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Authorised and notified according to Article 29 of the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011

European Technical Assessment ETA-25/0635 of 2025/07/03

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S	
Trade name of the construction product:	Woodbloc DLT-Elemente prefabricated wood slab elements
Product family to which the above 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:	Penzkofer Bau GmbH Strassfeld 20 DE-94209 Regen Internet: www.woodbloc.de
Manufacturing plant:	Penzkofer Bau GmbH Strassfeld 20 DE-94209 Regen
This European Technical Assessment contains:	13 pages including 5 annexes which form an integral part of the document
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	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”.
This version replaces:	

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of the product

Woodbloc DLT-Elemente are prefabricated wood slab elements of mechanically jointed square-sawn timber members made of vertical solid wood board members, which may be finger jointed, connected together with nails or hardwood dowels in order to form a slab. The elements are plane.

The elements consist of parallel oriented lamellae made of strength graded boards.

The components and the system setup of the product are given in Annex 1, Figure 1.

The application of chemical substances (wood preservatives and flame retardants) is not subject of the European technical assessment.

Wood species are spruce, fir or pine.

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

2.1 Intended use

The prefabricated wood slab is intended to be used as a structural or non-structural element in buildings and timber structures. The prefabricated wood slab shall be subjected to static and quasi static actions only. This includes seismic actions according to EN 1998-1.

The prefabricated wood slab is intended to be used in service classes 1 and 2 according to EN 1995-1-1. Members which are directly exposed to the weather shall be provided with an effective protection for the prefabricated wood slab element in service.

The performances given in Section 3 are only valid if the prefabricated wood slab elements are used in compliance with the specifications and conditions given in Annex 1 to 5.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the prefabricated wood slab element of at least 50 years. The indications given on the working life cannot be interpreted as a guaran-tee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

2.2 General assumptions

The prefabricated wood slab elements are manufactured in accordance with the provisions of this European technical assessment using the automated manufacturing process in ac-cordance with the technical documentation.

The boards shall be connected together to the required width of the prefabricated wood slab.

Specifications of the used boards are given in Annex 2. Boards are visually or machine strength graded.

Only technically dried wood shall be used.

The boards may be connected by finger joints in longitudinal direction according to EN 14080. Butt joints must be positioned outside of the inner third of the span. A board must not contain more than one butt joint.

The prefabricated wood slab elements correspond to the specifications given in Annexes 1 to 3 of this European technical assessment. The material characteristics, dimensions and tolerances of the prefabricated wood slab elements not indicated in these Annexes are given in the technical documentation of the European technical assessment.

Design

The European Technical Assessment only applies to the manufacture and use of prefabri-cated wood slab elements. Verification of stability of the building while using the prefabricat-ed wood slab elements is not subject of the European Technical Assessment.

The following conditions shall be observed:

- Design of the prefabricated wood slab elements is carried out under the responsibility of an engineer experienced in such products.
- Design of the works shall account for the protection of the prefabricated wood slab elements.
- The prefabricated wood slab elements are installed correctly.

Design of the prefabricated wood slab element can be performed according to EN 1995-1-1, taking into account Annexes 2 to 5 of the European Technical Assessment. Standards and regulations valid in the place of use shall be considered.

Packaging, transport, storage, maintenance and repair

The prefabricated wood slab elements shall be protected during transport and storage against any damage and detrimental moisture effects. The manufacturer's instructions for packaging transport and storage shall be observed.

Installation

The manufacturer shall prepare assembling instructions in which the product-specific char-acteristics and important measures to be taken into consideration for assembling are de-scribed. The assembling instructions shall be available at every construction site.

The assembling of the prefabricated wood slab elements according to this European tech-nical assessment shall be carried out by appropriately qualified personnel.

Prefabricated wood slab elements shall be protected against detrimental change of moisture. The safety-at-work and health protection regulations have to be observed.

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

Characteristic		Assessment of characteristic
3.1	**Mechanical resistance and stability (BWR 1)**	
	Bending [2)]	Annex 3
	Compression [2)]	Annex 3
	Tension [2)]	Annex 3
	Shear [2)]	Annex 3
	Fixing of objects	Annex 3
	Creep and duration of load	Annex 3
	Dimensional stability	Annex 3
	In-service environment	Annex 3
	Bond integrity of finger joints	An adhesive type I according to EN 15425 is used
3.2	**Safety in case of fire (BWR2)**	
	Reaction to fire	Annex 3
3.3	**Hygiene, health and the environment (BWR 3)**	
	Water vapour permeability - Water vapour transmission	No performance assessed
3.5	**Protection against noise (BWR 5)**	
	Airborne sound insulation	No performance assessed
	Impact sound insulation	No performance assessed
3.6	**Energy economy and heat retention (BWR 6)**	
	Thermal conductivity	No performance assessed
	Air permeability	No performance assessed
	Thermal inertia	No performance assessed

1) This characteristic also relates to BWR 4
2) Load bearing capacity and stiffness regarding mechanical actions perpendicular to and in plane of the prefabricated wood slab element.

For gluing the finger joints of the individual boards an adhesive type I according to EN 301 is to be used. Specifications are deposited with ETA Danmark.

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

4.1 AVCP system

In accordance with EAD No. 130011-00-0304 the applicable European legal act is: 1997/176/EC amended by 2001/596/EC

The systems to be applied are:
1 for prefabricated wood slab elements made of finger jointed solid wood board members
2+ for prefabricated wood slab elements made of solid wood board members without finger joints

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking.

Issued in Copenhagen on 2025-07-03 by

Thomas Bruun
Managing Director, ETA-Danmark

Annex 1	Structure of prefabricated wood slab elements

Construction of the prefabricated wood slab elements Woodbloc DLT-Elemente (example)

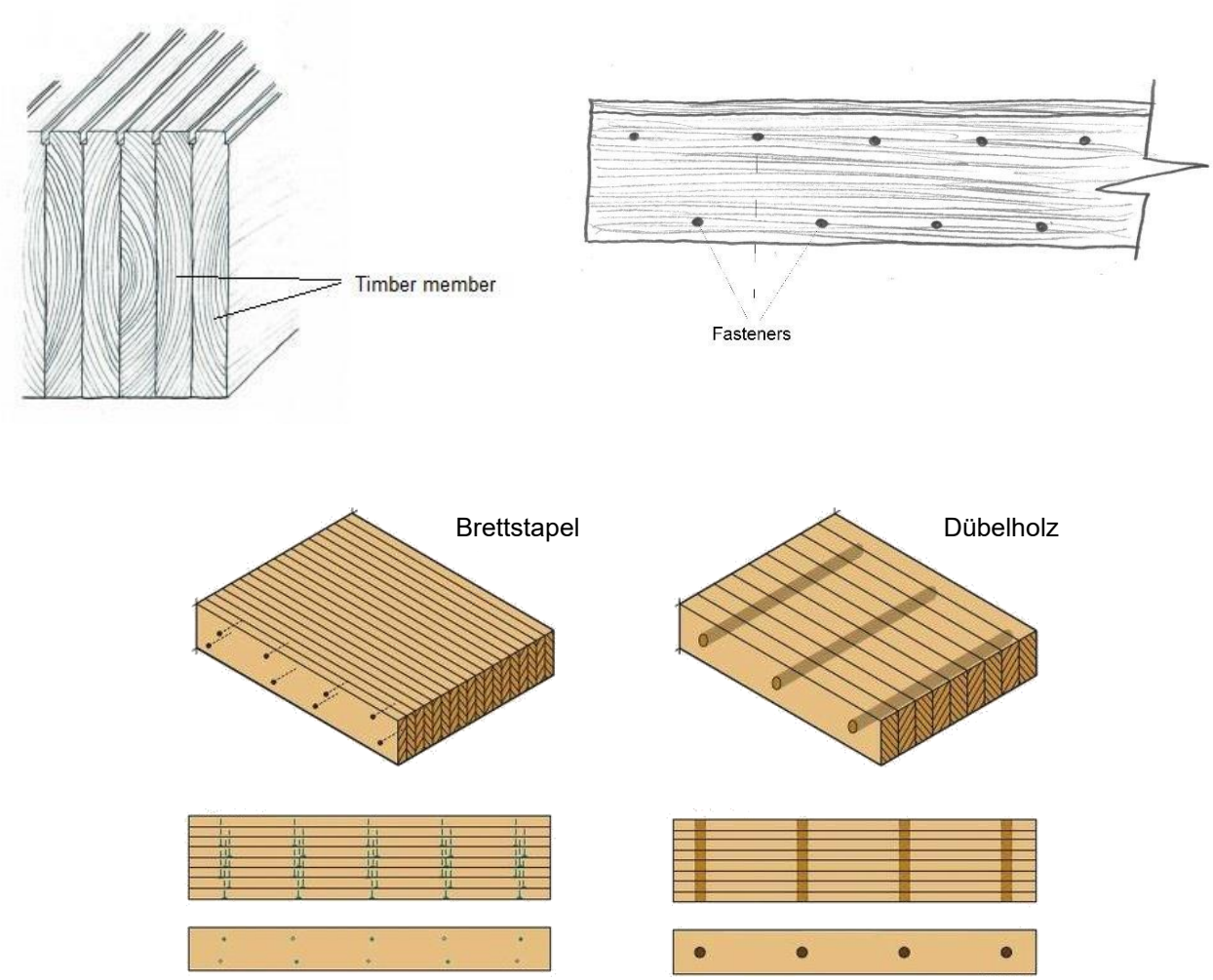

Figure 1: Principle structure of Woodbloc DLT-Elemente

Annex 2	**Dimensions and specifications of the prefabricated wood slab elements**

Table 1: Dimensions and specifications of the prefabricated wood slab

Characteristic	Dimensions and specifications
Prefabricated wood slab element	
Thickness	60 to 300 mm
Tolerance in thickness	± 1 mm
Width	580 mm to 3000 mm
Tolerance in width	± 3 mm
Length	≤ 20,00 m
Tolerance in length	± 3 mm
Number of boards	≥ 10
Maximum width of gaps between adjacent boards	4 mm at 12% moisture content
Boards	
Material	softwood
Strength class according to EN 338	≥ T11 or C18 for at least 50 % of the boards
Width	≥ 22 mm
Moisture of wood according to EN 13183-2	15±3 %
Finger joints	EN 14080
Butt joints	Max. 1 per board; only in the outer thirds of the span
Hardwood dowels	
Material	hardwood beech, ash or oak
Density	≥ 500 kg/m³

Annex 3	**Essential requirements of prefabricated wood slab elements**

Table 2: Essential Requirements of the prefabricated wood slab

ER	Requirement	Verification method	Class / Use category / value	
1	**Mechanical resistance and stability**			
	For the calculation the characteristic strength and stiffness values of softwood C24 according to EN 338 shall be used taking into consideration the definitions in annex 2. In addition the following values apply:			
	Mechanical actions in plane of the prefabricated wood slab	Tensile strength (5% - percentile)	$f_{t,0,k}$	11 N/mm²
	Mechanical actions perpendicular to the pre-fabricated wood slab	Bending strength (5% - percentile)	$f_{m,k}$	22 N/mm²
		Modulus of elasticity (mean value)	$E_{0,mean}$	11600 N/mm²
	For references regarding the calculation see annexes 4 to 5. National regulations might have to be followed.			
	Use of fasteners	According to EN 1995-1-1, for further details see annex 5		
	Creep and duration of load	According to EN 1995-1-1		
	Dimensional stability	Moisture content during use shall not change to such extent that adverse deformations can occur.		
2	**Behaviour in case of fire**			
	Reaction to fire			
	Solid timber except for floorings	Commission Decision 2005/610/EC	Euroclass D-s2,d0	
	Floorings		Euroclass D_{fl}-s1	
	Resistance to fire			
	Charring rate	EN 1995-1-2	β_0 = 0,65 mm/min β_n = 0,7 mm/min	

Annex 4	Design considerations of the prefabricated wood slab elements

1 Mechanical actions perpendicular to the prefabricated wood slab

For the design of prefabricated wood slab the characteristic strength and stiffness values shall be taken from Annex 3.

For the verification of the bending strength of prefabricated wood slabs with butt joints additional stress checks at the position of the butt joints are necessary.

For the verification of the bending deformation of prefabricated wood slabs with butt joints an effective modulus of elasticity may be used if the fastener spacing does not exceed 20 · d:

$$E_{0,ef} = E_{0,mean} \frac{A_{net} + A_{gross}}{2 \cdot A_{gross}} \quad (1)$$

Where: A_{net} = Net cross section at the position of the butt joints

A_{gross} = Gross cross section at the position of the butt joints

If the ratio of board depth to board thickness h/b is larger than 4, lateral torsional buckling needs to be checked. The ideal buckling stress for this case is:

$$\sigma_{ki} = \sigma_{m,crit} = \frac{1{,}32 \cdot E_{0,05} \cdot b^2}{\ell_{ef}^2} \cdot \left(\sqrt{5{,}6 + \frac{1{,}13 \cdot K_{u,05} \cdot \ell_{ef}^4}{E_{0,05} \cdot b \cdot h^3 \cdot a_1}} - 1 \right) \quad (2)$$

For the verification of the bending strength of prefabricated wood slabs loaded by a concentrated load, the following effective widths may be assumed:

$$b_{ef} = \frac{1{,}3 \cdot b \cdot \ell}{h \cdot a_1^{0,3}} \text{ for boards without butt joints} \quad (3)$$

$$b_{ef} = \frac{2{,}5 \cdot b \cdot \ell}{h^{1,15} \cdot a_1^{0,3}} \text{ for boards with butt joints} \quad (4)$$

For the verification of the bending deformation of prefabricated wood slabs loaded by a concentrated load, the following effective widths may be assumed:

$$b_{ef} = \frac{13{,}3 \cdot b \cdot \ell^{0,86}}{h \cdot a_1^{0,4}} \text{ for boards without butt joints} \quad (5)$$

$$b_{ef} = \frac{2{,}9 \cdot b \cdot \ell}{h \cdot a_1^{0,4}} \text{ for boards with butt joints} \quad (6)$$

The fasteners in the area of the concentrated load are designed for the following lateral force:

$$F_{v,Ed} = \frac{F_{Ed} \cdot a_1^{0,8} \cdot \ell^{0,67}}{8300 \cdot h^{0,67}} \quad (7)$$

Where:

- $E_{0,05}$ = 5-percentile of modulus of elasticity, $E_{0,05}$ = 9600 N/mm²
- b = Board thickness in mm
- h = Board depth in mm
- ℓ_{ef} = Effective buckling length in mm
- ℓ = Span in mm
- a_1 = Fastener spacing in mm defined by the sum of the fasteners per unit length
- $K_{u,05}$ = 5%-percentile of fastener slip modulus, $K_{u,05} = 160 \cdot d^{0,8}$ N/mm for nails and $K_{u,05} = 2{,}2 \cdot d^2$ N/mm for hardwood dowels; d is the fastener diameter in mm
- $K_{u,mean}$ = Mean value of fastener slip modulus, $K_{u,mean} = 1{,}2 \cdot K_{u,05}$

Minimum spacing and distances for hardwood dowels are $a_1 = a_2 = a_{3,c/t} = a_{4,c/t} = 2 \cdot d$.

Tension loads perpendicular to the grain should be avoided.

Annex 4	Design considerations of the prefabricated wood slab elements

2 Mechanical actions in plane of the prefabricated wood slab

Stress distribution and deformations within the prefabricated wood slab need to be calculated taking into account the slip between boards. It is generally necessary to use numerical solutions offered by computer programs taking into account the slip in the shear planes between single boards.

For the design of cross laminated timber the characteristic strength and stiffness values shall be taken from Annex 3.

The slip between two adjacent boards is taken into account applying the slip moduli given in section 1 of Annex 4. The characteristic load-carrying-capacity of a hardwood dowel may be assumed as:

$$F_{v,Rk} = 9{,}5 \cdot d^2 \text{ in N} \quad (8)$$

Where d is the dowel diameter in mm. If $b < 2 \cdot d$, $F_{v,Rk}$ is reduced by applying the factor $b/(2 \cdot d)$.

Minimum spacing and distances for hardwood dowels are $a_1 = a_2 = a_{3,c/t} = a_{4,c/t} = 2 \cdot d$.

Annex 5	Design considerations of connections with mechanical fasteners

General

The design rules given in this section amend the design rules for connections given in EN 1995-1-1. Plane sides are the surfaces of the element parallel to the plane of the element; narrow sides are the surfaces perpendicular to the plane sides of the element.

1.1 Laterally loaded dowel type fasteners

1.1.1 Joints in the plane side of prefabricated wood slab

If the joints between boards are not considered as member edges, only nails, screws or staples may be used.

For nails, screws, and staples in the plane side of prefabricated wood slabs the embedding strength of solid timber may be used, depending on the characteristic density of the boards of the prefabricated wood slab and on the angle between force and grain direction. If the joints between boards are not considered as member edges, the embedding strength shall be reduced by the factor k_{fh} and the withdrawal parameter for the rope effect by the factor k_{wi} (see 1.2).

The following conditions shall be fulfilled if the joints between boards are not considered as member edges:

- Diameter of nails $d \geq 2{,}5$ mm;
  gap width between adjacent boards at 12 % moisture content $t_{gap} \leq 0{,}75\ d$
  minimum number of nails per connection: 8
  $k_{fh} = 1$ for ringed shank nails with $\ell_{ef}/d > 14$

  $$k_{fh} = 0{,}75 - \frac{t_{gap}}{d} \quad \text{for } d > 2{,}5 \text{ mm}$$

  $$k_{fh} = 1 - \frac{0{,}3 \cdot t_{gap}}{d} \quad \text{for } d = 2{,}5 \text{ mm}$$

- Diameter of screws $d \geq 8$ mm;
  gap width between adjacent boards at 12 % moisture content $t_{gap} \leq 0{,}5\ d$
  minimum number of screws per connection: 4

  $$k_{fh} = 0{,}15 \cdot \left(1 - \frac{t_{gap}}{d}\right)$$

- Diameter of staples $d \geq 1{,}5$ mm;
  gap width between adjacent boards at 12 % moisture content $t_{gap} \leq d$
  minimum number of staples per connection: 10

  $$k_{fh} = 1 - \frac{0{,}3 \cdot t_{gap}}{d}$$

1.1.2 Joints in the narrow side of prefabricated wood slab

For fasteners in the narrow side of prefabricated wood slabs the embedding strength of solid timber may be used, depending on the characteristic density of the boards of the prefabricated wood slab and on the angle between force and grain direction.

For actions perpendicular to the plane side of the prefabricated wood slab the possibility of splitting caused by the tension force component perpendicular to the grain, shall be taken into account. Connections with ratios $h_e/h < 0{,}7$ should be designed according to EN 1995-1-1 8.1.4.

Where

h_e = Loaded edge distance to the centre of the most distant fastener
h = Thickness of the prefabricated wood slab

Annex 5	Design considerations of connections with mechanical fasteners

1.2 Axially loaded dowel type fasteners

1.2.1 Joints in the plane side of prefabricated wood slab

If the joints between boards are not considered as member edges, only nails, screws or staples may be used.

For nails and staples in the plane side of prefabricated wood slabs and for screws with an angle $\alpha \geq 30°$ between the screw axis and the shear plane between adjacent boards the withdrawal parameter of solid timber may be used, depending on the characteristic density of the boards of the prefabricated wood slab and on the angle between fastener axis and grain direction. If the joints between boards are not considered as member edges, the withdrawal parameter shall be reduced by the factor k_{wi}.

The following conditions shall be fulfilled if the joints between boards are not considered as member edges:

- Only ringed shank nails with diameter $d \geq 4$ mm;
  gap width between adjacent boards at 12 % moisture content $t_{gap} \leq 0{,}5\ d$
  $$k_{wi} = 0{,}75 - \frac{t_{gap}}{d}$$
- Diameter of screws $d \geq 8$ mm;
  gap width between adjacent boards at 12 % moisture content $t_{gap} \leq 0{,}5\ d$
  $$k_{wi} = 0{,}5 - \frac{0{,}2 \cdot t_{gap}}{d}$$
- Diameter of staples $d \geq 1{,}8$ mm;
  gap width between adjacent boards at 12 % moisture content $t_{gap} \leq d$
  minimum number of staples per connection: 15
  $$k_{wi} = 1 - \frac{0{,}3 \cdot t_{gap}}{d}$$

For the design of axially loaded screws in prefabricated wood slabs only threaded parts with an angle $\alpha \geq 30°$ between screw axis and grain direction may be taken into account.

The characteristic pull-through strength of the screw head for solid timber may be used, depending on the characteristic density of the boards at the head side of the screw.

1.2.2 Joints in the narrow side of prefabricated wood slab

For fasteners in the narrow side of prefabricated wood slabs the withdrawal parameter of solid timber may be used, depending on the characteristic density of the boards of the prefabricated wood slab and on the angle between force and grain direction.