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European Technical Assessment

ETA-24/0226
of 12.02.2025

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

iCLT

Product family to which the construction product belongs

Solid wood slab element – Element of mechanically jointed timber boards to be used as a structural element in buildings

Manufacturer

TESAŘSTVÍ BISKUP, s. r. o.
Studené 106
254 01 Jílové u Prahy
CZECH REPUBLIC

Manufacturing plants

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Studené 106
254 01 Jílové u Prahy
CZECH REPUBLIC

This European Technical Assessment contains

17 pages including 4 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)
130002-00-0304 “Solid wood slab element - element of dowel jointed timber boards to be used as a structural element in buildings”

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Specific Parts

1 Technical description of the product

1.1 General

This European Technical Assessment (ETA) applies to the element of mechanically jointed timber boards "iCLT". iCLT is made of softwood boards which are jointed with dowel-type fasteners (screws) in order to form solid wood slab elements. Generally adjacent layers of the softwood boards are arranged perpendicular (angle of 90 °) to each other, see Annex 1, Figure 1.

The principle structure of iCLT is shown in Annex 1, Figure 2 to Figure 5. Surfaces are planed. The boards of one cover layer may be provided with tongue and groove at the edges in longitudinal direction, see Annex 1, Figure 3.

The solid wood slab element consists of at least three and up to five adjacent layers which are arranged perpendicular to each other. With regard to the thickness of the solid wood slab element, thicknesses and orientations of individual layers are symmetrically assembled. In case of serious deviations from symmetry potential effects should be investigated.

One cover layer may be replaced by a multilayer solid wood panel. The solid wood panel shall be suitable for structural use. There shall be no butt joints in the longitudinal direction.

The surfaces of the solid wood slabs may be covered with additional layers without load bearing function. This panels are not part of this European Technical Assessment.

iCLT and the components for its manufacturing correspond to the specifications given in the Annexes 1 and 2. The material characteristics, dimensions and tolerances of iCLT, not indicated in these Annexes, are given in the technical file¹ 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 Boards

The specification of the boards is given in Annex 2, Table 2. Boards are visually or machine strength graded. Only technically dried wood shall be used. The boards may be finger jointed according to EN 15497. Finger jointed boards shall be CE marked.

The boards of one cover layer may be provided with tongue and groove at the edges in longitudinal direction, see Annex 1, Figure 3.

Wood species is Norway spruce or equivalent softwood.

1.2.2 Screws

For mechanically jointing the single boards, CE-marked fully-threaded screws "Würth ASSY" with dimension 5.0 x 80 mm according to ETA-11/0190 are used. They are made from carbon steel are hardened and zinc coated.

1.2.3 Solid wood panel

The solid wood panel is in accordance with EN 13353 and CE-marked according to EN 13986. The solid wood panel shall be suitable for structural use.

¹ 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 factory production control certification body involved in the assessment and verification of constancy of performance procedure, is handed over to the notified factory production control certification body.

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

2.1 Intended use

iCLT is intended to be used as a structural or non-structural wall element in buildings.

iCLT is subjected to static and quasi static actions only.

iCLT is intended to be used in service classes 1 and 2 according to EN 1995-1-1². Members which are directly exposed to the weather shall be provided with an effective protection for iCLT in service.

2.2 General assumptions

iCLT 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 planed boards shall be jointed together to the required thickness of the solid wood slab element. The individual boards may be jointed in longitudinal direction by means of finger joints according to EN 15497. Finger jointed boards shall be CE marked. The individual boards of the inner layers arranged in horizontal direction may be butt jointed. Minimum board length is 0,5 m. Butt joints must not be arranged above each other, minimum distance between butt joints is 2 board widths.

Screwing of the single boards must be performed by an automatic screw device. At least 2 screws are required at each node of crosswise jointed layers.

Edge distance in screwed boards is 25 mm, see Annex 1, Figure 2 to Figure 5.

Design

The European Technical Assessment only applies to the manufacture and use of iCLT. 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 iCLT is carried out under the responsibility of an engineer experienced in such products.
- Design of the works shall account for the protection of iCLT.
- iCLT is installed correctly.

Design of the solid wood slab element may be according to EN 1995-1-1, taking into account the Annexes 2 and 3 of the European Technical Assessment.

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.

² Reference documents are listed in Annex 4.

Installation

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.

Fixing of objects

All fixed objects that are subject to tensile forces shall in any case be anchored in iCLT with an anchoring depth of at least 3 layers. For heavy weight objects a deeper anchorage has to be provided. This refers in particular to kitchen cabinets, hot water boilers, handrails, etc..

The specifications of the installation instructions shall be observed.

2.3 Working life/Durability

The provisions made in the European Technical Assessment (ETA) are based on an assumed intended working life of iCLT of 50 years, when installed in the works, provided that the element is 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 experience³.

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

3.1 Essential characteristics of the product

Table 1: Essential characteristics and product performance

No	Essential characteristic	Product performance
Basic requirement for construction works 1: Mechanical resistance and stability ¹⁾		
1	Load-bearing capacity and stiffness regarding mechanical actions perpendicular to the solid wood slab element	Annex 2
2	Load-bearing capacity and stiffness regarding mechanical actions in plane of the solid wood slab element	Annex 2
3	Embedding strength / Withdrawal strength	Annex 2
4	Creep and duration of the load	Annex 2
5	Dimensional stability	Annex 2
6	Aspects of durability	Annex 2
Basic requirement for construction works 2: Safety in case of fire		
7	Reaction to fire	No performance assessed.
8	Resistance to fire	No performance assessed.

³ 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.

Basic requirement for construction works 3: Hygiene, health and the environment		
9	Content, emission and/or release of dangerous substances	3.1.1
10	Water vapour permeability	Annex 2
Basic requirement for construction works 4: Safety and accessibility in use		
11	Same as BWR 1	Annex 2
Basic requirement for construction works 5: Protection against noise		
12	Airborne sound insulation	No performance assessed.
13	Impact sound insulation	No performance assessed.
14	Sound absorption	No performance assessed.
Basic requirement for construction works 6: Energy economy and heat retention		
15	Thermal resistance	Annex 2
16	Air permeability	Annex 2
17	Thermal inertia	Annex 2
1) These characteristics also relate to BWR 4.		

3.1.1 Hygiene, health and the environment

The release of dangerous substances is determined according to EAD 130002-00-0304, "Solid wood slab element – Element of dowel jointed timber boards to be used as a structural element in buildings". No dangerous substances is the performance of iCLT in this respect.

NOTE 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.

3.2 Assessment methods

3.2.1 General

The assessment of the essential characteristics in Clause 3.1 of iCLT for the intended use, and 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 for construction works № 1, 2, 3, 4, and 6 of Regulation (EU) № 305/2011 has been made in accordance with the European Assessment Document EAD 130002-00-0304, Solid wood slab element – Element of dowel jointed timber boards to be used as a structural element in buildings.

3.2.2 Identification

The European Technical Assessment for iCLT is issued on the basis of agreed data that identify the assessed product. Changes to materials, to composition, to characteristics of the product, or to the production process could result in these deposited data being incorrect. Österreichisches Institut für Bautechnik should be notified before the changes are implemented, as an amendment of the European Technical Assessment is possibly 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 iCLT is System 2+. System 2+ is detailed in Commission Delegated Regulation (EU) № 568/2014 of 18 February 2014, Annex, 1.3., and provides for the following items

(a) The manufacturer shall carry out

- (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) factory production control;
- (iii) further testing of samples taken at the manufacturing plant by the manufacturer in accordance with a prescribed test plan⁴;

(b) The notified factory production control certification body shall decide on the issuing, restriction, suspension or withdrawal of the certificate of conformity of the factory production control on the basis of the outcome of the following assessments and verifications carried out by that body:

- (i) initial inspection of the manufacturing plant and of factory production control;
- (ii) continuous surveillance, assessment and evaluation of factory production control.

4.2 Construction products for which a European Technical Assessment has been issued

Manufacturers undertaking tasks under System 2+ shall consider the European Technical Assessment issued for the construction product in question as the assessment of the performance of that product. Manufacturers shall therefore not undertake the tasks referred to in point 4.1 (a)(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

In the manufacturing plant the manufacturer shall establish and continuously maintain a factory production control. All procedures and specification adopted by the manufacturer shall be documented in a systematic manner. The factory production control shall ensure the constancy of performances of the solid wood slab element with regard to the essential characteristics.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the control plan. The incoming raw materials shall be subject to controls by the manufacturer before acceptance. Check of incoming materials shall include control of inspection documents presented by the manufacturer of the raw materials.

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 control plan.

⁴ The prescribed test plan has been deposited with Österreichisches Institut für Bautechnik and is handed over only to the notified factory production control 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.

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 factory production control 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 are met, including the certificate of conformity issued by the notified factory production control certification body, the manufacturer shall draw up a declaration of performance.

5.2 Tasks for the notified factory production control certification body

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

The notified factory production control certification body shall verify the ability of the manufacturer for a continuous and orderly manufacturing of iCLT according to the European Technical Assessment. In particular the following items shall be appropriately considered

- Personnel and equipment
- The suitability of the factory production control established by the manufacturer
- Full implementation of the control plan

5.2.2 Continuous surveillance, assessment and evaluation of factory production control

The notified factory production control certification body shall visit the factory at least once a year for routine inspection. In particular the following items shall be appropriately considered

- The manufacturing process including personnel and equipment
- The factory production control
- The implementation of the control plan

The results of continuous surveillance are made available on demand by the notified factory production control certification body to Österreichisches Institut für Bautechnik. When the provisions of the European Technical Assessment and the control plan are no longer fulfilled, the certificate of constancy of performance is withdrawn by the notified factory production control certification body.

Issued in Vienna on 12.02.2025
by Österreichisches Institut für Bautechnik

The original document is signed by:

Thomas Rockenschaub
Deputy Managing Director

Figure 1: Principle structure of the solid wood slab

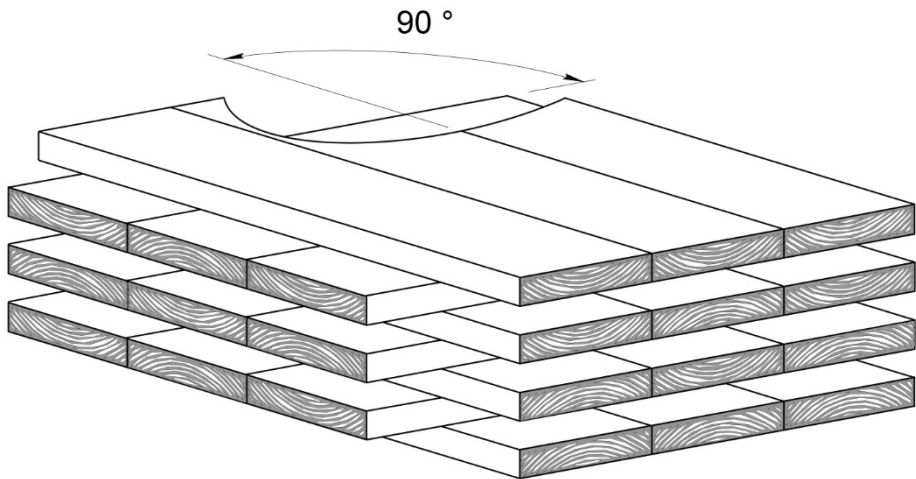
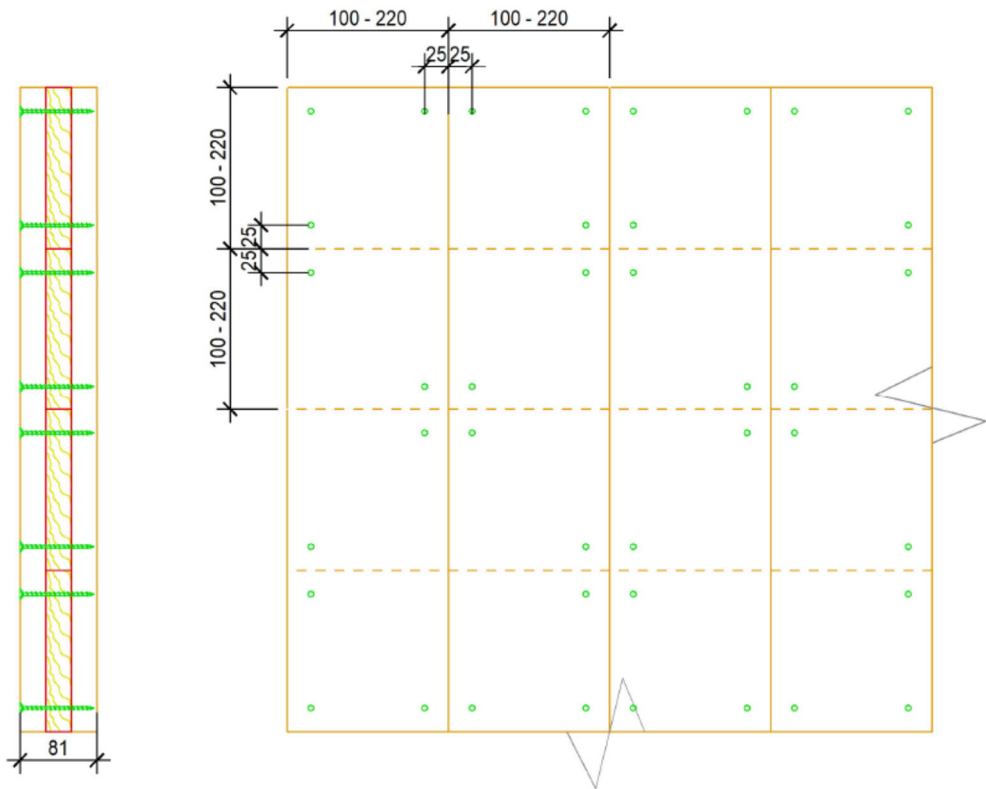


Figure 2: Principal structure of iCLT with 3 layers and screwing patterns (e.g., board width 170 mm)



iCLT	Annex 1 of European Technical Assessment ETA-24/0226 of 12.02.2025
Structure of iCLT	

Figure 3: Principal structure of iCLT with 3 layers and boards of one cover layer provided with tongue and groove at the edges in longitudinal direction (e.g., board width 160 mm)

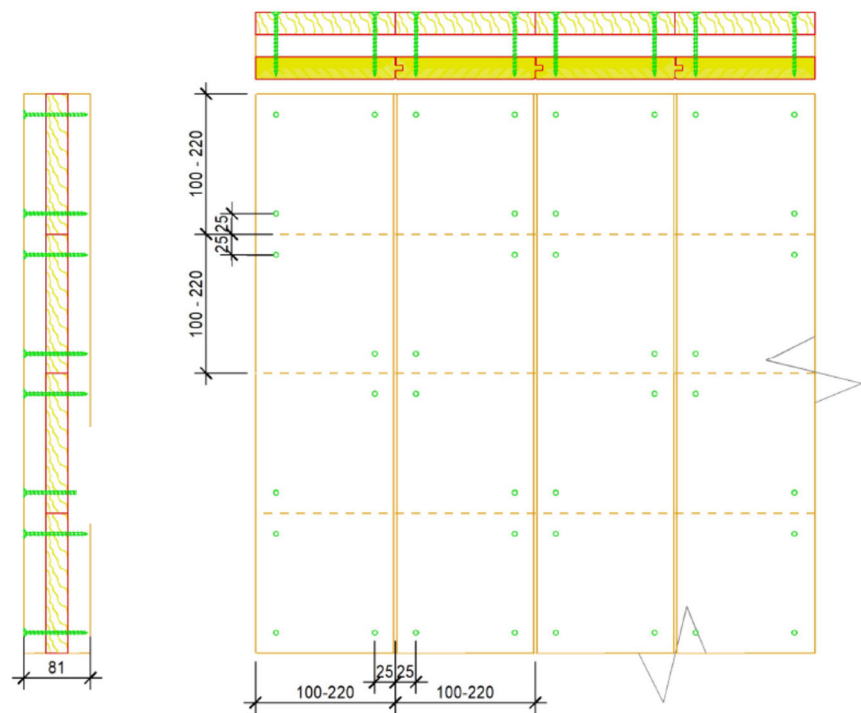
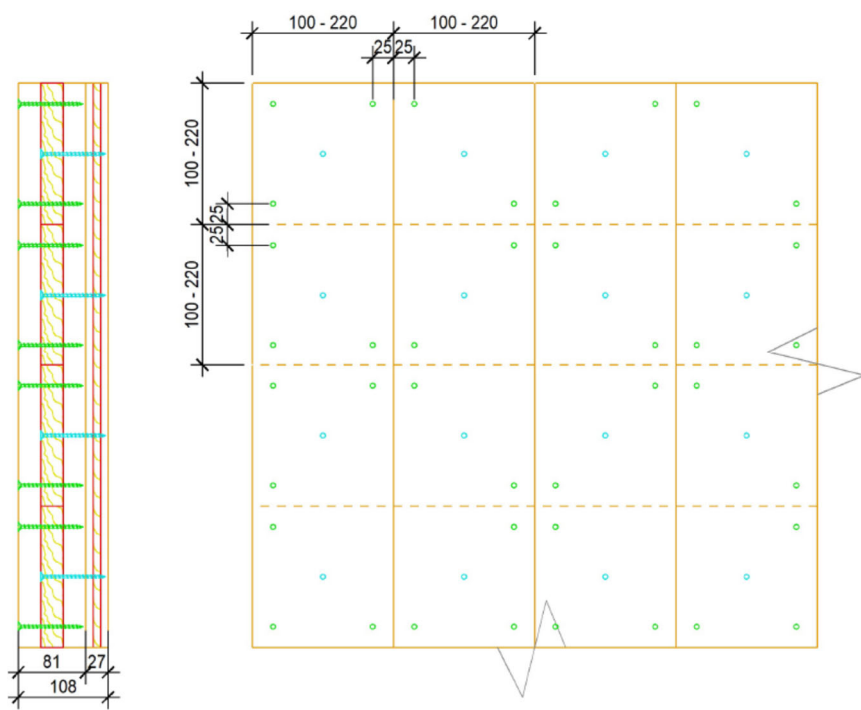
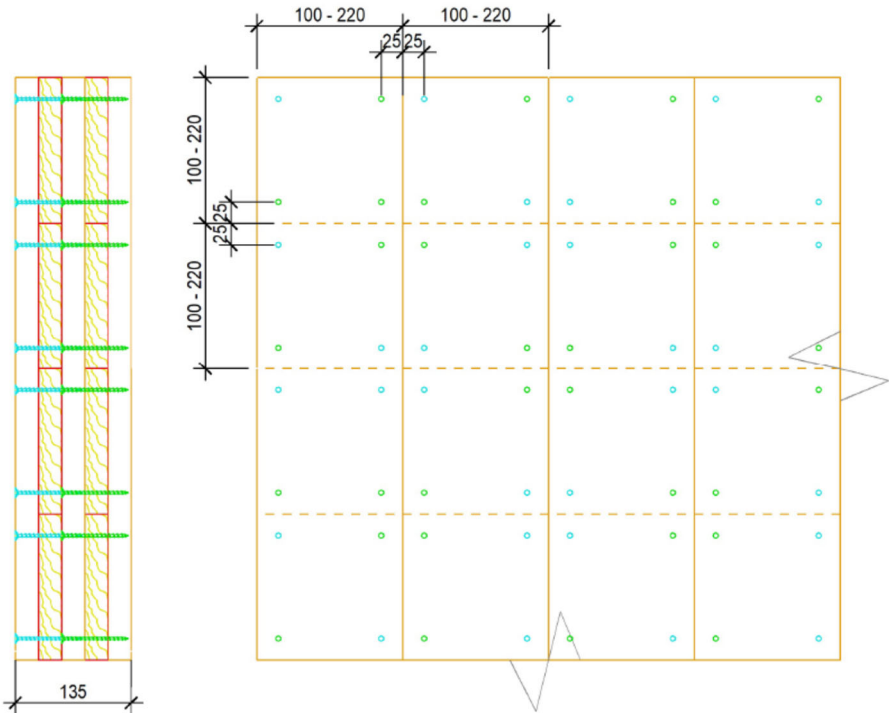


Figure 4: Principal structure of iCLT with 4 layers and screwing patterns (e.g., board width 170 mm, one cover layer replaced by a multilayer solid wood panel)



iCLT	Annex 1 of European Technical Assessment ETA-24/0226 of 12.02.2025
Structure of iCLT	

Figure 5: Principal structure of iCLT with 5 layers and screwing patterns (e.g., board width 170 mm)



iCLT	Annex 1 of European Technical Assessment ETA-24/0226 of 12.02.2025
Structure of iCLT	

Table 2: Dimensions and specifications

Item	Dimension / Specification	
iCLT		
Thickness	mm	81 to 135
Width	m	≤ 3.5
Length	m	≤ 12.5
Number of layers	—	3 to 5 symmetric assembly
Maximum width of joints between boards within one layer	mm	≤ 4 mm
Boards		
Surface	—	planed
Thickness (planed dimension)	mm	27 ± 2 40 for cover layer provided with tongue and groove
Width	mm	100 to 220
Ratio width to thickness	—	≥ 4 : 1
Boards shall be graded with suitable visual and/or machine procedures to be able to assign them to a strength class according to EN 338.	—	
Cover layer and inner layer		C24
Moisture of wood according to EN 13183-2	%	14 ± 2

iCLT

Annex 2

Characteristic data of iCLT

 of European Technical Assessment
 ETA-24/0226 of 12.02.2025

Table 3: Product characteristics of iCLT

BWR	Essential characteristic	Method of verification	Level / Class / Description	
1	Mechanical resistance and stability			
	1. Load bearing capacity and stiffness regarding mechanical actions perpendicular to the plane			
	Load bearing capacity and stiffness regarding mechanical actions perpendicular to the plane of the solid wood slab element may be calculated according to Annex 4. The results of the tested elements are given in the following.			
	Strength class of boards	EN 338	C24	
	Bending		3 layers ¹⁾	5 layers ²⁾
	– bending moment capacity M_{Rk} (longitudinal cover layers), b = 1,5 m	EAD 130002-00-0304, 2.2.1.1	24 kNm	48 kNm
	– effective bending stiffness $(EI)_{ef}$ (longitudinal cover layers), b = 1,5 m	EAD 130002-00-0304, 2.2.1.1	106 kNm ²	208 kNm ²
	– bending moment capacity M_{Rk} (transverse cover layers), b = 1,2 m	EAD 130002-00-0304, 2.2.1.1	-	21 kNm
	– effective bending stiffness $(EI)_{ef}$ (transverse cover layers), b = 1,2 m	EAD 130002-00-0304, 2.2.1.1	-	85 kNm ²
	Shear		3 layers ¹⁾	5 layers ²⁾
– shear capacity V_{Rk} , b = 1,0 m	EAD 130002-00-0304, 2.2.1.1	89 kN	102 kN	
– effective shear stiffness $(GA)_{ef}/\beta$, b = 1,0 m	EAD 130002-00-0304, 2.2.1.1	754 kN	1 157 kN	
Compression				
Load bearing capacity in compression perpendicular to the solid wood slab element shall be calculated according to EN 1995-1-1. The strength classes specified in EN 338 shall be used.				
Tension				
Tension perpendicular to the solid wood slab element is assigned to the screws.				

¹⁾ 3 layers 27-27-27²⁾ 5 layers 27-27-27-27-27

iCLT

Annex 2

Characteristic data of iCLT

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BWR	Essential characteristic	Method of verification	Level / Class / Description	
1	Mechanical resistance and stability			
	2. Load bearing capacity and stiffness regarding mechanical actions in plane ³⁾			
	Load bearing capacity and stiffness regarding mechanical actions in plane of the solid wood slab element may be calculated according to Annex 4. The results of the tested elements are given in the following.			
	Strength class of boards	EN 338	C24	
	Bending		3 layers ¹⁾	5 layers ²⁾
	– bending moment capacity M_{Rk}	EAD 130002-00-0304, 2.2.1.2	16 kNm	35 kNm
	– effective bending stiffness $(EI)_{mean}$	EAD 130002-00-0304, 2.2.1.2	1 065 kNm ²	1 725 kNm ²
	Shear (beam shaped applications H = 0,4 m)		3 layers ¹⁾	5 layers ²⁾
	– shear capacity V_{Rk}	EAD 130002-00-0304, 2.2.1.2	57 kN	98 kN
	– effective shear stiffness $(GA)_{mean}$	EAD 130002-00-0304, 2.2.1.2	5 746 kN	10 328 kN
	Shear walls		3 layers ¹⁾	5 layers ²⁾
	– shear capacity $F_{V,Rk}$	EAD 130002-00-0304, 2.2.1.2	29 kN	74 kN
	– Racking strength R_{mean}	EAD 130002-00-0304, 2.2.1.2	683 kN/m	1 191 kN/m
Compression				
Load bearing capacity in compression shall be calculated according to EN 1995-1-1. The strength classes specified in EN 338 shall be used. Only layers loaded parallel to the grain shall be taken into account.				
Buckling				
Load bearing capacity in buckling shall be calculated according to EN 1995-1-1 considering Annex 4.				
Tension				
Load bearing capacity in tension shall be calculated according to EN 1995-1-1. The strength classes specified in EN 338 shall be used. Only layers loaded parallel to the grain shall be taken into account.				

¹⁾ 3 layers 27-27-27²⁾ 5 layers 27-27-27-27-27

iCLT

Annex 2

Characteristic data of iCLT

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BWR	Essential characteristic	Method of verification	Level / Class / Description
	3. Other mechanical actions		
	Fasteners: Embedding strength and withdrawal strength	EN 1995-1-1	
	Creep and duration of load	For the factor k_{mod} the value for solid timber according to EN 1995-1-1 applies. The factor k_{def} can be assumed to be $2.0 \times k_{def}$ for solid timber.	
	Dimensional stability Moisture content during service shall not change to such an extend that adverse deformation will occur.		
	Aspects of durability – Service classes	EN 1995-1-1	1 and 2
	3 Hygiene, health and environment		
	Vapour permeability, μ , of wood	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.		
6	Energy economy and heat retention		
	Thermal resistance λ of wood	EAD 130002-00-0304	0.12 W/(m·K)
	Air tightness	Wind tightness is required in particular if dry lining is used. Adequate air tightness has to be provided by the manufacturer.	
	Thermal inertia, specific heat capacity c_p of wood	EN ISO 10456	1 600 J/(kg·K)

iCLT

Annex 2

Characteristic data of iCLT

 of European Technical Assessment
 ETA-24/0226 of 12.02.2025

Mechanical actions perpendicular to and in plane of iCLT

General

Design and execution of the solid wood slab element is performed according to EN 1995-1-1. The actions shall be applied according to EN 1991-1-1. Additional national provisions shall be taken into account.

The static verification of the building components is to be made for each application according to the relevant national provisions.

For the design of the single boards the characteristic nominal values for the strength and stiffness for softwood of the strength class C24 according to EN 338 shall be applied.

Mechanical actions perpendicular to cross laminated timber

The verification of the stress distribution and the internal forces and moments in the solid wood slab element in case of actions perpendicular to the plane of the element is to be made in accordance with the theory for composite structures. In addition shear deformation between the layers shall be considered, e.g. according to EN 1995-1-1, sections 9.1.3 and 9.1.4.

Elements with two or three longitudinal layers may be calculated using the method of mechanically jointed beams given in Eurocode 5. For an element with more than three longitudinal layers other calculation methods such as the “shear analogy method” are also applicable.

Mechanical actions in plane of the solid wood slab element

A maximum displacement of the height of the wall should not be exceeded in the serviceability state. This limit value will in general be governing.

In serviceability state design the horizontal displacement of the wall should be limited. For a maximum displacement of, for example, 1/500 of the wall height, the horizontal load $F_{V,ser}$ per m wall is limited to: $F_{V,ser} \leq (GA)_{ef} / 500$

If the solid wood slab elements are used as beams, the boards of the longitudinal layers shall be assumed as independent. The bending capacity hence is the sum of the bending capacities of the single boards of the longitudinal layers.

If the solid wood slab elements are used as columns, only the cross-sectional area of the boards of the longitudinal layers without cross- or diagonal layers shall be considered.

When calculating the effective bending stiffness, the slip between the longitudinal layers due to the deformation of the screw connection should be taken into account.

Initial deflections taking into account geometrical and structural imperfections may be assumed as for glulam members.

Buckling may be calculated according to EN 1995-1-1 taking into account the slip in the screw connections.

iCLT	Annex 3 of European Technical Assessment ETA-24/0226 of 12.02.2025
Design considerations for iCLT	

EAD 130002-00-0304, European Assessment Document for “Solid wood slab element – Element of dowel jointed timber boards to be used as a structural element in buildings”

European Technical Assessment ETA-11/0190 of 23.07.2018 for “Würth self-tapping screws” of Adolf Würth GmbH & Co. KG, Reinhold-Würth-Straße 12-17, 74653 Künzelsau, Germany

EN 338 (04.2016), Structural timber – Strength classes

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 13183-2 (04.2002), Moisture content of a piece of sawn timber – Part 2: Estimation by electrical resistance method

EN 13353:2008+A1 (05.2011), Solid wood panels (SWP) – Requirements

EN 13986:2004+A1 (04.2015), Wood-based panels for use in construction – Characteristics, evaluation of conformity and marking

EN 15497 (04.2014), Structural finger jointed solid timber – Performance requirements and minimum production 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

EN ISO 13788 (12.2012), Hygrothermal performance of building components and building elements – Internal surface temperature to avoid critical surface humidity and interstitial condensation – Calculation methods

iCLT	Annex 4 of European Technical Assessment ETA-24/0226 of 12.02.2025
Reference documents	