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## European Technical Assessment

**ETA-19/0066**  
 of 17.05.2019

General part

**Technical Assessment Body issuing the European Technical Assessment**

Österreichisches Institut für Bautechnik (OIB)  
 Austrian Institute of Construction Engineering

**Trade name of the construction product**

FBE – PHE element

**Product family to which the construction product belongs**

Prefabricated wood slab element made of mechanically jointed square-sawn timber members to be used as a structural element in buildings

**Manufacturer**

FBE snc  
 Via dell'Industria 1  
 36070 Castelgomberto (VI)  
 Italy

**Manufacturing plant**

FBE snc  
 Via Zona Industriale No. 49  
 36078 Valdagno (VI)  
 Italy

**This European Technical Assessment contains**

16 pages including 3 Annexes which form an integral part of this assessment.

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

European Assessment Document  
 EAD 130011-00-0304 "Prefabricated wood slab element made of mechanically jointed square-sawn timber members to be used as a structural element in buildings".

## 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 FBE – PHE element

This European Technical Assessment (ETA) applies to the prefabricated wood slab element made of mechanically jointed square-sawn timber members “FBE – PHE element”. FBE – PHE element is made of upright softwood members which are jointed together with hardwood dowels. The layers of the square-sawn timber members are arranged parallel to each other, see Annex 1, Figure 1. Surfaces are planed.

The principle structure of FBE – PHE element is shown in Annex 1, Figure 1 and Figure 2. The square-sawn timber members are provided with a 45° and 3 mm deep chamfer at the top. In addition a milling with a depth of 8 mm and a width of 2 mm may be arranged at the bottom of the upright timber members. An example of a structure with milling is shown in Annex 1, Figure 3.

FBE – PHE element consists of up to thirty adjacent layers which are arranged parallel to each other.

FBE – PHE element and the square-sawn timber members for its manufacturing correspond to the specifications given in the Annexes 1 and 2. The material characteristics, dimensions and tolerances of FBE – PHE element, not indicated in these Annexes, are given in the technical file<sup>1</sup> of the European Technical Assessment.

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

#### 1.2 Components

##### 1.2.1 Square-sawn timber members

The specification of the square-sawn timber members is given in Annex 1, Table 1. The square-sawn timber members are visually or machine strength graded. The square-sawn timber members may be finger jointed. Only technically dried wood shall be used.

They are provided with a 45° and 3 mm deep chamfer at the top. In addition a milling with a depth of 8 mm and a width of 2 mm may be arranged at the bottom of the upright timber members.

Wood species is European spruce or equivalent softwood.

##### 1.2.2 Hardwood dowels

The specification of the hardwood dowels is given in Annex 1, Table 2. They are made of European beech and shall be free of significant knots, abnormal direction of grain and significant reaction wood, fissures, rot, mould and insect infestation.

The hardwood dowels are arranged perpendicular to the grain of the square-sawn timber members in a predefined grid. The dowels are dried before positioning.

<sup>1</sup> 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.

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

### 2.1 Intended use

FBE – PHE element is intended to be used as a structural element in buildings to construct walls, floors and roofs.

FBE – PHE element is subjected to static and quasi static actions.

FBE – PHE element is intended to be used in service classes 1 and 2 according to EN 1995-1-1<sup>2</sup>.

Members which are directly exposed to the weather shall be provided with an effective protection for FBE – PHE element in service. Within a roof construction, FBE – PHE element will not contribute to the water tightness, but will receive a suitable waterproofing and roof covering. Waterproofing and roof covering are not subject of the European Technical Assessment.

### 2.2 General assumptions

FBE – PHE element 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 design and execution of the works.

Layers of square-sawn timber members shall be jointed together to the required width of the prefabricated wood slab element. The individual boards may be jointed in longitudinal direction by means of finger joints according to EN 14080, there shall be no butt joints.

#### Design

The European Technical Assessment only applies to the manufacture and use of FBE – PHE element. Verification of stability of the works including application of loads on the product is not subject to the European Technical Assessment.

The following conditions shall be observed:

- Design of FBE – PHE element is carried out under the responsibility of an engineer experienced in such products.
- Design of the works shall account for the protection of FBE – PHE element.
- FBE – PHE element is installed correctly.
- Serial toppling (rolling-shear) shall be avoided by suitable design provisions.

Design of the prefabricated wood slab element may be according to EN 1995-1-1 and EN 1995-1-2, taking into account the Annex 2 of the European Technical Assessment.

Centric single loads are transferred to the edges of the element by the hardwood dowels. Design shall account for shearing off the dowels.

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

#### Packaging, transport, storage, maintenance, replacement and repair

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.

<sup>2</sup> Reference documents are listed in Annex 3.



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

#### 3.1 Essential characteristics of the product

**Table 1: Essential characteristics of the product and product performance**

No	Essential characteristic	Product performance
Basic Works Requirement 1: Mechanical resistance and stability <sup>1)</sup>		
1	Bending <sup>2) 3)</sup>	Annex 2
2	Compression	Annex 2
3	Tension <sup>3)</sup>	Annex 2
4	Shear <sup>2) 3)</sup>	Annex 2
5	Fixing of objects	Annex 2
6	Creep and duration of the load	Annex 2
7	Dimensional stability	Annex 2
8	In-service environment	Annex 2
9	Bond integrity of finger joints	Annex 2
Basic Works Requirement 2: Safety in case of fire		
10	Reaction to fire	Annex 2
11	Resistance to fire	No performance assessed.
Basic Works Requirement 3: Hygiene, health and the environment		
12	Water vapour permeability – Water vapour transmission	Annex 2
Basic Works Requirement 4: Safety and accessibility in use		
13	Same as BWR 1	
Basic Works Requirement 5: Protection against noise		
14	Airborne sound insulation	Annex 2
15	Impact sound insulation	Annex 2
Basic Works Requirement 6: Energy economy and heat retention		
16	Thermal conductivity	Annex 2
17	Air tightness	Annex 2
18	Thermal inertia	Annex 2
<sup>1)</sup> These characteristics also relate to BWR 4. <sup>2)</sup> Load bearing capacity and stiffness regarding mechanical actions perpendicular to the element. <sup>3)</sup> Load bearing capacity and stiffness regarding mechanical actions in plane of the element.		

## 3.2 Assessment methods

### 3.2.1 General

The assessment of FBE – PHE element 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, for protection against noise and for energy economy and heat retention in the sense of the Basic Requirements 1 to 6 of Regulation (EU) № 305/2011 has been made in accordance with *European Assessment Document EAD 130011-00-0304 “Prefabricated wood slab element made of mechanically jointed square-sawn timber members to be used as a structural element in buildings”*.

### 3.2.2 Identification

The European Technical Assessment for FBE – PHE element is issued on the basis of agreed data, deposited with Österreichisches Institut für Bautechnik, which identifies the product that has been assessed. 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

According to Commission Decision 97/176/EC the system of assessment and verification of constancy of performance to be applied to FBE – PHE element is 1. As laid down in the Commission Delegated Regulation (EU) № 568/2014 of 18 February 2014, Annex, 1.2, under System 1 the manufacturer shall draw up the declaration of performance and determine the product-type on the basis of

- (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 plan<sup>4</sup>;
- (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.

<sup>4</sup> 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.

## **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 element of mechanically jointed timber boards 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.

#### **5.1.2 Declaration of performance**

The manufacturer is responsible for preparing the declaration of performance. When all the criteria of the assessment and verification of constancy of performance including certification are met, the manufacturer shall issue a declaration of performance.













**Table 4:** Product characteristics of the FBE – PHE element

BWR	Essential characteristic	Assessment method	Level / Class / Description
1	<b>Mechanical resistance and stability</b>		
	<b>1. Load bearing capacity and stiffness regarding mechanical actions perpendicular to FBE – PHE element</b>		
	Strength class of square-sawn timber members	EN 338	C24
	Modulus of elasticity		
	– parallel to the grain $E_{0, mean}$	EAD 130011-00-0304 2.2.1	h = 80 mm: 11 000 MPa 80 < h ≤ 200 mm: 9 700 MPa 200 < h ≤ 260 mm: 9 300 MPa
	– perpendicular to the grain $E_{90, mean}$	EN 338	300 MPa
	Shear modulus		
	– parallel to the grain $G_{090, mean}$	EN 338	560 MPa
	Bending strength		
	– parallel to the grain $f_{m, k}$	EAD 130011-00-0304 2.2.1	h = 80 mm: 24 MPa <sup>1)</sup> 80 < h ≤ 200 mm: 18 MPa <sup>1)</sup> 200 < h ≤ 260 mm: 14 MPa <sup>1)</sup>
Tensile strength			
No performance assessed. In general the FBE – PHE element is unsuitable for tension perpendicular to the plane of the slab. Fasteners shall be applied to overcome such design situations.			
Compressive strength			
– perpendicular to the grain $f_{c, 90, k}$	EN 338	2.2 MPa	
Shear strength			
– parallel to the grain $f_{v, 090, k}$	EN 338	3.4 MPa <sup>2)</sup>	

<sup>1)</sup>  $k_h$  and  $k_{sys}$  shall always be taken as 1

<sup>2)</sup>  $k_{cr}$  for solid wood shall be applied

**FBE – PHE element**

Annex 2

Characteristic data of FBE – PHE element

of European Technical Assessment  
ETA-19/0066 of 17.05.2019

BWR	Essential characteristic	Assessment method	Level / Class / Description
1	<b>Mechanical resistance and stability</b>		
	<b>2. Load bearing capacity and stiffness regarding mechanical actions in plane of the FBE – PHE element</b>		
	Strength class of square-sawn timber members	EN 338	C24
	Modulus of elasticity – parallel to the grain $E_{0, mean}$	EAD 130011-00-0304 2.2.1	9 300 MPa
	Bending strength – parallel to the grain $f_{m, k}$	EAD 130011-00-0304 2.2.1	14 MPa
	Tensile strength – parallel to the grain $f_{t, 0, k}$	EN 338	10 MPa
	Compressive strength – parallel to the grain $f_{c, 0, k}$	EN 338	18 MPa
	Shear strength – parallel to the grain $f_{v, 090, k}$	EAD 130011-00-0304 2.2.4	1.0 MPa
	Racking strength and stiffness with vertical load $F_v = 20$ kN/m		
	– racking strength $F_{H, k}$ – racking stiffness $R_{mean}$	EN 594 EN 594	13.5 kN/m wall length <sup>1)</sup> 800 N/mm <sup>1)</sup>
<b>FBE – PHE element</b>		Annex 2	
Characteristic data of FBE – PHE element		of European Technical Assessment ETA-19/0066 of 17.05.2019	

<sup>1)</sup> tested configurations: wall dimensions 2400 x 2400 mm with thicknesses 160 mm and 200 mm comprised of two hold downs (mounted to the supporting beam with one M16 bolt and to the wall element with 26 anker nails Ø4.0x60 mm) and two angle brackets (mounted to the supporting beam with two M12 bolts and to the wall element with 26 anker nails Ø4.0x60 mm). The joints between the single elements are connected by 8 pairs of inclined screws Ø8.0.

BWR	Essential characteristic	Assessment method	Level / Class / Description
	<b>3. Other mechanical actions</b>		
	Fixing of objects	see 2.2	
	Creep and duration of load	EN 1995-1-1	
	Dimensional stability Moisture content during service shall not change to such an extent that adverse deformation will occur. Dimensional changes in thickness and width of softwood according to EN 336: - increase of 0.25 % per 1 % moisture increase for a moisture content $20\% \leq u \leq 30\%$ - decrease of 0.25 % per 1 % moisture decrease for a moisture content $u < 20\%$		
	In-service environment – Service classes	EN 1995-1-1	1 and 2
	Bond integrity of finger joints	EAD 130011-00-0304 2.2.1	Pass
<b>2</b>	<b>Reaction to fire</b>		
	Solid wood panels excluding floorings ( $\rho_{\min} = 400 \text{ kg/m}^3$ )	Commission Decision 2003/43/EC	Euroclass D-s2, d0
	Floorings of solid wood panels ( $\rho_{\min} = 400 \text{ kg/m}^3$ )		Euroclass D <sub>fl</sub> -s1
<b>3</b>	<b>Hygiene, health and environment</b>		
	Vapour permeability, $\mu$ , for the timber	EN ISO 10456	50 (dry) to 20 (wet)
	The elements are open for water vapour diffusion. Harmful condensation within the element shall be avoided in intended use conditions. This can be proven case by case by a calculation according to EN ISO 13788, when needed.		
<b>5</b>	<b>Protection against noise</b>		
	Airborne sound insulation for element thickness 160 mm	EN ISO 10140-2, EN ISO 717-1	$R_w (C; C_{tr}) = 39 (-1; -3) \text{ dB}$
	Impact sound insulation for element thickness 160 mm	EN ISO 10140-3, EN ISO 717-2	$L_{n,w} (C_i) = 83 (-4) \text{ dB}$
<b>6</b>	<b>Energy economy and heat retention</b>		
	Thermal resistance $\lambda$	EN ISO 10456	0.12 W/(m·K)
	Air tightness	EN 12114	Class 4 according to EN 12207
	Thermal inertia, specific heat capacity $c_p$	EN ISO 10456	1 600 J/(kg·K)
<b>FBE – PHE element</b>		Annex 2	
Characteristic data of FBE – PHE element		of European Technical Assessment ETA-19/0066 of 17.05.2019	

