to a strength class according to EN 338.
For grading classes different from EN 338 or grading rules different from EN 14081-1 the respective strength and stiffness values as well as density shall be assessed according to EN 408 and EN 384.

In addition the tensile strength of the finger joint parallel to the grain $f_{t,0,j,k}$ shall be assessed and evaluated according to EN 14080, Annex E, on at least 30 specimens per strength class.

Assessment of product type “duo, trio, quattro” is performed according to product type “mono”. Hereby, the lamination with the lowest strength class is decisive.

Expression of results

The following strength and stiffness properties as well as density of the material shall be given in the ETA according to EN 338:

- Bending strength $f_{m,k}$
- Tensile strength in direction of grain $f_{t,0,k}$ and perpendicular to the grain $f_{t,90,k}$
- Compression strength in direction of grain $f_{c,0,k}$ and perpendicular to the grain $f_{c,90,k}$
- Shear strength $f_{v,k}$
- Modulus of elasticity parallel to the grain $E_{m,0,mean}$ and $E_{m,0,k}$
- Modulus of elasticity perpendicular to the grain $E_{m,90,mean}$ and $E_{m,90,k}$
- shear modulus G_{mean} and shear modulus G_k
- Characteristic density ρ_k
- Tensile strength of the finger joint parallel to the grain $f_{t,0,j,k}$

2.2.2 Mechanical TIME-resistance of finger joint

Purpose of the assessment

Determination of the mechanical TIME-resistance of the finger joint.

Assessment method

Tension test of finger joint according to EN 14080, Annex E, at the time t_{min} after producing the finger joint. The time t_{min} is the minimum time between producing the finger joint and the first proof loading. Possible time steps are 2/5/10 minutes starting with the first test immediately after production ($t_{min,start}$ = time for mounting and fixing). The free span can be reduced to a length of 4 times the thickness added to the finger-length l_{fj}, see Figure 2.2.2.1.

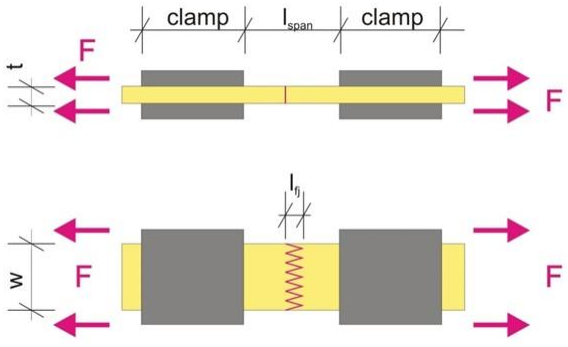

Figure 2.2.2.1: Test-configuration for finger-joint testing in tension

At least 40 specimens shall be tested at different times t_{min} in the medium dimensions (width and thickness).

The curing time of finger joints is assessed as the time where less than 1 % of finger joints failed below the proof level.

Expression of results

The curing time of finger joints before proof loading in minutes shall be given in the ETA.

2.2.3 Mechanical resistance against PRE-damaging due to first and second proof loading

Purpose of the assessment

Determination of the mechanical resistance against PRE-damaging due to first and second proof loading.

Assessment method

Assessment of the proof load level is performed on finger jointed structural timber specimens tension proof loaded in production with a first proof-level of 50±2 % of the given tensile strength in direction of grain $f_{t,0,k}$ and a second proof level of 10 % higher than the first (e.g. for strength class T14: $f_{t,0,k}$ = 14 MPa, first proof-level 7.0 MPa, second proof-level 7.7 MPa). At least the first 1000 m³ of production on different cross sections (at least medium dimensions) shall be evaluated. Higher proof load levels may be assessed in the same way.

Suitable proof load levels are determined when within the second proof-loading a maximum of 0.1 % of finger joints fail below proof-level 1 and a maximum of 1 % of finger joints fail within the second proof-loading in total.

Expression of results

The range of the proof load level in % shall be given in the ETA.

2.2.4 Proof load factor k_{pl}

Purpose of the assessment

Timber products subjected to tensile proof loading result in a more reliable minimum strength, since every piece in the lower tail of the strength distribution is rejected by the proof loading process.

The increased reliability is used to define a virtual strength[3] of the tension proof loaded timber by the proof load factor k_{pl}, as shown in the following Equation:

$$R_{k,pl} = R_k \cdot k_{pl}$$

Where

$R_{k,pl}$	…	Virtual strength of tension proof loaded structural finger jointed solid timber
R_k	…	Strength according to the respective strength class of EN 338
k_{pl}	…	Proof loading factor

Assessment method

The proof-loading factor k_{pl} is determined with the following material based input parameters

- Proof level

[3] For correct interpretation of k_{pl} it is essential to consider: Design values R_d with virtual strength $R_{k,pl}$, i.e. with proof loading, and a partial factor for material results in the same reliability as design values with strength R_k, i.e. without proof loading, and the same partial factor for the material.

- Coefficient of variation (COV) of the tension strength of the base material of the tension proof loaded structural finger jointed solid timber prior to proof loading

The coefficient of variation is either determined in tensile tests according to EN 408 on at least 30 specimens or taken from the following Table 2.2.4.1.

Table 2.2.4.1 Coefficient of variation

Strength class	Grading	COV
C16	Graded for C16	30%
C24	All pieces of base material graded equal or better than C24	25%
	All pieces of base material graded equal to C24	30%
C30	Graded for C30	25%

The proof level is determined in percent of the characteristic tension strength of the tension proof loaded timber prior to proof loading

proof level = $\frac{\sigma_{proof}}{f_{t,0,k}} \cdot 100$ in %

Where

σ_{proof} … Tension stress applied to each piece in tension proof loading
$f_{t,0,k}$ … Characteristic tensile strength in direction of grain prior to proof loading

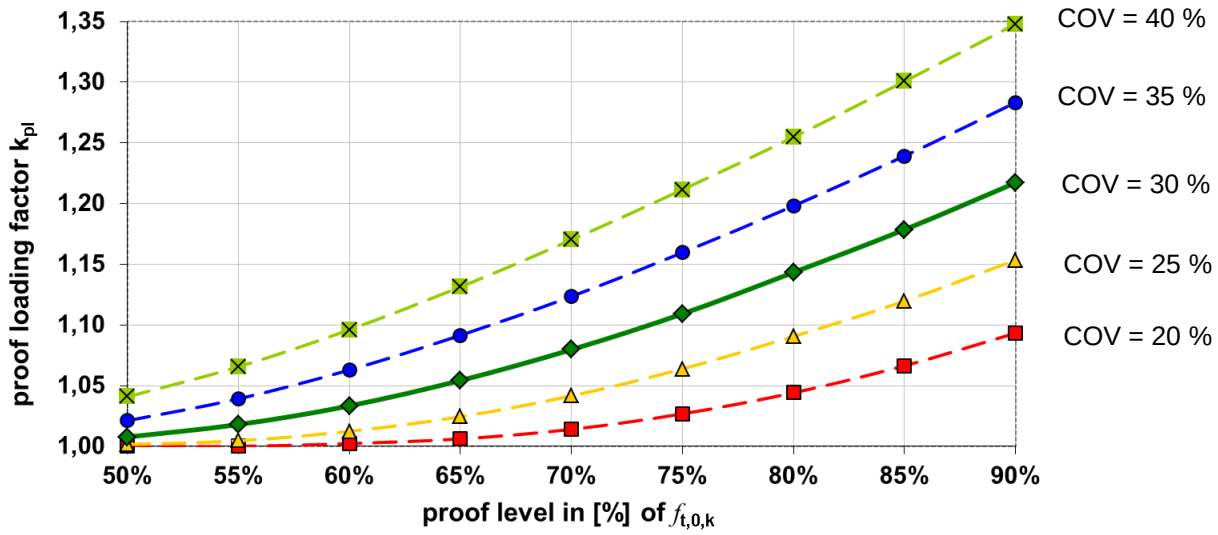

Figure 2.2.4.1: Proof-loading factor k_{pl} as a function of proof-level and the coefficient of variation COV of tension-strength

Expression of results

The value of k_{pl} together with proof level and COV shall be given in the ETA.

NOTE: Proof loading makes a cut just for the lowest strength but does not cut the higher strengths. Therefore the proof-loading-factor favours samples with a higher COV.

2.2.5 Bending strength and stiffness – system effect k_{sys} for timber elements stressed on edge

Purpose of the assessment

Determination of the bending strength and stiffness – system effect k_{sys} for timber elements stressed on edge.

Assessment method

For assessment of the system effect k_{sys} for timber elements stressed on edge the product type “duo, trio, quattro” shall be tested in edgewise bending and assessed according to EN 14080, Annex F.

At least 40 specimens shall be tested in a medium cross section.

The system factor k_{sys} may be determined in relation to the bending strength and stiffness of the product type “mono” according to EN 1995-1-1, Clause 6.6. The system effect k_{sys} shall be capped to the value of 1.15 for two-part cross sections and to 1.20 for three-part and four-part cross sections. The system factor k_{sys} is not applicable for strength classes higher than C30.

Expression of results

The system factor k_{sys} for timber elements stressed on edge shall be given in the ETA.

2.2.6 Bond line integrity

Purpose of the assessment

Determination of the performance of the gluing - bond line integrity.

Assessment method

The bond line of the product type “duo, trio, quattro” shall be assessed according to EN 14080, Annex C and Clause 5.5.5.2.2, either Method A or Method B, for glued laminated timber and glued solid timber.

Expression of results

The maximum values for the total delamination in % together with the chosen method A or B shall be given in the ETA.

2.2.7 Creep and duration of load

Purpose of the assessment

For structural wood products the influence of creep and duration of load are to be taken into account according to EN 1995-1-1 clauses 2.2.3 and 2.4.1 by the parameters k_{def} and k_{mod}.

Assessment method

Values for k_{def} and k_{mod} are given in the EN1995-1-1, tables 3.1 and 3.2.

Expression of results

Two sets of the parameters shall be given in the ETA:

- For product type “mono” the parameters k_{def} and k_{mod} are defined according to structural wood.
- For product type “duo, trio, quattro” the parameters k_{def} and k_{mod} are defined according to glued laminated timber.

2.2.8 Dimensional stability

Purpose of the assessment

Determination of the performance of the dimensional stability parameters.

Assessment method

Dimensions of cross section shall be measured on 5 specimens according to EN 1309-1 at mid-length of the proof loaded product type “mono” at moisture content of 15 % ± 3 % and proof loaded product type “duo, trio, quattro” at moisture content of 12 % ± 3 %.The average values on length, width and thickness shall be assessed according to EN 336 for product type “mono” and EN 14080, Clause 5.11, for product type “duo, trio, quattro”..

Swelling and shrinkage shall be assessed according to EN 336 for product type “mono” and EN 14080, Clause 5.11, for product type “duo, trio, quattro”..

Expression of results

The average values on length, width and thickness in mm shall be given in the ETA.

Swelling and shrinkage values shall be given in the ETA.

2.2.9 Reaction to fire

The tension proof loaded timber of product type “mono” is considered to satisfy the requirements for performance class D-s2, d0 of the characteristic reaction to fire in accordance with the EC Decision 2003/593/EC without the need for testing on the basis of it fulfilling the conditions set out in that Decision and its intended use being covered by that Decision.

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

The tension proof loaded timber of product type “duo, trio, quattro” is considered to satisfy the requirements for performance class D-s2, d0 of the characteristic reaction to fire in accordance with the EC Decision 2005/610/EC without the need for testing on the basis of it fulfilling the conditions set out in that Decision and its intended use being covered by that Decision.

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

When the product does not meet the provisions of the aforementioned EC Decision or when a higher classification is sought, testing shall be done using the procedures/test method(s) according to EN 13501-1 and EN 15497, Clause 5.5, for product type “mono” or EN 14080, Clause 5.8, for product type “duo, trio, quattro”. The product shall be classified according to Commission Delegated Regulation (EU) No 2016/364.

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

2.2.10 Resistance to fire (Charring rate)

Purpose of the assessment and assessment method

Load-bearing performance (criterion R) can be determined in accordance with EN 1995-1-2 when the charring rates are defined in EN 1995-1-2 as a part of design of works. The charring rate of the components according to EN 1995-1-2 shall be given in the ETA. This method is the reference method.

For certain configurations where test conditions can be specified, the product shall be tested using the test method relevant for the corresponding fire resistance class, in order to be classified according to EN 13501-2.

Expression of results

The resistance to fire class and boundary conditions shall be stated in the ETA.

2.2.11 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[4] 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: Product with direct contact to indoor air.
IA 2: Product with indirect contact to indoor air (e.g. covered products) but possible impact on indoor air.

2.2.11.1 SVOC and VOC

Purpose of the assessment and assessment method

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 following table:

Intended use	Loading factor (m^2/m^3)
Walls	1,0
Floor, ceiling	0,4

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 the usual practice of the product installation.

NOTE: The size of the test specimen has to be chosen in consideration of the test chamber size and the intended loading factor.

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 28 days testing.

Expression of results

The product performance shall be expressed in [mg/m^3] and given in the ETA.

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4 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.

2.2.11.2 Formaldehyde

Purpose of the assessment and assessment method

Release of formaldehyde shall be assessed according to EN 15497, Clause 5.6, for product type “mono” or EN 14080, Clause 5.9, for product type “duo, trio, quattro”.

Expression of results

The class of emission of formaldehyde shall be given in the ETA.

2.2.12 Natural durability

Purpose of the assessment and assessment method

Natural durability of the product is assessed as the performance of the wood material with poorest performance according to EN 350.

Expression of results

The natural durability class 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: Decision 97/176/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)					
1	Strength, stiffness and density properties of timber	EN 14081-1, 6.3	EN 14081-1, 6.3	EN 14081-1, 6.3	EN 14081-1, 6.3
2	Species	Check the suppliers declaration	Species as mentioned in 1.1	–	Each reception
3	Adhesive	Check the suppliers declaration	Adhesive as mentioned in 1.1	–	Each reception
4	Moisture content of timber to be joined	EN 14080, Annex G.1	EN 14080, Annex G.1	2	2 times a month
		EN 14080, Annex G2	EN 14080, Annex I.4.4	–	According to the quality measurement manual of the manufacturer
5	Finger joints in laminations	EN 14080, Annex E	See control plan	2	For each strength class per shift and line
6	Finger joints in laminations with contact free application of adhesive	EN 15497, Annex F	EN 15497, Annex G.4.5.4	Automatic monitoring system: 2 Visual control: 1	Automatic monitoring system: Per shift in regular time intervals Visual control: Every two hours
7	Geometrical data	EN 14080, 5.11	EN 14080, 5.11	2	At each change of cross section

8	Bonding strength of glue lines in glued laminated timber and glued solid timber	EN 14080, Annex C, Method B	EN 14080, 5.5.5.2.2 for glued laminated timber and glued solid timber	1 full cross sectional specimen	each 20 m³ of production
		EN 14080, I.5.8	EN 14080, I.5.8	1 full cross sectional specimen	each 20 m³ of production
9	Functioning and adjusting value of the tensile test machine	Test operation	The calculated tension proof load must be reached	–	Once a day
10	Calibration of the tensile test machine	EN ISO 7500-1	Class I according to EN ISO 7500-1	–	Once a year
11	Setting on the tensile test machine	Visually on operating panel	Correct settings regarding tension proof load and cross section as well as minimum time between producing the finger joint and the first proof loading	–	At each change of cross section and minimum once per shift

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 3.3.1.

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	Check of incoming materials	Control plan	control plan	N/A	N/A
2	Equipment to control the subjects in 3.2.1	inspection	control plan	N/A	N/A
3	Documentation and the templates for the records of the subjects in 3.2.1	inspection	control plan	N/A	N/A

Continuous surveillance, assessment and evaluation of factory production control					
1	Strength, stiffness and density properties of timber	EN 14081-1	control plan	control plan	1/year
2	Species	Control plan	control plan	control plan	1/year
3	Adhesive	Control plan	control plan	control plan	1/year
4	Moisture content of timber to be joined	EN 14080	control plan	control plan	1/year
5	Finger joints in laminations	Control plan	control plan	control plan	2/year
6	Geometrical data	Control plan	control plan	control plan	1/year
7	Bonding strength of glue lines in glued laminated timber and glued solid timber	Control plan	control plan	control plan	1/year
8	Functioning and adjusting value of the tensile test machine	Control plan	control plan	control plan	1/year
9	Calibration of the tensile test machine	Control plan	control plan	control plan	1/year
10	Setting on the tensile test machine	Control plan	control plan	control plan	1/year

4 REFERENCE DOCUMENTS

EN 301:2017	Adhesives, phenolic and aminoplastic, for load-bearing timber structures – Classification and performance requirements
EN 302-6:2013	Adhesives for load-bearing timber structures – Test methods – Part 6: Determination of the minimum pressing time under referenced conditions
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 384:2018	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 1309-1:1997	Round and sawn timber – Method of measurement of dimensions – Part 1: Sawn timber
EN 1365-3:1999	Fire resistance tests for loadbearing elements – Part 3: Beams
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 1995-1-2:2004+ AC:2009	Eurocode 5: Design of timber structures – Part 1-2: General – Structural fire design
EN 13501-1:2018	Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests
EN 13501-2:2016	Fire classification of construction products and building elements – Part 2: Classification using data from fire resistance tests, excluding ventilation services
EN 14080:2013	Timber structures – Glued laminated timber and glued solid timber – Requirements
EN 14081-1:2016	Timber structures – Strength graded structural timber with rectangular cross section – Part 1: General requirements
EN 15425:2017	Adhesives – One component polyurethane for load bearing timber structures – Classification and performance requirements
EN 15497:2014	Structural finger jointed solid timber — Performance requirements and minimum production requirements
EN ISO 7500-1:2018	Metallic materials – Calibration and verification of static uniaxial testing machines – Part 1: Tension/compression testing machines – Calibration and verification of the force-measuring system