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European Technical Assessment

ETA-14/0354 of 20.02.2015

GENERAL PART

Technical Assessment Body issuing the European Technical Assessment

Österreichisches Institut für Bautechnik
 Austrian Institute of Construction Engineering

Trade name of the construction product

FST

Product family to which the construction product belongs

Glued laminated timber made of hardwood – Structural laminated veneer lumber made of beech

Manufacturer

Pollmeier Furnierwerkstoffe GmbH
Pferdsdorfer Weg 6
99831 Kreuzburg
Germany

Manufacturing plant

Pollmeier Furnierwerkstoffe GmbH
Pferdsdorfer Weg 6
99831 Kreuzburg
Germany

This European Technical Assessment contains

12 Pages including 2 Annexes which form an integral part of this assessment

This European Technical Assessment is issued in accordance with Regulation (EU) № 305/2011, on the basis of

European Assessment Document
EAD 130010-00-0304 “Glued laminated timber made of hardwood – Structural laminated veneer lumber made of beech”, Edition November 2014

Remarks

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

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SPECIFIC PARTS

1 Technical description of the product

1.1 General

This European Technical Assessment (ETA) applies to the glued laminated timber "FST" which is composed of structural laminated veneer lumber (LVL) lamellae made of beech. Lamella conform to EN 14374.

FST consists of at least three lamellae which are bonded at the faces. Surfaces are grinded.

Holes in the glued laminated timber made of LVL are not subject of the European Technical Assessment.

The application of wood preservatives and flame retardants is not subject of the European Technical Assessment.

1.2 Wood

Wood species is European Beech (*Fagus sylvatica* L.).

2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (thereafter EAD)

2.1 Intended use

FST is intended to be used as a structural or non-structural element in buildings and timber structures.

The product shall be subjected to static and quasi static actions only.

FST is intended to be used in service classes 1 and 2 according to EN 1995-1-1¹.

2.2 General assumptions

Glued laminated timber made of LVL is manufactured in accordance with the provisions of the European Technical Assessment using the manufacturing process as identified in the inspection of the manufacturing plant by Österreichisches Institut für Bautechnik and laid down in the technical file.

The manufacturer shall ensure that the requirements in accordance with the Clauses 1, 2 and 3 as well as with the Annexes of the European Technical Assessment are made known to those who are concerned with planning and execution of the works.

Manufacture

Manufacture shall be in accordance with EN 14080. In addition, the provisions laid down in this European Technical Assessment shall be considered.

Layers of grinded LVL - lamellae shall be bonded together to the required thickness of the product. There shall be no finger joints in the individual lamellae.

Adhesive according to Clause 3.1.2.2 shall be applied on one face of each lamellae.

¹ Reference documents are listed in Annex 2.

Bonding pressure is minimum 1.0 N/mm².

The temperature in the manufacturing room shall be minimum 20°C.

Minimum pressing time and spread rate according to the technical file shall be met.

Mechanical loading during minimum pressure and hardening time is not permitted, except insignificant loading during transport.

Design

The European Technical Assessment only applies to the manufacture and use of FST. Verification of stability of the works including application of loads on the products is not subject to the European Technical Assessment.

The following conditions shall be observed:

- Design of the glued laminated timber made of LVL is carried out under the responsibility of an engineer experienced in such products.
- Design of the works shall account for the protection of the product.
- Members of FST are installed correctly.

Design of glued laminated timber made of LVL can be according to EN 1995-1-1 and EN 1995-1-2, taking into account of Annex 1 of the European Technical Assessment.

Standards and regulations in force at the place of use shall be considered.

Fasteners

Admissible fasteners in FST are nails, screws, rod dowels, bolts, split ring and shear connectors.

Calculation of fasteners shall follow EN 1995-1-1. However, for dowel-type fasteners with a diameter $d \geq 8$ mm the embedment strength shall be reduced by factor 0.8 for use in the edges. Calculation of embedment strength of dowel-type fasteners is not permissible for use in the face.

Packaging, transport and storage

Glued laminated timber made of LVL shall be protected during transport and storage against any damage and detrimental moisture effects. The manufacturer's instruction for packaging, transport and storage shall be observed.

Installation

The manufacturer shall prepare installation instructions in which the product-specific characteristics and the most important measures to be taken into consideration for installation are described. The installation instructions shall be available at every construction site and shall be deposited at Österreichisches Institut für Bautechnik.

Installation of glued laminated timber made of LVL shall be done as ordinary glued laminated timber. The product shall only be installed in structures where they are protected from wetting, weathering and moisture.

Installation of glued laminated timber made of LVL shall be carried out by appropriately trained personnel under the supervision of the person responsible for technical matters on site. An assembly plan shall be prepared for each structure, which contains the sequence in which the individual members of FST shall be installed and their designation. The assembly plan shall be available at the construction site.

Use, maintenance and repair

The assessment of the product is based on the assumption that maintenance is not required during the assumed intended working life.

Should repair prove necessary this is treated on an individual basis relative to the specific application and/or damage.

2.3 Assumed working life

The provisions made in the European Technical Assessment (ETA) are based on an assumed intended working life of glued laminated timber made of LVL of 50 years, when installed in the works, provided that the members of FST are subject to appropriate installation, use and maintenance (see Clause 2.2). These provisions are based upon the current state of the art and the available knowledge and experience².

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 nor by the Technical Assessment Body, but are regarded only as a means for choosing the appropriate products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and reference to the methods used for its assessment

Table 1: Essential characteristics of the product and methods of verification and assessment

No	Essential characteristic	Method of verification and assessment	Expression of product performance
(1)	(2)	(3)	(4)
Basic Works Requirement 1: Mechanical resistance and stability ^{1) 2)}			
1	Bending strength	3.2	Annex 1
2	Tensile strength parallel to the grain	3.2	Annex 1
3	Tensile strength perpendicular to the grain	3.2	Annex 1
4	Compression strength parallel to the grain	3.2	Annex 1
5	Compression strength perpendicular to the grain	3.2	Annex 1
6	Shear strength	3.2	Annex 1
7	Modulus of elasticity parallel to the grain	3.2	Annex 1
8	Modulus of elasticity perpendicular to the grain	3.2	Annex 1
9	Shear modulus	3.2	Annex 1
10	Creep and duration of the load	3.2	Annex 1
11	Dimensional stability	3.2	Annex 1
12	Adhesive characteristics	3.2	3.1.2.2
13	Bonding quality	3.2	Annex 1
14	In-service environment	3.2	Annex 1
15	Density	3.2	Annex 1
Basic Works Requirement 2: Safety in case of fire			
16	Reaction to fire	3.2	Annex 1
17	Resistance to fire	3.2	Annex 1

² The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works is subject, and the particular conditions of the design, execution, use and maintenance of that works may be outside this ETA. Therefore, it cannot be excluded that in these cases the real working life of the product may also be shorter than the assumed working life.

No	Essential characteristic	Method of verification and assessment	Expression of product performance
(1)	(2)	(3)	(4)
Basic Works Requirement 3: Hygiene, health and the environment			
18	Content, emission and/or release of dangerous substances	3.2	3.1.1.2 and Annex 1
Basic Works Requirement 4: Safety and accessibility in use			
19	Same as BR 1		
Basic Works Requirement 5: Protection against noise			
--	No characteristic has been assessed.		
Basic Works Requirement 6: Energy economy and heat retention			
20	Thermal conductivity	3.2	Annex 1
21	Thermal inertia	3.2	Annex 1
Basic Works Requirement 7: Sustainable use of natural resources			
--	No characteristic has been assessed.		
1)	These characteristics also relate to BWR 4.		
2)	Declaration of performance and CE mark shall not indicate “no performance determined” – NPD – for that characteristic.		

3.1 Essential characteristics of the product

3.1.1 FST - glued laminated timber made of LVL

3.1.1.1 General

FST and the lamellae for its manufacturing correspond to the specifications given in Annex 1. The material characteristics, dimensions and tolerances of the product, not indicated in this Annex, are given in the technical file³ of the European Technical Assessment.

3.1.1.2 Hygiene, health and the environment

On dangerous substances, the glued laminated timber made of LVL conform to the European Assessment Document EAD 130010-00-0304 “Glued laminated timber made of hardwood – Structural laminated veneer lumber made of beech”, Edition November 2014. A manufacturer’s declaration to this effect has been submitted.

In addition to the specific clauses relating to dangerous substances contained in the European Technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

³ The technical file of the European Technical Assessment is deposited at Österreichisches Institut für Bautechnik and, in so far as is relevant to the tasks of the notified product certification body involved in the assessment and verification of constancy of performance procedure, is handed over to the notified product certification body.

3.1.2 Components

3.1.2.1 Lamellae

Lamella conform to EN 14374. The specification of the lamellae is given in Annex 1, Table 2.

Surfaces are grinded at the earliest 24 hours before bonding. The lamellae shall be bonded at the faces. No recycled wood shall be used.

3.1.2.2 Adhesive

The adhesive for bonding glued laminated timber made of LVL shall conform to EN 301, Type I. Only phenolic resorcinol (PRF) adhesives are applicable.

Adhesives with tested adhesive-hardener-ratio are given in the technical file of the European Technical Assessment.

3.2 Assessment methods

3.2.1 General

The assessment of glued laminated timber made of LVL for the intended use in relation to the requirements for mechanical resistance and stability, for safety in case of fire, for hygiene, health and the environment, for safety and accessibility in use, and for energy economy and heat retention in the sense of the Basic Requirements 1, 2, 3, 4, and 6 of Regulation (EU) № 305/2011 has been made in accordance with *European Assessment Document EAD 130010-00-0304 "Glued laminated timber made of hardwood – Structural laminated veneer lumber made of beech"*.

3.2.2 Identification

The European Technical Assessment for FST is issued on the basis of agreed data, deposited with Österreichisches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to materials, to the composition or to characteristics of the product, or to the production process, which could result in this deposited data being incorrect, should be immediately notified to Österreichisches Institut für Bautechnik before the changes are introduced. Österreichisches Institut für Bautechnik will decide whether or not such changes affect the European Technical Assessment, and, if so, whether further assessment or alterations to the European Technical Assessment are considered necessary.

4 Assessment and verification of constancy of performance (thereafter AVCP) system applied, with reference to its legal base

4.1 System of assessment and verification of constancy of performance

The manufacturer shall draw up the declaration of performance and determine the product-type on the basis of the assessments and verifications of constancy of performance carried out under the following system as laid down in the Commission Delegated Regulation (EU) № 568/2014 of 18 February 2014, Annex V, 1.2, referred to as System 1. This system provides for:

- (a) the manufacturer shall carry out:
 - (i) factory production control;
 - (ii) further testing of samples taken at the manufacturing plant by the manufacturer in accordance with a prescribed test plan⁴;

⁴ The prescribed test plan has been deposited with Österreichisches Institut für Bautechnik and is handed over only to the notified product certification body involved in the procedure for the assessment and verification of constancy of performance. The prescribed test plan is also referred to as control plan.

- (b) the notified product certification body shall decide on the issuing, restriction, suspension or withdrawal of the certificate of constancy of performance of the construction product on the basis of the outcome of the following assessments and verifications carried out by that body:
- (i) an assessment of the performance of the construction product carried out on the basis of testing (including sampling), calculation, tabulated values or descriptive documentation of the product;
 - (ii) initial inspection of the manufacturing plant and of factory production control;
 - (iii) continuous surveillance, assessment and evaluation of factory production control.

4.2 AVCP for construction products for which a European Technical Assessment has been issued

Notified bodies undertaking tasks under System 1 shall consider the European Technical Assessment issued for the construction product in question as the assessment of the performance of that product. Notified bodies shall therefore not undertake the tasks referred to in point 4.1 (b)(i).

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

5.1 Tasks for the manufacturer

5.1.1 Factory production control

At the manufacturing plant the manufacturer has implemented and continuously maintains a factory production control system. All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures. The factory production control system ensures that the performance of the glued laminated timber made of LVL is in conformity with the European Technical Assessment.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the prescribed test plan. The incoming raw materials shall be subject to controls and tests by the manufacturer before acceptance. Check of incoming materials shall include control of inspection documents (comparison with nominal values) presented by the manufacturer of the raw materials by verifying the dimensions and determining the material properties.

The frequencies of controls and tests conducted during manufacturing and on the assembled product are defined by taking account of the manufacturing process of the product and are laid down in the prescribed test plan.

The results of factory production control are recorded and evaluated. The records include at least the following data:

- Designation of the product, basic materials and components
- Type of control or test
- Date of manufacture of the product and date of testing of the product or basic materials or components
- Results of controls and tests and, if appropriate, comparison with requirements
- Name and signature of person responsible for factory production control

The records shall be kept at least for ten years time after the construction product has been placed on the market and shall be presented to the notified product certification body involved in continuous surveillance. On request they shall be presented to Österreichisches Institut für Bautechnik.

5.2 Tasks for the notified product certification body

5.2.1 Initial inspection of the manufacturing plant and of factory production control

The notified product certification body shall ascertain that, in accordance with the prescribed test plan, the factory, in particular personnel and equipment, and the factory production control, are suitable to ensure a continuously and orderly manufacturing of FST with the specifications given in the specific parts as well as in the Annexes of the European Technical Assessment.

5.2.2 Continuous surveillance, assessment and evaluation of factory production control

The notified product certification body shall visit the factory at least twice a year for surveillance. It shall be verified that the system of factory production control and the specified manufacturing process are maintained, taking account of the prescribed test plan. On demand the results of continuous surveillance shall be made available by the notified product certification body to Österreichisches Institut für Bautechnik. When the provisions of the European Technical Assessment and the prescribed test plan are no longer fulfilled, the certificate of constancy of performance shall be withdrawn by the notified product certification body.

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The original document is signed by:

Rainer Mikulits
Managing Director

Table 2: Dimensions and specifications

Characteristic		Dimension / Specification
Glued laminated timber		
Height	mm	120 to 600
Width	mm	80 to 300
Length	m	≤ 18.0
Number of layers	—	3 to 15
LVL - lamellae		
Surface	—	grinded ¹⁾
Thickness (grinded dimension)	mm	40 ± 3
Width	mm	80 to 300
Laminated veneer lumber according to EN 14374	—	
$f_{m,l,k}$	N/mm ²	≥ 80
$f_{t,0,l,k}$	N/mm ²	≥ 60
Density	—	
ρ_{mean}	kg/m ³	≥ 740
ρ_k	kg/m ³	≥ 680
Moisture content of lamella during gluing	%	5 ± 3

¹⁾ The adhesive joint between the single laminations shall not be fully exposed. Grinding may take place at the earliest 24 hours before bonding.

FST	Annex 1 of European Technical Assessment ETA-14/0354 of 20.02.2015
Characteristic data	

Table 3: Product characteristics of FST

BR	Essential characteristic	Method of verification	Class / Use category / Numeric value	
1	Mechanical resistance and stability			
	Bending strength $f_{m,k}$	EN 408	70 MPa ¹⁾	
	Modulus of elasticity parallel to the grain of the lamellas			
	– $E_{0,mean}$	EN 408	16 700 MPa	
	– $E_{0,05}$	EN 408	15 300 MPa	
	Modulus of elasticity perpendicular to the grain of the lamellas			
	– $E_{90,mean}$	EN 14374	470 MPa	
	– $E_{90,05}$	EN 14374	400 MPa	
Tensile strength				
– parallel to the grain of the lamellas $f_{t,0,k}$	EAD 130010-00-0304	55 MPa ²⁾		
– perpendicular to the grain of the lamellas $f_{t,90,k}$	EN 384	0.6 MPa		
Compressive strength		Service class 1	Service class 2	
– parallel to the grain of the lamellas $f_{c,0,k}$	EN 408 and EAD 130010-00-0304	59.4 MPa ³⁾	49.5 MPa ³⁾	
– perpendicular to the grain of the lamellas $f_{c,90,k}$	EN 384 and EAD 130010-00-0304	10.2 MPa	8.5 MPa	
Shear strength $f_{v,k}$	EN 408	4.0 MPa ⁴⁾		

1) For flatwise bending the characteristic strength may be multiplied by $k_{h,m} = \left(\frac{600}{h}\right)^{0.14}$, where h is the height of FST in mm.

2) The characteristic tensile strength may be multiplied by $k_{h,t} = \left(\frac{600}{h}\right)^{0.10}$, where h is the larger length of the cross section of FST perpendicular to the longitudinal axis in mm.

3) The characteristic compression strength may be multiplied by $k_{c,0} = \min(0.0009 \cdot h + 0.892; 1.18)$ for $n > 3$. Hereby h is the height of FST in mm and n is number of LVL lamellas.

4) The characteristic shear strength may be multiplied by $k_{h,v} = \left(\frac{600}{h}\right)^{0.25}$, where h is the height of FST in mm.

FST	Annex 1 of European Technical Assessment ETA-14/0354 of 20.02.2015
Characteristic data	

BR	Essential characteristic	Method of verification	Class / Use category / Numeric value
	Shear modulus		
	– G_{mean}	EN 14374	850 MPa
	– G_{05}	EN 14374	760 MPa
	Creep and duration of load	k_{mod} and k_{def} according to EN 1995-1-1 for glued laminated timber	
	Dimensional stability		
	Moisture content during service shall not change to such an extent that adverse deformation will occur.		
	Moisture content	EAD 130010-00-0304	5 – 10 %
	Bonding quality	EN 14374	Pass
In-service environment			
Durability of timber			
Service classes	EN 1995-1-1		1 and 2
2	Safety in case of fire		
	Reaction to fire	Commission Decision 2005/610/EC	Euroclass D-s2, d0
	Resistance to fire	EN 1995-1-2	Charring rate $\beta_0 = 0.65$ mm/min $\beta_n = 0.7$ mm/min
3	Hygiene, health and environment		
	Content and/or release of dangerous substances		
	– Formaldehyde	EN 717-1	E1
4	Safety and accessibility in use		
	Same as BR 1		
6	Energy economy and heat retention		
	Thermal conductivity λ	EN ISO 10456	0.17 W/(m·K)
	Thermal inertia, specific heat capacity c_p	EN ISO 10456	1 600 J/(kg·K)
FST		Annex 1	
Characteristic data		of European Technical Assessment ETA-14/0354 of 20.02.2015	

EAD 130010-00-0304, European Assessment Document for “Glued laminated timber made of hardwood – Structural laminated veneer lumber made of beech”, Edition November 2014

EN 301 (10.2013), Adhesives, phenolic and aminoplastic, for load-bearing timber structures - Classification and performance requirements

EN 384 (04.2010), Structural timber — Determination of characteristic values of mechanical properties and density

EN 408:2010+A1 (07.2012), Timber structures — Structural timber and glued laminated timber — Determination of some physical and mechanical properties

EN 717-1 (10.2004), Wood-based panels - Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method

EN 1995-1-1 (11.2004), +AC (06.2006), +A1 (06.2008), + A2 (05.2014), Eurocode 5 - Design of timber structures - Part 1-1: General - Common rules and rules for buildings

EN 1995-1-2 (11.2004), +AC (06.2006), +AC (03.2009), Eurocode 5 - Design of timber structures - Part 1-2: General - Structural fire design

EN 14080 (06.2013), Timber structures — Glued laminated timber and glued solid timber — Requirements

EN 14374 (11.2004), Timber structures - Structural laminated veneer lumber - Requirements

EN ISO 10456 (12.2007), +AC (12.2009), Building materials and products - Hygrothermal properties - Tabulated design values and procedures for determining declared and design thermal values

FST	Annex 2 of European Technical Assessment ETA-14/0354 of 20.02.2015
Reference documents	

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