Designated according to The Construction Products (Amendment etc.) (EU Exit) Regulations 2020

UK Technical Assessment	UKTA-0836-22/6044 of 25/03/2022
Technical Assessment Body issuing the UK Technical Assessment:	British Board of Agrément
Trade name of the construction product:	HASSLACHER CROSS LAMINATED TIMBER
Product family to which the construction product belongs:	Product area code: 13 Solid wood slab to be used as structural elements in buildings
Manufacturer:	HASSLACHER Holding GmbH Feistritz 1 9751 Sachsenburg Austria
Manufacturing plant(s):	NORDLAM GmbH Gasereistrasse 1 39126 Magdeburg, Sachsen-Anhalt Germany NORITEC Holzindustrie GmbH Latzendorf 100 9832 Stall, Carinthia Austria
This UK Technical Assessment contains:	14 pages including 3 Annexes which form an integral part of this Assessment
This UK Technical Assessment is issued in accordance with The Construction Products (Amendment etc.) (EU Exit) Regulations 2020 on the basis of:	UKAD No 130005-00-0304 *Solid wood slab element to be used as structural element in buildings*

1 Technical description of the product

1.1 General

This UK Technical Assessment (UKTA) applies to HASSLACHER CROSS LAMINATED TIMBER. The product is manufactured from softwood boards which are bonded together to form cross laminated timber (solid wood slab elements). Generally, adjacent layers of the softwood boards are arranged perpendicular (i.e. an angle of 90°) to each other (see Annex 1, Figure 1).

The principle structure of the cross laminated timber is shown in Annex 1, Figures 1, 2 and 3. Surfaces are planed or sanded.

The solid wood slab elements consist of at least three and up to eleven adjacent layers which are arranged perpendicular to each other. The thickness and orientation of individual layers are symmetrically assembled.

The individual boards of the layers running parallel to the longitudinal direction of the element (longitudinal layers) may be side-glued.

In multilayer elements with at least five layers, a maximum of two consecutive board layers may be arranged in the same direction if their overall thickness does not exceed 90 mm.

Single board layers (maximum 50% of the cross section) may be replaced by single- or multi-layer solid wood panels. The solid wood panels shall be suitable for structural use.

One cover layer may be substituted by lamellae type *excellent* (see section 1.2.2).

The surfaces of the solid wood slabs may be substituted with wood-based panels.

HASSLACHER CROSS LAMINATED TIMBER and the boards for its manufacturing correspond to the specifications given in the Annexes 1 and 2. The material characteristics, dimensions and tolerances of the product not indicated in these Annexes are given in the technical file of the UK Technical Assessment.

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

1.2 Components

1.2.1 Boards

The specification of the boards is given in Annex 2, Table 1. Boards are visually or machine strength graded. Only technically dried wood is used.

The wood species used is European Spruce or an equivalent softwood.

1.2.2 Lamellae type *excellent*

The specification of the lamellae type *excellent* is given in Annex 2, Table 1. Lamellae are composed of a bearing lamella and transverse lamella of European Spruce and also a cover lamellae comprising European Spruce or equivalent softwood, birch or oak or equivalent hardwood. Bearing lamellae, transverse lamellae and cover lamellae are visually or machine strength graded. Only technically dried wood is used.

1.2.3 Wood-based panels

The specification of the wood-based panels is given in Annex 2, Table 1. Wood-based panels are in accordance with EN 13986 or a UK Technical Assessment.

1.2.4 Adhesive

The adhesive for bonding of the cross laminated timber and the finger joints of the individual boards shall conform to EN 301.

Typically, a MUF adhesive is used.

2 Specification of the intended use(s) in accordance with the applicable UK Assessment Document (hereinafter UKAD)

2.1 Intended use

The solid wood slab is intended to be used as a structural or non-structural element in buildings and timber structures.

The solid wood slab shall be subjected to static and quasi-static actions only.

The solid 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 must have effective protection for the solid wood slab element in service.

2.2 General assumptions

The solid wood slab elements are manufactured in accordance with the provisions of the UK Technical Assessment using the manufacturing process as identified in the inspection of the manufacturing plant by BBA 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 UK Technical Assessment are made known to those who are concerned with design and execution of the works.

Layers of planed boards shall be bonded together to the required thickness of the cross laminated timber. The individual boards shall be jointed in longitudinal direction by means of finger joints according to EN 14080, there shall be no butt joints.

Adhesive shall be applied on one face of each board. The edges of the boards need not to be bonded.

Design

The UK Technical Assessment only applies to the manufacture and use of cross laminated timber. Verification of stability of the works including application of loads on the cross laminated timber is not subject to the UK Technical Assessment.

The following conditions must be observed:

- Design of cross laminated timber members is carried out under the responsibility of an engineer experienced in such products.
- Design of the works shall account for the protection of the cross laminated timber.
- The cross laminated timber members are installed correctly.

Design of cross laminated timber members elements may be according to EN 1995-1-1 and EN 1995-1-2, taking into account of Annexes 2 and 3 of the UK Technical Assessment.

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

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.

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 best practice of the building professionals.

2.3 Assumed working life

The provisions made in the UK Technical Assessment are based on an assumed intended working life of HASSLACHER CROSS LAMINATED TIMBER of 50 years, when installed in the works, provided that the cross laminated timber elements 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 experience.

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 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 references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Bending (1)	See Annex 2
Tension and compression (1)	See Annex 2
Shear (1)	See Annex 2
Embedment strength	See Annex 2
Creep and duration of the load	See Annex 2
Dimensional stability	See Annex 2
In-service environment	See Annex 2
Bond integrity	See Annex 2

(1) Load bearing capacity and stiffness regarding mechanical actions perpendicular to and in plane of the solid wood slab element.

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	See Annex 2
Resistance to fire	See Annex 2

3.3 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Content, emission and/or release of dangerous substances	(1)
Water vapour permeability – Water vapour transmission	See Annex 2

(1) The release of dangerous substances is determined according to UKAD 130005-00-0304, *No dangerous substances* is the performance of the HASSLACHER CROSS LAMINATED TIMBER in this respect.

3.4 Safety and accessibility (BWR 4)

Essential characteristic	Performance
Impact resistance	See Annex 2

3.5 Protection against noise (BWR 5)

Essential characteristic	Performance
Airborne sound insulation	No performance assessed
Impact sound insulation	No performance assessed
Sound absorption	No performance assessed

3.6 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Thermal conductivity	See Annex 2
Air permeability	No performance assessed
Thermal inertia	See Annex 2

3.7 Sustainable use of natural resources (BWR 7)

Performance not assessed.

4 Assessment and verification of constancy of performance (hereinafter AVCP) system applied

4.1 System of assessment and verification of constancy of performance

According to UKAD No. 130005-00-0304 and Annex V of the Construction Products Regulation (Regulation (EU) 305/2011 as brought into UK law and amended, the system of assessment and verification of constancy of performance (AVCP) 1 applies.

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with the British Board of Agrément and made available to the UK Approved Bodies involved in the conformity attestation process.

5.1 UKCA marking for the product/ system must contain the following information:

- Identification number of the Approved Body
- Name/address of the manufacturer of the product/ system
- Marking with intention of clarification of intended use
- Date of marking
- Number of certificate of constancy of performance
- UKTA number.

On behalf of the British Board of Agrément 	
Date of Issue: 25 March 2022	**Hardy Giesler** Chief Executive

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ANNEX 1 : STRUCTURE OF CROSS LAMINATED TIMBER

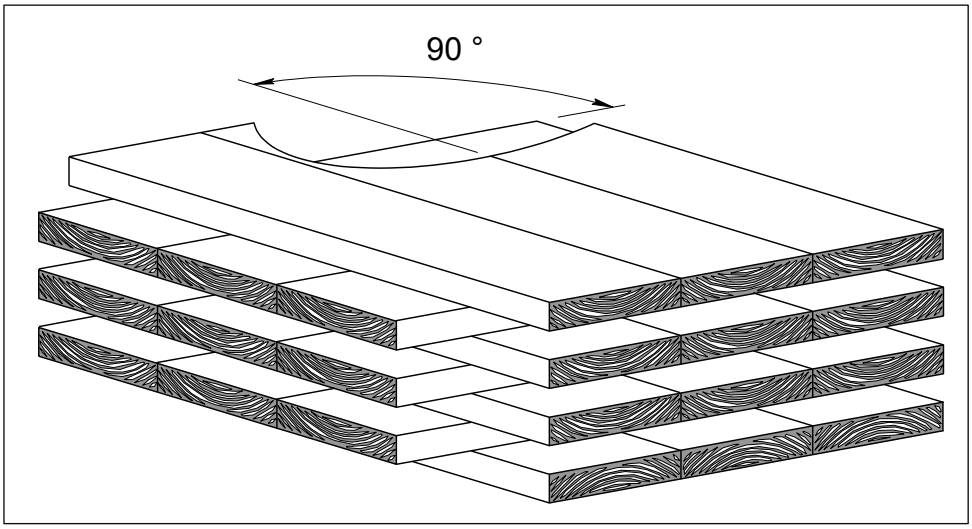


Figure 1 : Structure of the solid wood slab (e.g. cross laminated timber with 7 layers)

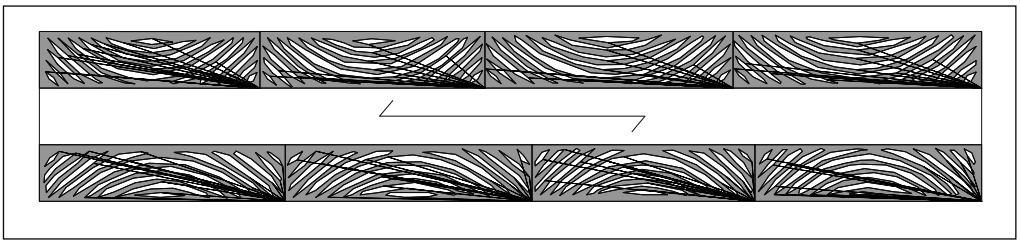


Figure 2 : Structure of cross laminated timber with 3 layers

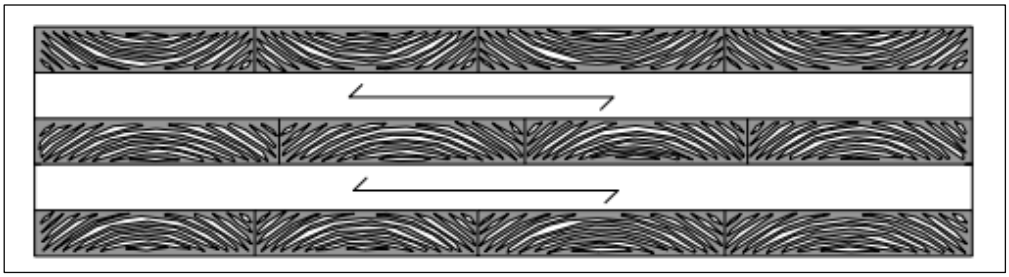


Figure 3 : Structure of cross laminated timber with 5 layers

ANNEX 2 : CHARACTERISTIC DATA OF CROSS LAMINATED TIMBER

Table 1 : Dimensions and specifications

Item		Dimension / Specification	
Cross laminated timber			
Thickness	(mm)	57 to 360	
Width	(m)	≤ 4.0	
Length	(m)	≤ 20.0	
Number of layers	—	3 to 11 symmetric assembly (1)	
Maximum width of joints between boards within one layer	(mm)	3	
Boards			
Surface	—	planed or sanded	
Thickness (planed dimension)	(mm)	19 to 45 30 to 45 for boards of strength class C40/L40/T26	
Width	(mm)	80 to 300	
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.	—	CL26E11.8	CL36E14.7 3s, 5s, 7s, 9s 5ss, 7ss, 9ss (4)
Cover layer		C24,L25 (2) or T14 (3)	C40,L40 (2) or T26 (3)
Inner layer		≤ 30 % C16, L17 (2) or T11 (3) ≥ 70 % C24, L25 (2) or T14 (3)	C24,L25 (2) or T14 (3)
Moisture of wood according to EN 13183-2	(%)	11 ± 2	
Finger joints	—	EN 14080	
Lamellae type *excellent*	—	Z-737: **7**-3-7 **spruce** Z-9520: **9**-5-20 **spruce** Z-8527: **8**-5-27 **spruce** Z-FiBi: **7**-5-21 **birch** Z-FiEi: **7**-5-21 **oak** Z-FiZi: **7**-5-21 **pine**	
Wood-based panels	—	EN 13986	

NOTE

(1) In the case of additional application of fire protection boards, a deviation from the symmetric assembly is allowed. The fire protection board and its application is not subject of this UK Technical Assessment.

(2) According to EN 14081-4.

(3) According to EN 338.

(4) In the case of two consecutive cover layers the same strength class is used.

Table 2 : Product characteristics of the solid wood slab

BWR	Essential characteristic	Assessment method	Level / Class / Description	
1	**Mechanical resistance and stability**			
	1. Mechanical actions perpendicular to cross laminated timber			
	Strength class of boards	EN 338	CL26E11.8	CL36E14.7
	Modulus of elasticity (MPa)			
	– parallel to the grain of the boards $E_{0,\,mean}$	I_{eff}, Annex 3 UKAD 130005-00-0304, 2.2.1.1	11 800 (1)	14 700 (2) 14 600 (3) 14 400 (4) 14 000 (5)
	– perpendicular to the grain of the boards $E_{90,\,mean}$	EN 338	370	
	Shear modulus (MPa)			
	– parallel to the grain of the boards $G_{90,\,mean}$	EN 338	690	
	– perpendicular to the grain of the boards (rolling shear modulus) $G_{9090,\,mean}$	UKAD 130005-00-0304, 2.2.1.1	50	
	Bending strength (MPa)			
	– parallel to the grain of the boards $f_{m,\,k}$	W_{eff}, Annex 3 UKAD 130005-00-0304, 2.2.1.1	$1/k_{sys} \cdot 26.4$ (6) (7)	$1/k_{sys} \cdot 36$ (6) (7)
	Tensile strength (MPa)			
	– perpendicular to the grain of the boards $f_{t,\,90,\,k}$	EN 338, reduced	0.12	
	Compressive strength (MPa)			
	– perpendicular to the grain of the boards $f_{c,\,90,\,k}$	EN 338	2.5	
	Shear strength (MPa) – parallel to the grain of the boards $f_{v,\,090,\,k}$	EN 338	4.0	
	- perpendicular to the grain of the boards (rolling shear strength) $f_{v,\,9090,\,k}$	A_{gross}, Annex 3 UKAD 130005-00-0304, 2.2.1.3	1.5	
	2. Mechanical actions in plane of cross laminated timber			
	Strength class of boards	EN 338	CL26E11.8	CL36E14.7
	Modulus of elasticity (MPa)			
	– parallel to the grain of the boards $E_{0,\,mean}$	A_{net}, I_{net}, Annex 3 UKAD 130005-00-0304, 2.2.1.1	11 600	14 700 (2) 14 600 (3) 14 400 (4) 14 000 (5)

BWR	Essential characteristic	Assessment method	Level / Class / Description	
	Shear modulus (MPa)			
	– parallel to the grain of the boards $G_{090,\,mean}$	A_{net}, Annex 3 UKAD 130005-00-0304, 2.2.1.3	250	
	Bending strength (MPa)			
	– parallel to the grain of the boards $f_{m,\,k}$	W_{net}, Annex 3 UKAD 130005-00-0304, 2.2.1.1	24	34.5
	Tensile strength (MPa)			
	– parallel to the grain of the boards $f_{t,\,0,\,k}$	EN 338	14	19.5
	Compressive strength (MPa)			
	– parallel to the grain of the boards $f_{c,\,0,\,k}$	EN 338	21	24.5
	Shear strength (MPa)			
	– parallel to the grain of the boards $f_{v,\,090,\,k}$	A_{net}, Annex 3 UKAD 130005-00-0304, 2.2.1.3	4.0 (8)	
	3. Other mechanical actions			
	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.			
	Fasteners	EN 1995-1-1, the direction of grain of the cover layer shall be taken as reference		
	In-service environment			
	Durability of timber	EN 1995-1-1		
	Service classes		1 and 2	
	Bond integrity	UKAD 130005-00-0304	Pass	
2	**Reaction to fire**			
	Glued laminated timber products	Commission Decision 2005/610/EC	Mean density of wood ≥ 380 kg.m^{-3} Euroclass D-s2, d0	
	Resistance to fire			
	Charring rate of lamellas (9)	EN 1995-1-2		
	- β_0 - β_n		0.65 mm/min 0.8 mm/min	
3	**Hygiene, health and environment**			
	Vapour permeability (μ), including joints within the layers	EN ISO 10456	50 (dry) to 20 (wet)	
4	**Safety and accessibility in use**			
	Impact resistance	Soft body resistance is assumed to be fulfilled for walls with a minimum of 3 layers and minimum thickness of 60 mm.		

BWR	Essential characteristic	Assessment method	Level / Class / Description
6	**Energy economy and heat retention**		
	Thermal conductivity (λ)	EN ISO 10456	0.12 W/(m·K)
	Thermal inertia, specific heat capacity (c_p)	EN ISO 10456	1 600 J/(kg·K)

NOTES
(1) 1 MPa = 1 N.mm^{-2}
(2) for lay-up 3s, 5s, 5ss and 7ss
(3) for lay-up 9ss
(4) for lay-up 7s
(5) for lay-up 9s
(6) $k_{sys} = \max\begin{cases} 1{,}1 - 0{,}025 \cdot n \\ 1 \end{cases}$ where *n* … number of boards within cover layer
(7) Initial assessment: COV < 15 %
(8) Related to Ax,net or Az,net.
(9) Charring rates are used in the simplified bilinear model of clause 3.4.3 of EN 1995-1-2 to determine the charring depth according to time requirements, considering clause 4.2.2 (Residual cross section method) of EN 1995-1-2. The fire exposed lamella shall be considered as a protective cladding of the subsequent lamella. Analogously, this procedure also applies to walls and floors/roofs made with cross laminated timber.

ANNEX 3 : DESIGN CONSIDERATION OF CROSS LAMINATED TIMBER

Mechanical actions perpendicular to plane and in plane of cross laminated timber

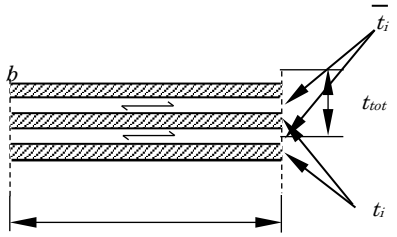
General

Due to the perpendicular orientation of the boards, cross laminated timber is able to transfer loads in all directions according to its condition of support. For cross laminated timber multi-axle stressed in both principal directions, different stiffness for the two principal directions shall be considered.

For calculation of characteristic values of cross-section, only boards which are oriented in direction of the mechanical action may be employed.

For design of cross laminated timber according to EN 1995-1-1, characteristic strength and stiffness of solid wood according to Annex 2 shall be taken.

Mechanical actions perpendicular to cross laminated timber



Where

t_i = Thickness of board layers in direction of mechanical actions

$\bar{t}_i$ = Thickness of board layers perpendicular to direction of mechanical actions

The bending stiffness is specified in relation to the effective moment of inertia I_{eff}.
The calculation of the effective moment of inertia and therewith of the effective bending stiffness is according to EN 1995-1-1.

For I_{eff} see clause 9.1.3 and Annex B of EN 1995-1-1.
The term s_i/K_i of EN 1995-1-1 should be substituted by: $\frac{\bar{t}_i}{G_{9090} \cdot b}$

$$I_i = \frac{b \cdot t_i^3}{12}$$

$$A_i = b \cdot t_i$$

$$\tau_{v,d} = \frac{1.5 \cdot V_d}{A_{gross}}$$

$$W_{eff} = \frac{2 \cdot I_{eff}}{t_{tot}}$$

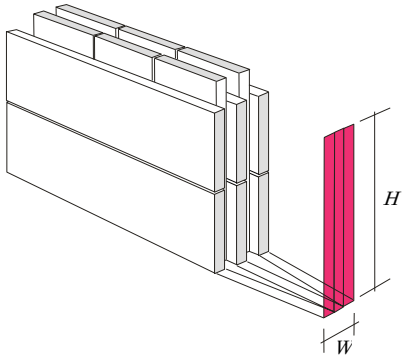
$$h_{tot} = \sum_i (t_i + \bar{t}_i)$$

$$A_{gross} = b \cdot t_{tot}$$

Where

I = moment of inertia
I_{eff} = effective moment of inertia
S = spacing of fasteners according to EN 1995-1-1 *(not relevant for solid wood slab)*
K = slip modulus according to EN 1995-1-1 *(not relevant for solid wood slab)*
G_{9090} = shear modulus of the board perpendicular to grain *(rolling shear modulus)*; G_{90} = 50 MPa
b = width of the member of cross laminated timber

Mechanical actions in plane of the solid wood slab



Where

$H \leq 400$ mm

$W = T = \Sigma \bar{t}_i$

t_i = Thickness of board layers in direction of mechanical actions

$\bar{t}_i$ = Thickness of board layers perpendicular to direction of mechanical actions

V = Shear force

Under the terms of the technical beam theory the following equations may be used.

Moment of inertia

$$I_{net} = \frac{T \cdot H^3}{12}$$

Section modulus

$$W_{net} = \frac{T \cdot H^2}{6}$$

Shear stress

$$\tau_{v,d} = \text{Maximum} \begin{cases} \frac{3}{2} \cdot \frac{V_d}{A_{x,net}} \\ \frac{3}{2} \cdot \frac{V_d}{A_{z,net}} \end{cases}$$

$$A_{x,net} = H \cdot \sum_i \bar{t}_i$$

$$A_{z,net} = H \cdot \sum_i t_i$$

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