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

UK Technical Assessment	UKTA-0836-23/6616 of 12/01/2023
Technical Assessment Body issuing the UK Technical Assessment:	British Board of Agrément
Trade name of the construction product:	MM crosslam
Product family to which the construction product belongs:	13 - STRUCTURAL TIMBER PRODUCTS/ELEMENTS AND ANCILLARIES
Manufacturer:	Mayr-Melnhof Holz Gaishorn GmbH, 8783 Gaishorn am See 182 Austria
Manufacturing plant(s):	Mayr-Melnhof Holz Gaishorn GmbH, 8783 Gaishorn am See 182 Austria
This UK Technical Assessment contains:	19 pages and 5 Annexes
This UK Technical Assessment is issued in accordance with The Construction Products (Amendment etc.) (EU Exit) Regulations 2020 on the basis of:	UKAD 130005-00-0304 Solid wood slab element to be used as a structural element in buildings

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1. **Technical description of the product**

1.1 **General**

This United Kingdom Technical Assessment (UKTA) applies to "MM crosslam".
MM crosslam is made of softwood boards which are bonded together in order to form cross laminated timber (solid wood slab elements). Generally, layers of softwood boards are arranged perpendicularly (angle of 90°) to each other. See Annex 1, Figure 1.

The principal structure of the cross laminated timber is shown in Annex 1, Figure 2 and Figure 3. Surfaces are planned.

The product consists of at least three, and up to thirteen layers, which are arranged on top of each other. In cases of serious deviations from symmetry, the potential effects should be investigated.

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 one- or multi-layer solid wood panels. The solid wood panels shall be suitable for structural use.

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

MM crosslam, and the boards used for its manufacturing, correspond to the specifications given in the Annexes 1 and 2. The material characteristics, dimensions and tolerances of MM crosslam that are not indicated in these Annexes, are given in the technical file of the UKTA.

The application of wood preservatives and flame retardants is not covered by this UKTA.

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 wood species is European spruce or equivalent softwood.

1.2.2 Wood-based panels

Wood-based panels are in accordance with BS EN 13986 or a UKTA.

1.2.3 Adhesive

The adhesive for bonding the cross laminated timber and the finger joints of the individual boards shall conform to BS EN 301: 2017 or BS EN 15425: 2017.

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 BS EN 1995-1-1: 2014.

Members which are directly exposed to the weather shall be provided with an effective protection for the solid wood slab element.

2.2 **General assumptions**

The solid wood slab elements are manufactured in accordance with the provisions of the

UKTA using the manufacturing process as identified in the inspection of the manufacturing plant and laid down in the technical file.

- The manufacturer shall ensure that requirements in accordance with Clauses 1, 2 and 3, as well as with the Annexes of the UKTA, 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 a longitudinal direction by means of finger joints according to BS EN 14080: 2013. There shall be no butt joints.

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

Design

This UKTA 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 the subject of the UKTA.

The following conditions shall 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 take into account 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 BS EN 1995-1-1: 2014 and BS EN 1995-1-2: 2009, taking into account Annexes 2 and 3 of the UKTA.

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 clients on the transport, storage, maintenance, replacement and repair of the product as the manufacturer 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 usual practice of the building professionals.

2.3 Assumed working life

The provisions made in the UKTA are based on an assumed intended working life of MM crosslam 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 given by the product manufacturer or his representative, or 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) [1]

Essential characteristic	Product performance
- Bending [2]	Annex 2
- Tension and compression [2]	Annex 2
- Shear [2]	Annex 2
- Embedment strength	Annex 2
- Creep and duration of the load	Annex 2
- Dimensional stability	Annex 2

- In-service environment   Annex 2
- Bond integrity   Annex 2

1) These characteristics also relate to basic requirement for construction works 4.

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

3.2 Safety in case of fire (BWR 2)

Essential characteristic   *Product performance*

- Reaction to fire   Annex 2
- Resistance to fire   Annex 2

3.3 Health, hygiene and the environment (BWR 3)

Essential characteristic   *Product performance*

- Content, emission and/or release of dangerous substances   3.3.1
- Water vapour permeability – Water vapour transmission   Annex 2

3.3.1 The release of dangerous substances is determined according to UKAD 130005-00-0304, "Solid wood slab element to be used as a structural element in buildings". No dangerous substances were found in the MM crosslam in this respect.

NOTE In addition to the specific clauses relating to dangerous substances contained in the UKTA, there may be other requirements applicable to the products falling within its scope (e.g., transposed UK 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.

3.4 Safety and accessibility in use (BWR 4)

Essential characteristic   Product performance

- Impact resistance   Annex 2

3.5 Protection against noise (BWR 5)

Not relevant.

3.6 Energy economy and heat retention (BWR 6)

Not relevant.

3.7 Sustainable use of natural resources (BWR 7)

No performance assessed

3.8 Assessment methods

3.8.1 General

The assessment of the essential characteristics in the above clauses of MM crosslam 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; for protection against noise; and for energy economy and heat retention in use, with regard to the basic work requirements for construction works of Regulation (EU) No. 305/2011 has been made in accordance with the United Kingdom Assessment Document UKAD 130005-00-0304.

3.8.2   Identification

The United Kingdom Technical Assessment for MM crosslam 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. The British Board of Agrément should be notified before the changes are implemented, as an amendment of the UKTA is possibly necessary.

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. 120005-00-0304 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 (where applicable)
- UKTA number.

On behalf of the British Board of Agrément	
Date of Issue: 12 January 2023	**Hardy Giesler** Chief Executive Officer

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ANNEX 1

This annex applies to the product described in the main body of the UKTA.

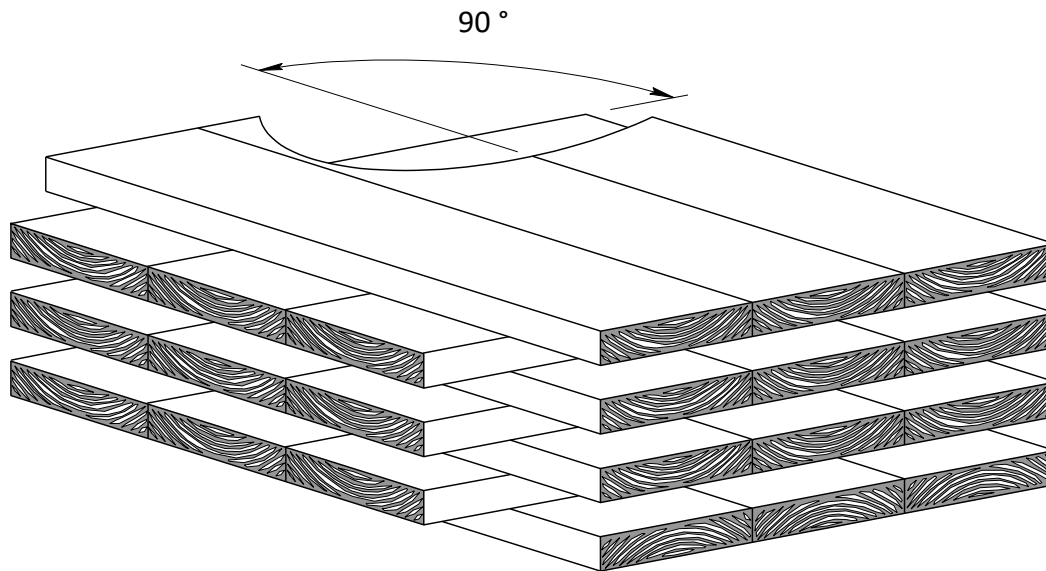**Figure 1**: Principal structure of the solid wood slab

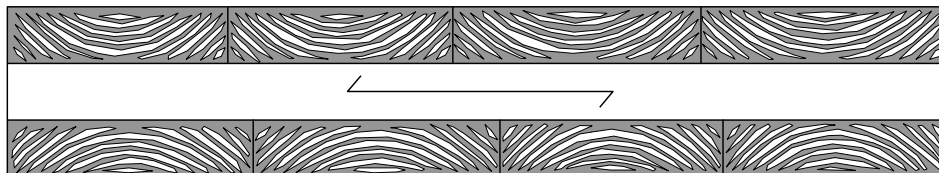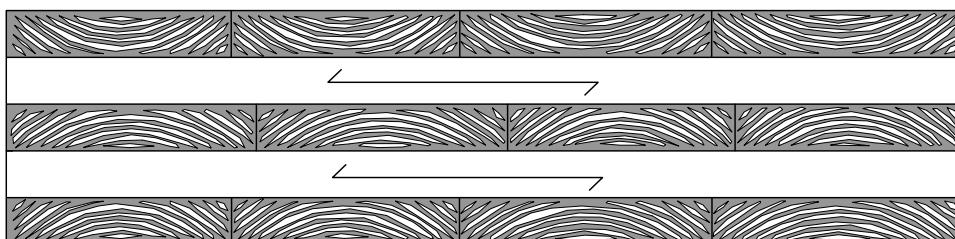**Figure 2**: Principal structure of cross laminated timber with 3 layers

Figure 3: Principal structure of cross laminated timber with 5 layers

ANNEX 2

This annex applies to the product described in the main body of the UKTA.

Table 1: Dimensions and specifications

Characteristic		Dimension / Specification
Cross laminated timber		
Thickness	mm	36 to 350
Width	m	≤ 4.0
Length	m	≤ 18.0
Number of layers	—	3 to 13 symmetric assembly
Maximum width of joints between boards within one layer	mm	3 max. 10 % $\leq$ 4 mm
Board		
Surface	—	planed
Thickness (planed dimension)	mm	12 to 45
Width	mm	70 to 280
Ratio width to thickness	—	$\geq 4 : 1$
Boards shall be graded with suitable visual and/or machine procedures to be able to assign them to a strength class according to BS EN 338: 2016. Cover layer Inner layer	—	C16 / T11 to C35 / T21 [1)] $\leq$ 30 % C16 / T11 [2)] $\leq$ 30 % C24 / T14 [4)] $\geq$ 70 % C_{DI} [2), 3)] $\geq$ 70 % C35 / T21 [4)]
Moisture of wood according to BS EN 13183-2: 2002	%	6 to 15 % Within one member of cross laminated timber, the moisture content shall not differ by more than 5 %.
Finger joints	—	BS EN 14080: 2013

1)   According to BS EN 338: 2016.
2)   If the boards of the cover layer confirm to strength class C18 / T11 to C24 / T14.
3)   Strength class of the cover layer.
4)   If the boards of the cover layer confirm to strength class C35 / T21.

ANNEX 2 cont.

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	BS EN 338: 2016	C16 / T11 to C35 / T21
	Modulus of elasticity − parallel to the grain of the boards $E_{0,\,mean}$	I_{eff}, Annex 3 UKAD 130005-00-0304, 2.2.1.1	C16 / T11 8 000 MPa C18 / T11 9 000 MPa C24 / T14 11 600 MPa C30 / T18 12 600 MPa C35 / T21 13 700 MPa
	− perpendicular to the grain of the boards $E_{90,\,mean}$	BS EN 338: 2016	C16 / T11 270 MPa C18 / T11 300 MPa C24 / T14 370 MPa C30 / T18 400 MPa C35 / T21 430 MPa
	Shear modulus − parallel to the grain of the boards $G_{090,\,mean}$	BS EN 338: 2016	C16 / T11 500 MPa C18 / T11 560 MPa C24 / T14 650 MPa C30 / T18 750 MPa C35 / T21 810 MPa
	− perpendicular to the grain of the boards (rolling shear modulus) $G_{9090,\,mean}$	UKAD 130005-00-0304, 2.2.1.1	50 MPa
	Bending strength − parallel to the grain of the boards $f_{m,\,k}$	W_{eff}, Annex 3 UKAD 130005-00-0304, 2.2.1.1	C16 / T11 $1/k_{sys} \cdot$ 17.6 MPa [1] C18 / T11 $1/k_{sys} \cdot$ 19.8 MPa [1] C24 / T14 $1/k_{sys} \cdot$ 26.4 MPa [1] C30 / T18 $1/k_{sys} \cdot$ 33.0 MPa [1] C35 / T21 $1/k_{sys} \cdot$ 38.5 MPa [1]
	Tensile strength − perpendicular to the grain of the boards $f_{t,\,90,\,k}$	BS EN 338: 2016, reduced	0.12 MPa

[1] $k_{sys} = \max\{1.0; 1.1 - 0.025 \cdot n\}$

n … number of boards within cover layer

ANNEX 2 cont.

Table 3 (continued): Product characteristics of the solid wood slab

BWR	Essential characteristic	Assessment method	Level / Class / Description
1	Compressive strength – perpendicular to the grain of the boards $f_{c, 90, k}$	BS EN 338: 2016	C16 / T11 2.2 MPa C18 / T11 2.2 MPa C24 / T14 2.5 MPa C30 / T18 2.7 MPa C35 / T21 2.7 MPa
	Shear strength – parallel to the grain of the boards $f_{v, 090, k}$	BS EN 338: 2016	C16 / T11 3.2 MPa C18 / T11 3.4 MPa C24 / T14 4.0 MPa C30 / T18 4.0 MPa C35 / T21 4.0 MPa
	– 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	1.10 MPa

ANNEX 2 cont.

Table 4 (continued): Product characteristics of the solid wood slab

BWR	Essential characteristic	Assessment method	Level / Class / Description
1	**Mechanical resistance and stability**		
	2. Mechanical actions in plane of cross laminated timber		
	Strength class of boards	BS EN 338: 2016	C16 / T11 to C35 / T21
	Modulus of elasticity − parallel to the grain of the boards $E_{0, mean}$	A_{net}, I_{net}, Annex 3 UKAD 130005-00-0304, 2.2.1.1	C16 / T11 8 000 MPa C18 / T11 9 000 MPa C24 / T14 11 600 MPa C30 / T18 12 600 MPa C35 / T21 13 700 MPa
	Shear modulus − parallel to the grain of the boards $G_{090, mean}$	A_{net}, Annex 3 UKAD 130005-00-0304, 2.2.1.3	250 MPa
	Bending strength − parallel to the grain of the boards $f_{m, k}$	W_{net}, Annex 3 UKAD 130005-00-0304, 2.2.1.1	C16 / T11 16 MPa C18 / T11 18 MPa C24 / T14 24 MPa C30 / T18 30 MPa C35 / T21 35 MPa
	Tensile strength − parallel to the grain of the boards $f_{t, 0, k}$	BS EN 338: 2016	C16 / T11 8.5 MPa C18 / T11 10.0 MPa C24 / T14 14.5 MPa C30 / T18 19.0 MPa C35 / T21 22.5 MPa
	Compressive strength − parallel to the grain of the boards $f_{c, 0, k}$	BS EN 338: 2016	C16 / T11 17 MPa C18 / T11 18 MPa C24 / T14 21 MPa C30 / T18 24 MPa C35 / T21 25 MPa
	Shear strength	A_{net}, Annex 3 UKAD 130005-00-0304, 2.2.1.3	5.0 MPa

ANNEX 2 cont.

Table 5 (continued): Product characteristics of the solid wood slab

BWR	Essential characteristic	Assessment method	Level / Class / Description	
1	**3. Other mechanical actions**			
	Creep and duration of load	k_{mod} and k_{def} according to BS EN 1995-1-1: 2009 for glued laminated timber		
	Dimensional stability Moisture content during service shall not change to such an extent that adverse deformation will occur.			
	Fasteners	BS EN 1995-1-1: 2009: the direction of grain of the cover layer shall be taken as reference		
	In-service environment			
	Durability of timber Service classes	BS EN 1995-1-1: 2009	1 and 2	
	Bond integrity	UKAD 130005-00-0304	Pass	
2	**Safety in case of fire**			
	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			
	Structures with specified fire resistance	BSEN 13501-2: 2016	Annex 3	
	Charring rate for MUF - Charring of the cover layer - Charring of more layers than the cover layer	UKAD 130005-00-0304	Floor/Roof 0.65 mm/min 0.76 mm/min [1]	Wall 0.60 mm/min 0.71 mm/min
	Charring rate for PU - Charring of the cover layer - Charring of more layers than the cover layer	UKAD 130005-00-0304	Floor/Roof 0.65 mm/min 1.3 mm/min [1]	Wall 0.63 mm/min 0.86 mm/min

1) until 25 mm of charring. Afterwards, the charring rate 0.65 mm/min applies up to the next glue line.

ANNEX 2 cont.

Table 6 (continued): Product characteristics of the solid wood slab

BWR	Essential characteristic	Assessment method	Level / Class / Description
3	**Hygiene, health and environment**		
	Vapour permeability, μ, for wood	EN ISO 10456: 2009	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.	
6	**Energy economy and heat retention**		
	Thermal conductivity, λ, of wood	BS EN ISO 10456: 2009	0.12 W/(m·K)
	Thermal inertia, specific heat capacity c_p, of wood	BS EN ISO 10456: 2009	1 600 J/(kg·K)

ANNEX 3

This annex applies to the product described in the main body of the UKTA

Examples with specified fire resistance

Wall structures

Cladding on the fire exposed side	Mounting	CLT element	Test load	Tested wall height	Classifi-cation
		Designation and structure [mm]	[kN/m]	[m]	i => o
–	–	MM crosslam 100 3s 40-20-40	35	3	REI 60
–	–	MM crosslam 100 5s 20-20-20-20-20	35	3	REI 60
12.5 mm gypsum plasterboard type DF according to EN 520, ρ ≥ 800 kg/m³	Drywall screws 3.9 mm x 35 mm with a = 75/150 mm (edge/centre) row distance 625 mm	MM crosslam 80 3s 30-20-30	35	3	REI 60

Cladding on the fire exposed side	Mounting	CLT element	Test load	Tested wall height	Classifi-cation
		Designation and structure [mm]	[kN/m]	[m]	i => o
2 x 15 mm gypsum plasterboard type DF according to EN 520, ρ ≥ 800 kg/m³	First layer: ribbed nails l = 40 mm Second layer: ribbed nails l = 40 mm (left side) and staples l = 45 mm (right side) with a = 75/150 mm (edge/centre) row distance 625 mm	MM crosslam 80 3s 30-20-30	–	3	EI 90
12.5 mm gypsum plasterboard type DF according to EN 520, ρ ≥ 800 kg/m³	Drywall screws 3.9 mm x 35 mm with a = 75/150 mm (edge/centre) row distance 625 mm	MM crosslam 100 3s 40-20-40	35	3	REI 90
12.5 mm gypsum plasterboard type DF according to EN 520, ρ ≥ 800 kg/m³ 40 mm mineral wool according to ÉN 13162, ρ = 11 kg/m³	Drywall screws 3.9 mm x 35 mm with a = 75/150 mm (edge/centre) row distance 625 mm	MM crosslam 100 3s 40-20-40	35	3	REI 90
12.5 mm gypsum plasterboard type DF according to EN 520, ρ ≥ 800 kg/m³	Drywall screws 3.9 mm x 35 mm with a = 75/150 mm (edge/centre) row distance 625 mm	MM crosslam 100 5s 20-20-20-20-20	35	3	REI 90

ANNEX 3 cont.

Cladding on the fire exposed side	Mounting	CLT element	Test load	Tested wall height	Classifi-cation
		Designation and structure [mm]	[kN/m]	[m]	i => o
12.5 mm gypsum plasterboard type DF according to BS EN 520:2004+A1: 2009, ρ ≥ 800 kg/m³ 40 mm mineral wool according to ÉN 13162, ρ = 11 kg/m³	Drywall screws 3.9 mm x 35 mm with a = 75/150 mm (edge/centre) row distance 625 mm	MM crosslam 100 3s 40-20-40	35	3	REI 120

Floor structures

Cladding on the fire exposed side	Mounting	CLT element	Test load	Tested span	Classifi-cation
		Designation and structure [mm]	[kN/m²]	[m]	b => a
–	–	MM crosslam 140 5s 40-20-20-20-40	5	5	REI 60
12.5 mm gypsum plasterboard type DF according to BS EN 520:2004+A1: 2009, ρ ≥ 800 kg/m³	Drywall screws 3.9 mm x 35 mm with a = 75/150 mm (edge/centre) row distance 625 mm	MM crosslam 100 3s 40-20-40	0.6	5	REI 60

Cladding on the fire exposed side	Mounting	CLT element	Test load	Tested span	Classifi-cation
		Designation and structure [mm]	[kN/m²]	[m]	b => a
–	–	MM crosslam 160 5s 40-20-40-20-40	6	5	REI 90
12.5 mm gypsum plasterboard type DF according to BS EN 520:2004+A1: 2009, ρ ≥ 800 kg/m³	Drywall screws 3.9 mm x 35 mm with a = 75/150 mm (edge/centre) row distance 625 mm	MM crosslam 140 5s 40-20-20-20-40	–	5	EI 90
35 mm wood wool board Heraklith EPV type L2-W1-T2-S2-P2-CS(10/Y)200-CI3 according to BS EN 13168:2012+A1: 2015	Heraklith screws 4.5 mm x 60 mm with a = 215 mm row distance 625 mm	MM crosslam 160 5s 40-20-40-20-40	–	5	EI 90

ANNEX 4

This annex applies to the product described in the main body of the UKTA.

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

For the design of cross laminated timber according to BS EN 1995-1-1: 2009, the characteristic strength and stiffness of solid wood according to Annex 2 shall be used. If the cross laminated timber is comprised of visually graded boards, the characteristic bending strength parallel to the grain may be determined with the following equation:

$$f_{m,\,CLT,\,k} = Minimum \begin{cases} a_{CLT} \cdot f_{t_{0_{k}}}0 \\ 8; 1 \\ 2 \cdot f_{m_{k}} \end{cases}$$

$$b \geq 1 \text{ m}$$

Where

$f_{m,\,CLT,\,k}$ .... MPa .... characteristic bending strength of cross laminated timber

$f_{m,\,k}$ .... MPa .... characteristic bending strength according to BS EN 338: 2016

a_{CLT} = 3.5 .... - .... for visually graded timber

$f_{t,\,0,\,k}$ .... MPa .... characteristic tensile strength of board according to BS EN 338: 2016

b .... mm .... width of the member of cross laminated timber

For cross laminated timber multiaxial stressed in both principal directions, different stiffnesses for the two principal directions shall be considered.

Mechanical actions perpendicular to cross laminated timber
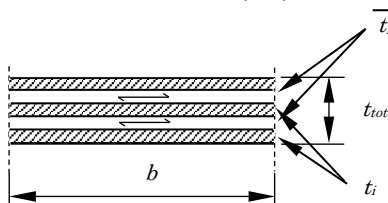
Where

t_i .... Thickness of board layers in direction of mechanical actions

$\overline{t_i}$ .... 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 therefore of the effective bending stiffness is according to BS EN 1995-1-1: 2009.

For I_{eff} see clause 9.1.3 and Annex B of EN 1995-1-1.

The term $\frac{s_i}{K_i}$ of EN 1995-1-1 should be substituted by $\frac{\overline{t_i}}{G_{9090} \cdot b}$:

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

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

$$A_i = b \cdot t_i$$

$$h_{tot} = \sum_i (t_i + \overline{t_i})$$

$$\tau_{v,\,d} = \frac{1,5 \cdot V_d}{A_{gross}}$$

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

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_{9090} = 50 MPa
b .... width of the member of cross laminated timber

<u>Mechanical actions in plane of the solid wood slab</u>

H

$T = \Sigma\ t_i$
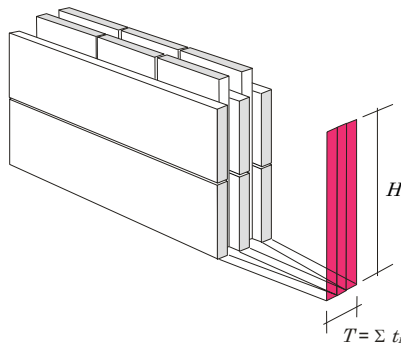
Where
$H \leq 400$ mm
t_i .... Thickness of board layers in direction of mechanical actions
$\overline{t_i}$ .... Thickness of board layers perpendicular to direction of mechanical actions
V .... Shear force

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

Moment of inertia

Section modulus

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

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

Shear strength

$$\tau_{v,\,d} = Maximum \begin{cases} \dfrac{3}{2} \cdot \dfrac{V_d}{A_{x,\,net}} \\[2mm] \dfrac{3}{2} \cdot \dfrac{V_d}{A_{z,\,net}} \end{cases}$$

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

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

ANNEX 5

This annex applies to the product described in the main body of the UK Technical Assessment.

UKAD 130005-00-0304, UK Assessment Document for "Solid wood slab element to be used as a structural element in buildings"

BS EN 301: 2017 (11.2017), Adhesives, phenolic and aminoplastic, for load-bearing timber structures – Classification and performance requirements

BS EN 338: 2016, Structural timber – Strength classes

BS EN 520:2004+A1: 2009, Gypsum plasterboards – Definitions, requirements and test methods

BS EN 1995-1-1: 2009, Eurocode 5 – Design of timber structures - Part 1-1: General – Common rules and rules for buildings

BS EN 1995-1-2: 2009, Eurocode 5 – Design of timber structures – Part 1-2: General – Structural fire design

BS EN 13162: 2015, Thermal insulation products for buildings – Factory made mineral wool (MW) products – Specification

BS EN 13168: 2015, Thermal insulation products for buildings – Factory made wood wool (WW) products – Specification

BS EN 13183-2: 2002, Moisture content of a piece of sawn timber – Part 2: Estimation by electrical resistance method

BS EN 13986: 2015, Wood-based panels for use in construction – Characteristics, evaluation of conformity and marking

BSEN 14080: 2013, Timber structures – Glued laminated timber and glued solid timber – Requirements

BS EN 15425: 2017, Adhesives – One component polyurethane for load bearing timber structures – Classification and performance requirements

BS EN ISO 10456: 2009, Building materials and products – Hygrothermal properties – Tabulated design values and procedures for determining declared and design thermal values

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