LOCK FLOOR

JOINT PROFILE FOR PANELS

VIDEO

DESIGN REGISTERED

CE ETA-19/0831

SERVICE CLASS

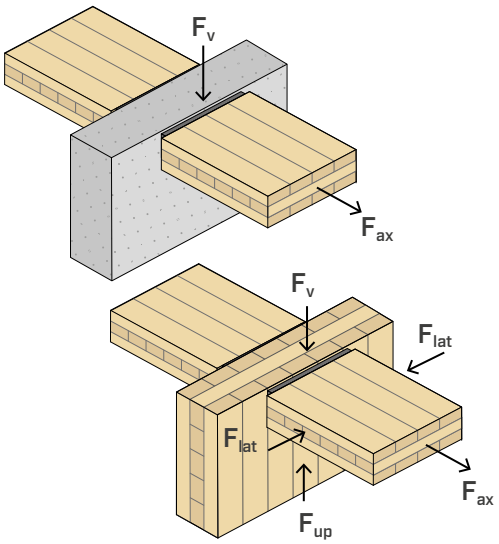
SC1 SC2 SC3

For information on the application areas of with reference to environment service class, atmospheric corrosivity class and timber corrosion class, refer to the website www.rothoblaas.com.

MATERIAL

alu 6005A EN AW-6005A aluminium alloy

EXTERNAL LOADS



MULTI-STOREY WALLS

Ideal for connecting floor panels to multi-story walls (concrete or timber). The hooking system enables installation without the use of shoring or temporary support structures.

FAST INSTALLATION

The profiles can be pre-installed on panels and walls, without additional fastening on site during installation.

HYBRID STRUCTURES

The LOCKCFLOOR135 model is ideal for fastening timber floors to steel or timber structures.

USA, Canada and more design values available online.

FIELDS OF USE

Concealed panel joint in timber-to-timber, timber-to-concrete or timber-to-steel configuration, suitable for panel floors, façades or stairs.

Can be applied to:

- CLT
- LVL
- MPP

PREFABRICATION

The timber-to-timber version is specifically designed for attaching floors to multi-story CLT walls. The hooking system is particularly suitable for prefabricated floors.

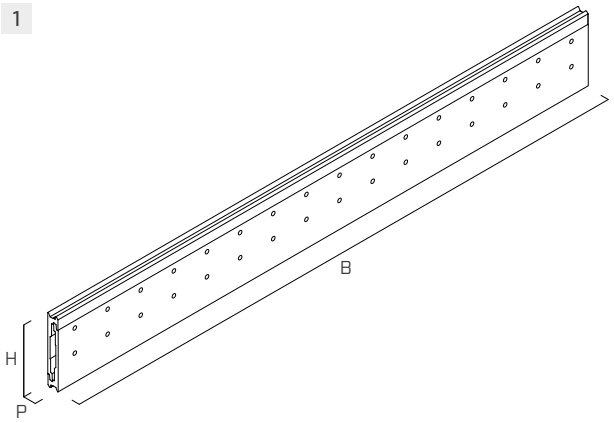
STAIRS AND OTHER

The geometry of the connector is also suitable for non-standard applications, as the installation of timber staircases, prefabricated façades and more.

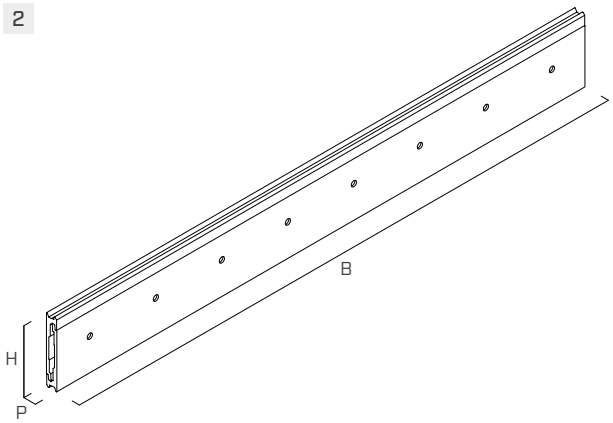
CODES AND DIMENSIONS

LOCK T FLOOR-LOCK C FLOOR

1



2



	CODE	B [mm]	H [mm]	P [mm]	*B [in]*	*H [in]*	*P [in]*	n_{screw} x Ø(1) [pcs]	$n_{anchors}$ x Ø(1) [pcs]				pcs(2)
1	**LOCKTFLOOR135**	1200	135	22	*47 1/4*	*5 5/16*	*0.87*	64 - Ø7 | *0.28*	-	●	-	-	1
2	**LOCKCFLOOR135**	1200	135	22	*47 1/4*	*5 5/16*	*0.87*	32 - Ø7 | *0.28*	8 - Ø10 | *0.40*	●	●	●	1

Screws and anchors not included in the package.
(1) Number of screws and anchors for connector pairs.
(2) Number of connector pairs.

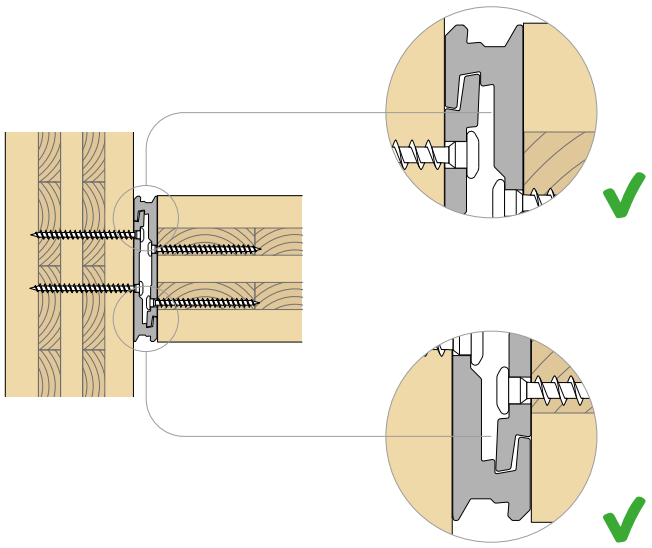
FASTENERS

type	description		d [mm]	support	page
LBS	round head screw		7		571
LBS EVO	C4 EVO round head screw		7		571
LBS HARDWOOD EVO	C4 EVO round head screw on hardwoods		7		572
SKS	screw-in anchor		10		528

INSTALLATION METHODS

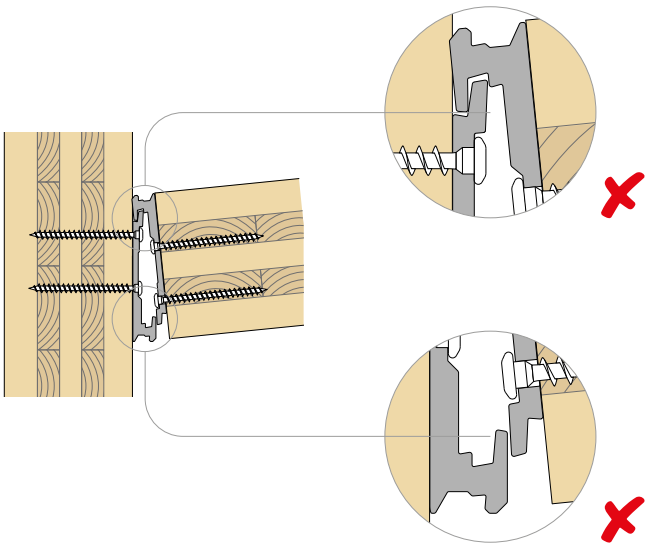
CORRECT INSTALLATION

Install the panel by lowering it from the top, without tilting. Ensure proper seating and coupling of the connector at both the top and bottom, as shown in the figure.



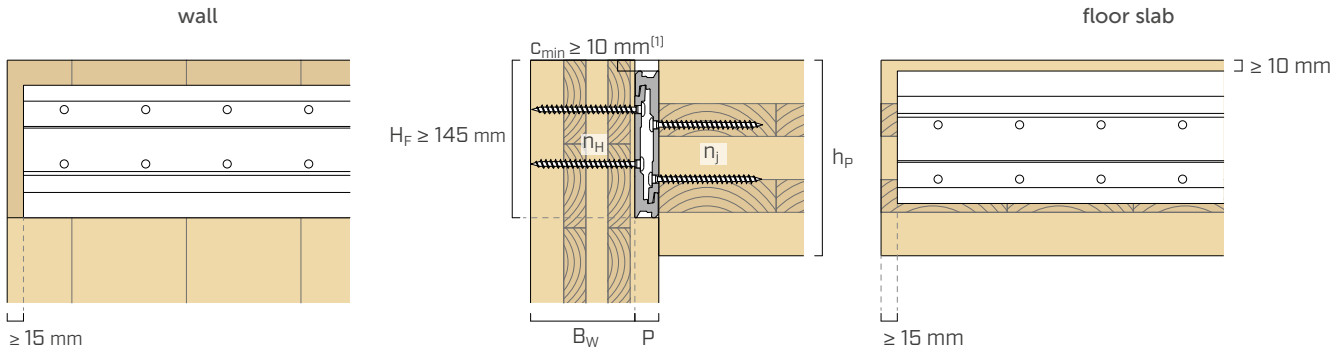
INCORRECT INSTALLATION

Partial and incorrect coupling of the connector. Ensure that both flanges of the connector are properly seated in their respective seats.

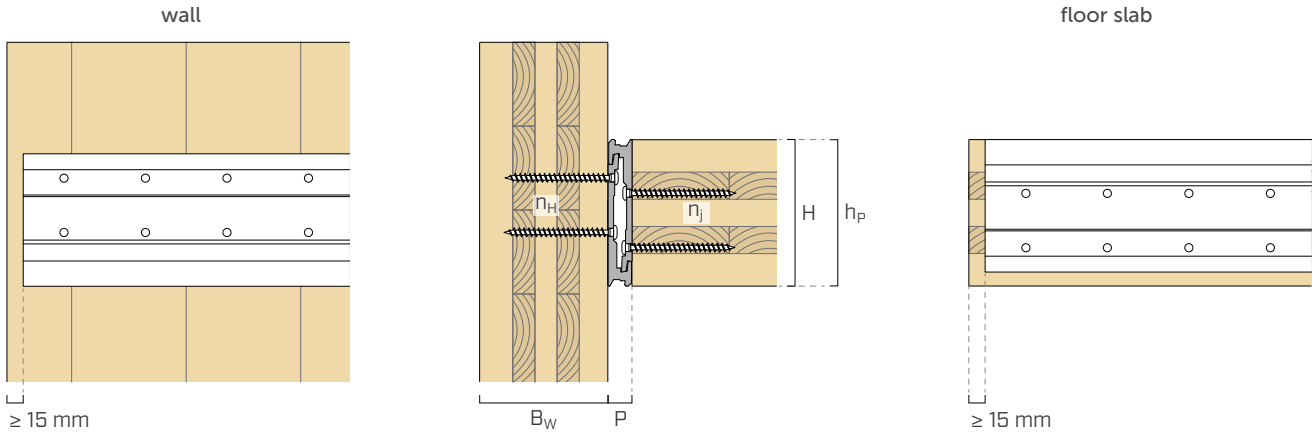


INSTALLATION | LOCK T FLOOR

CONCEALED INSTALLATION



VISIBLE INSTALLATION

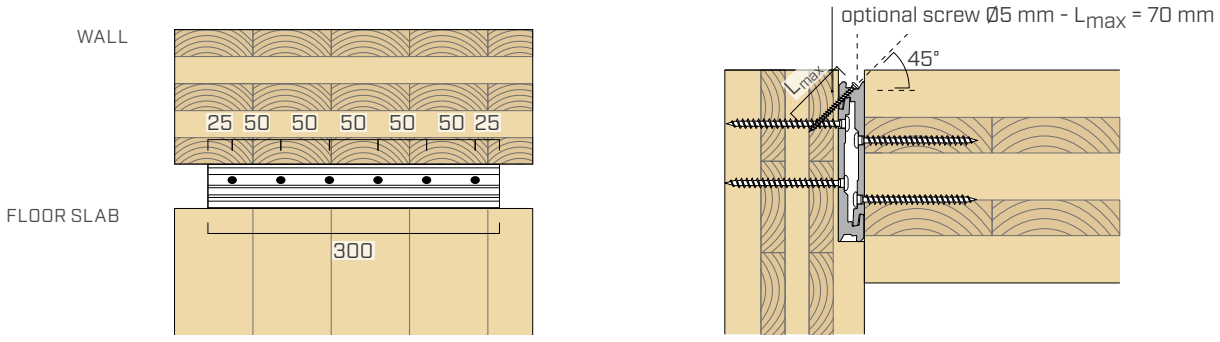


connector	B x H [mm]	no. of modules[2]	fasteners LBS screws $n_H + n_j$ - Ø x L [mm]	CLT wall B_w [mm]	CLT floor h_p [mm]
LOCKTFLOOR135	300 x 135	1	8 + 8 - Ø7 x 80	80	135[1]
	600 x 135	2	16 + 16 - Ø7 x 80		
	900 x 135	3	24 + 24 - Ø7 x 80		
	1200 x 135	4	32 + 32 - Ø7 x 80		

[1] Alignment between the top of floor and top of wall can be achieved by lowering the connector $c_{min} \geq 10$ mm from the top of the CLT floor. This ensures the minimum distance requirements for screws in the wall are met, with respect to the upper end of the wall. In this case, the minimum thickness of the h_p floor is 145 mm.
[2] The 1200 mm long connector can be cut into 300 mm standard length modules.

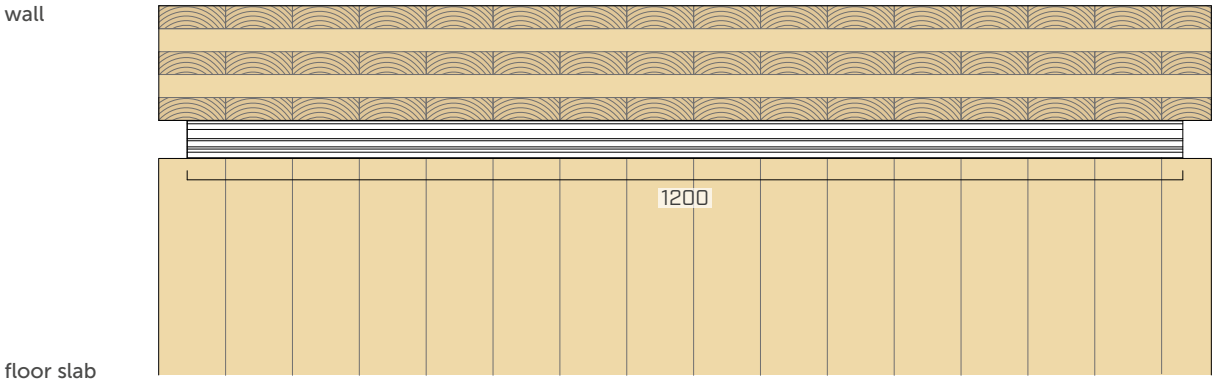
OPTIONAL INCLINED SCREW

45° inclined holes must be drilled on site using a 5 mm diameter and metal drill bit. The image shows the location of optional inclined holes for a 300 mm wide module.

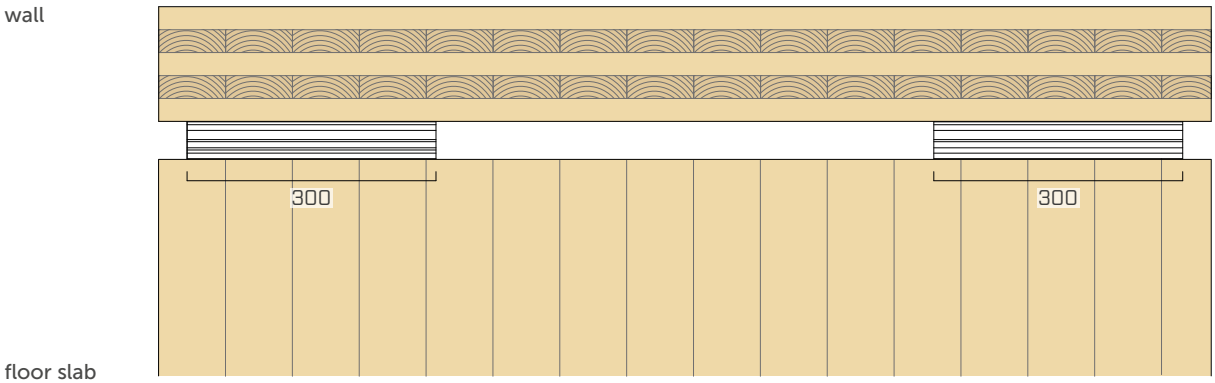


FASTENING PATTERNS

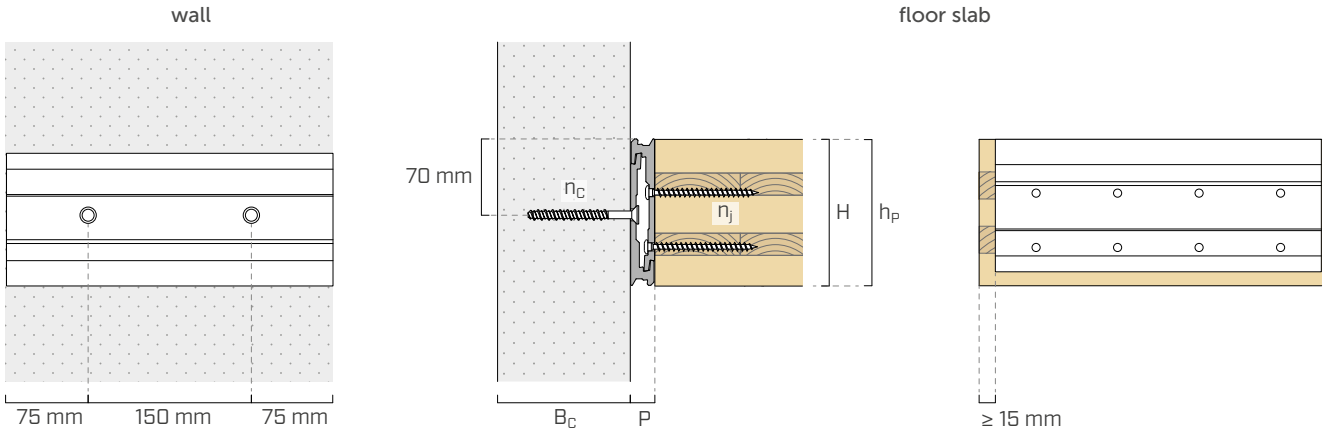
CONTINUOUS INSTALLATION



DISCONTINUOUS INSTALLATION



INSTALLATION | LOCK C FLOOR



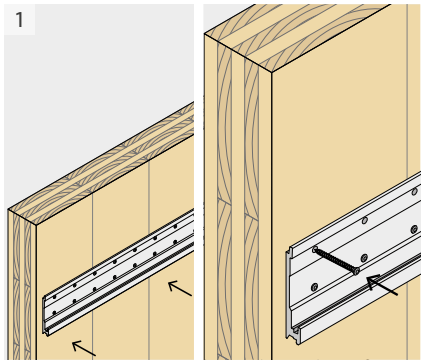
connector	B x H [mm]	no. of modules(1)	fasteners SKS anchors n_c - Ø x L [mm]	concrete wall B_c [mm]	fasteners LBS screws n_j - Ø x L [mm]	CLT floor h_p [mm]
LOCKCFLOOR135	300 x 135	1	2 - Ø10 x 100	120	8 - Ø7 x 80	135
	600 x 135	2	4 - Ø10 x 100		16 - Ø7 x 80	
	900 x 135	3	6 - Ø10 x 100		24 - Ø7 x 80	
	1200 x 135	4	8 - Ø10 x 100		32 - Ø7 x 80	

(1) The 1200 mm long connector can be cut into 300 mm standard length modules.

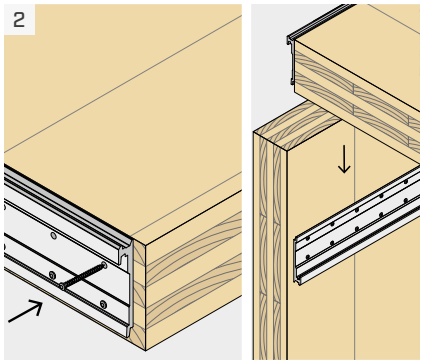
MOUNTING

VIDEO

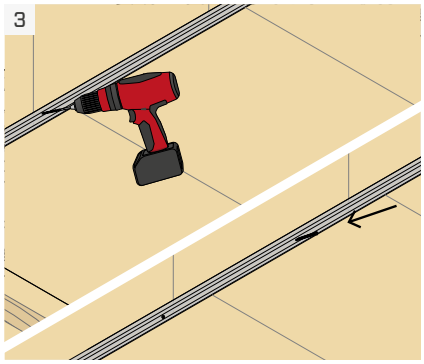
LOCK T FLOOR - VISIBLE INSTALLATION



Place the connector on the wall and fasten all screws.

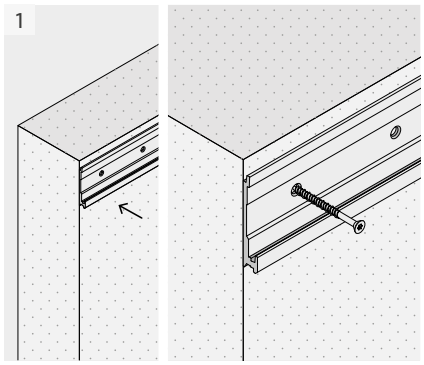


Place the connector on the floor and install all screws.
Engage the floor from the top to the bottom. Make sure that the two LOCK FLOOR connectors are parallel to each other and avoid subjecting them to excessive strain during installation.

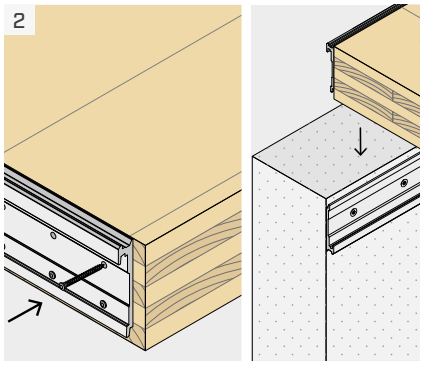


It is possible to install screws for uplift, and lateral shear transfer, F_{up} and F_{up} by drilling Ø5 inclined holes at 45° in the upper part of the connector.
A Ø5 screw must be installed in the hole.

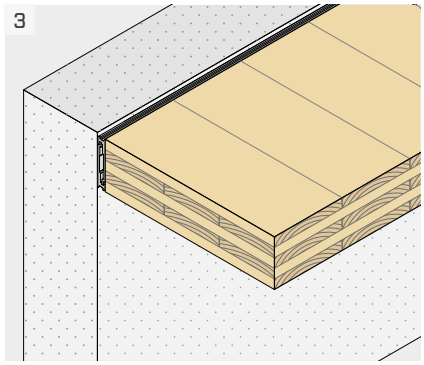
LOCK C FLOOR - VISIBLE INSTALLATION



Place the connector on concrete and fasten the anchors according to the installation instructions.

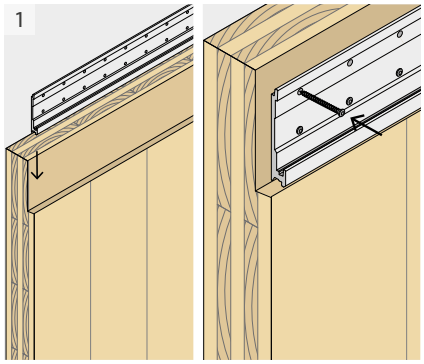


Place the connector on the floor and install all screws.
Engage the floor from the top to the bottom.

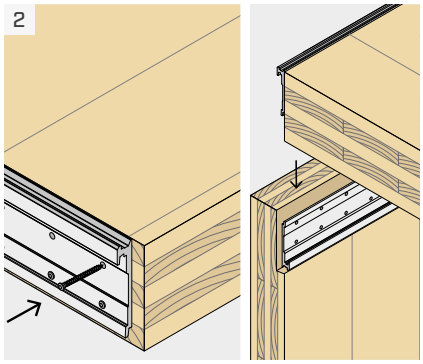


Make sure that the two LOCK FLOOR connectors are parallel to each other and avoid subjecting them to excessive strain during installation.

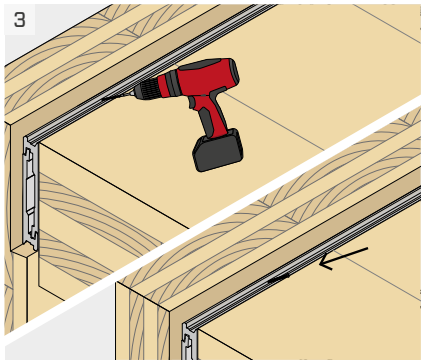
LOCK T FLOOR - CONCEALED INSTALLATION



Cut the routing on the main element. Place the connector on the wall and fasten all screws.



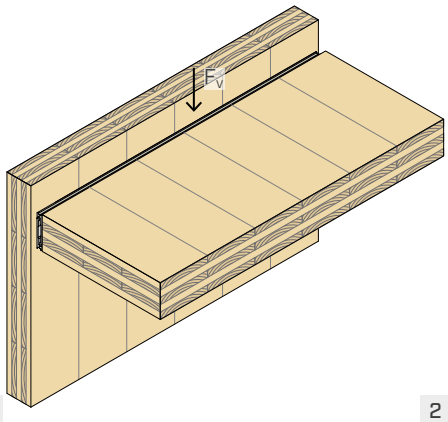
Place the connector on the floor and install all screws.
Engage the floor from the top to the bottom. Make sure that the two LOCK FLOOR connectors are parallel to each other and avoid subjecting them to excessive strain during installation.



It is possible to install screws for uplift, and lateral shear transfer, F_{up} and F_{up} by drilling Ø5 inclined holes at 45° in the upper part of the connector.
A Ø5 screw must be installed in the hole.

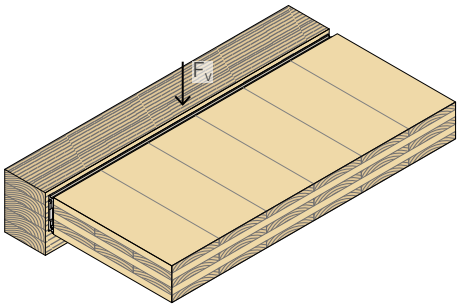
STRUCTURAL VALUES | TIMBER-TO-TIMBER | F_V

CLT wall | CLT floor



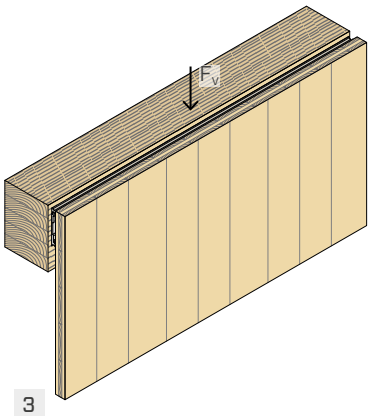
1

beam | CLT floor



2

beam | CLT façade

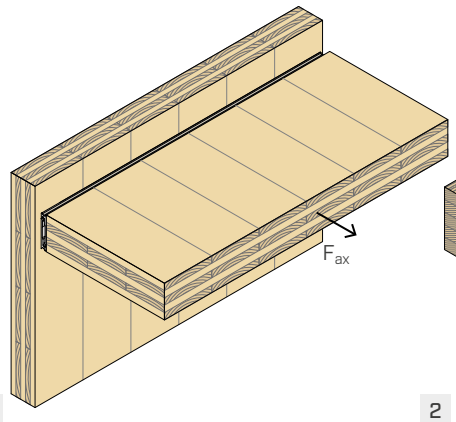


3

connector	B x H [mm]	no. of modules[1]	fasteners LBS screw $n_H + n_j$ - Ø x L [mm]	$R_{v,k\ timber}$ 1 [kN]	2 [kN]	3 [kN]
LOCKTFLOOR135	300 x 135	1	8+8 - Ø7x80	**21,4**	**21,4**	**28,5**
	600 x 135	2	16+16 - Ø7x80	**42,7**	**42,7**	**57,0**
	900 x 135	3	24+24 - Ø7x80	**64,1**	**64,1**	**85,6**
	1200 x 135	4	32+32 - Ø7x80	**85,5**	**85,5**	**114,1**

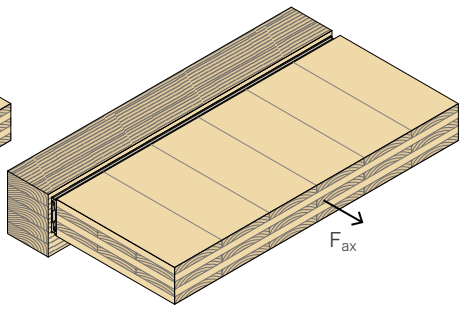
STRUCTURAL VALUES | TIMBER-TO-TIMBER | F_{ax}

CLT wall | CLT floor



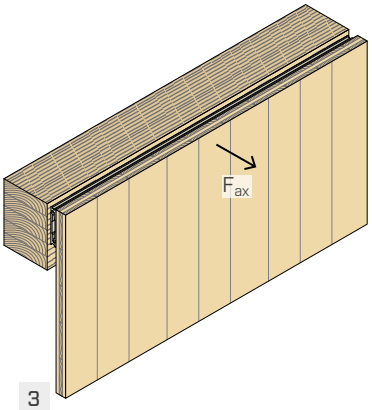
1

beam | CLT floor



2

beam | CLT façade



3

connector	B x H [mm]	no. of modules[1]	fasteners LBS screw $n_H + n_j$ - Ø x L [mm]	$R_{ax,k\ timber}$ 1 [kN]	2 [kN]	3 [kN]	$R_{ax,k\ alu}$ [kN]
LOCKTFLOOR135	300 x 135	1	8+8 - Ø7x80	**28,5**	**28,5**	**37,9**	**32,3**
	600 x 135	2	16+16 - Ø7x80	**57,1**	**57,1**	**75,8**	**64,6**
	900 x 135	3	24+24 - Ø7x80	**85,6**	**85,6**	**113,6**	**96,9**
	1200 x 135	4	32+32 - Ø7x80	**114,1**	**114,1**	**151,5**	**129,2**

NOTES

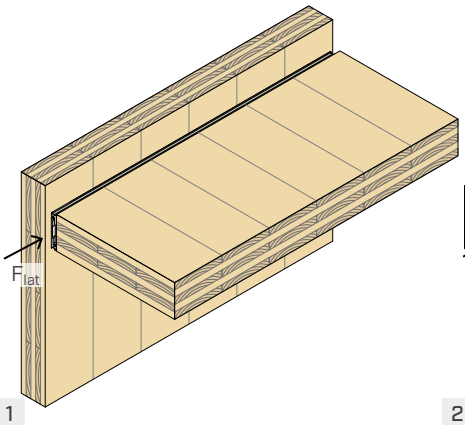
[1] The 1200 mm long connector can be cut into 300 mm standard length modules.

GENERAL PRINCIPLES

For the GENERAL PRINCIPLES of calculation, see page 59.

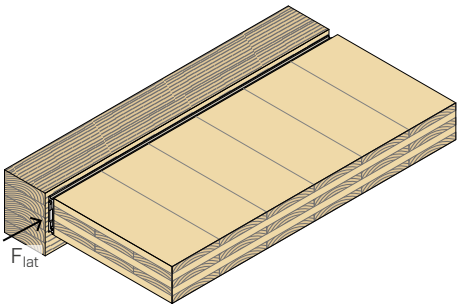
STRUCTURAL VALUES | TIMBER-TO-TIMBER | F_{lat}

CLT wall | CLT floor



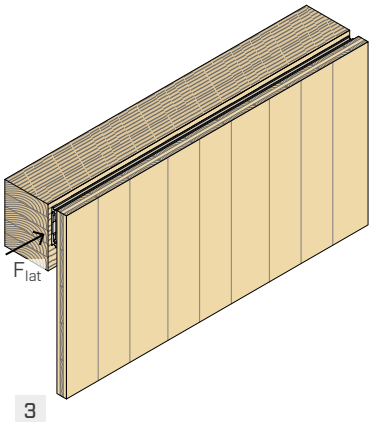
1

beam | CLT floor



2

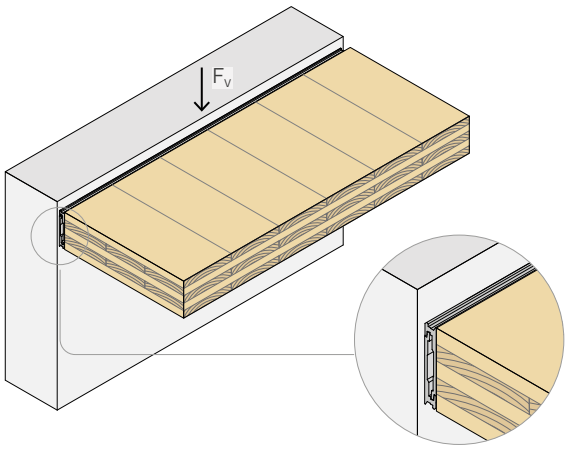
beam | CLT façade



3

connector	B x H [mm]	no. of modules[1]	fasteners LBS screws $n_H + n_j$ - Ø x L [mm]	fasteners LBS 45° screw n - Ø x L [mm]	$R_{lat,k\ timber}$ 1 [kN]	2 [kN]	3 [kN]
LOCKTFLOOR135	300 x 135	1	8+8 - Ø7x80	6 - Ø5x70	**8,7**	**8,7**	**11,6**
	600 x 135	2	16+16 - Ø7x80	12 - Ø5x70	**24,6**	**21,4**	**21,4**
	900 x 135	3	24+24 - Ø7x80	18 - Ø5x70	**36,9**	**30,2**	**30,2**
	1200 x 135	4	32+32 - Ø7x80	24 - Ø5x70	**49,3**	**38,5**	**38,5**

STRUCTURAL VALUES | TIMBER-TO-CONCRETE | F_v



connector	B x H [mm]	no. of modules[1]	fasteners LBS screws n_j - Ø x L [mm]	$R_{v,k\ timber}$ [kN]	fasteners SKS anchors n_c - Ø x L [mm]	$R_{v,d\ concrete}$ [kN]
LOCKCFLOOR135	300 x 135	1	8+8 - Ø7x80	**21,4**	2 - Ø10x100	**20,0**
	600 x 135	2	16+16 - Ø7x80	**42,7**	4 - Ø10x100	**40,1**
	900 x 135	3	24+24 - Ø7x80	**64,1**	6 - Ø10x100	**60,2**
	1200 x 135	4	32+32 - Ø7x80	**85,5**	8 - Ø10x100	**80,3**

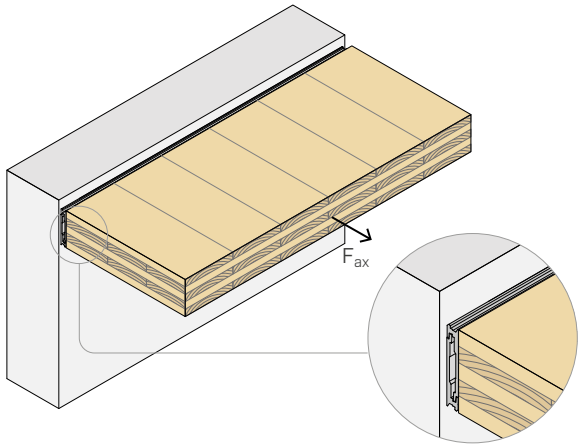
NOTES

[1] The 1200 mm long connector can be cut into 300 mm standard length modules.

GENERAL PRINCIPLES

For the GENERAL PRINCIPLES of calculation, see page 59.

STRUCTURAL VALUES | TIMBER-TO-CONCRETE | F_{ax}



connector	B x H [mm]	no. ofmodules(1)	fasteners LBS screws n_j - Ø x L [mm]	$R_{ax,k\ timber}$ [kN]	fasteners SKS anchors n_c - Ø x L [mm]	$R_{ax,d\ concrete}$	$R_{ax,k\ alu}$ [kN]
LOCKCFLOOR135	300 x 135	1	8+8 - Ø7x80	**28,5**	2 - Ø10x100	**20,1**	**25,3**
	600 x 135	2	16+16 - Ø7x80	**57,1**	4 - Ø10x100	**39,2**	**50,6**
	900 x 135	3	24+24 - Ø7x80	**85,6**	6 - Ø10x100	**58,3**	**75,9**
	1200 x 135	4	32+32 - Ø7x80	**114,1**	8 - Ø10x100	**77,3**	**101,2**

NOTES

(1) The 1200 mm long connector can be cut into 300 mm standard length modules.

GENERAL PRINCIPLES

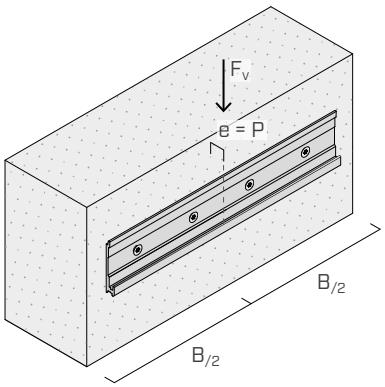
For the GENERAL PRINCIPLES of calculation, see page 59.

DESIGN OF ALTERNATE FASTENERS AND ANCHORS

For fastening with anchors other than those indicated in the table, the calculation on concrete may be performed with reference to the ETA of the chosen anchor and the diagrams below.

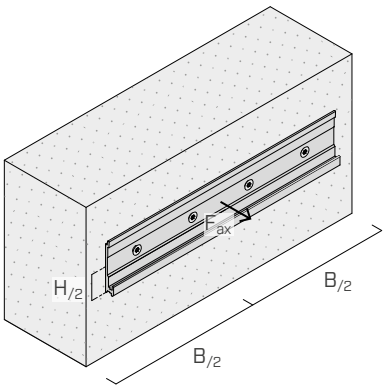
In the same way, the calculation of fasteners on steel can be carried out in accordance with national design standards for steel structures, following the diagrams below.

The fastener group shall be designed for shear force and eccentric moment equal to:



$V_d = F_{v,d}$

$M_d = e \cdot F_{v,d}$



$V_{ax,d} = F_{ax,d}$

where:
e = 22 mm for LOCKTFLOOR135
H = 135 mm hight of LOCK FLOOR connector
B width of the LOCK FLOOR connector

GENERAL PRINCIPLES

- Dimensioning and verification of concrete and timber elements must be carried out separately. In particular, it is recommended to perform a splitting check for loads perpendicular to the grain of timber elements.
- The connector must always be fully fastened using all the holes.
- Fastening with partial nailing. Screws with the same length must be used for each connector half.
- Pre-drilling holes are not required for screws on secondary beam, with density $\rho_k \leq 420$ kg/m^3.
- In the calculation phase, a strength class of C25/30 concrete with thin reinforcement was considered, in the absence of spacing and distances from the edge and minimum thickness indicated in the installation tables. The strength values are valid for the calculation hypothesis defined in the table; for boundary conditions different from those in the table (e.g. minimum distances from the edge or different concrete thickness), the concrete strength must be calculated separately (see the DESIGN OF ALTERNATE FASTENERS AND ANCHORS section).
- The coefficients k_{mod} and γ_M should be taken according to the current regulations used for the calculation.
- The following verification shall be satisfied for combined loading:

$$\left(\frac{F_{ax,d}}{R_{ax,d}}\right)^2 + \left(\frac{F_{v,d}}{R_{v,d}}\right)^2 + \left(\frac{F_{lat,d}}{R_{lat,d}}\right)^2 \leq 1$$

STRUCTURAL VALUES | F_{lat}

- Values calculated according to EN 1995:2014 and ETA-19/0831 for screws without pre-drilling hole. ρ_k = 350 kg/m^3 for CLT and ρ_k = 385 kg/m^3 for GL24h have been considered for calculations.
- Design values can be obtained from characteristic values as follows:

$$R_{lat,d} = \frac{R_{lat,k\ timber} \cdot k_{mod}}{\gamma_M}$$

STRUCTURAL VALUES | F_V | F_{ax}

- Values calculated according to EN 1995:2014 and ETA-19/0831 for screws without pre-drilling hole. ρ_k = 350 kg/m^3 for CLT and ρ_k = 385 kg/m^3 for GL24h have been considered for calculations.
- Design values of concrete anchors are in accordance with ETA-24/0024.
- Design values can be obtained from characteristic values as follows:

TIMBER-TO-TIMBER

$$R_{v,d} = \frac{R_{v,k\ timber} \cdot k_{mod}}{\gamma_M}$$

$$F_{ax,d} = min \begin{cases} \dfrac{R_{ax,k\ timber} \cdot k_{mod}}{\gamma_M} \\ \dfrac{R_{ax,k\ alu}}{\gamma_{M2}} \end{cases}$$

TIMBER-TO-CONCRETE

$$R_{v,d} = min \begin{cases} \dfrac{R_{v,k\ timber} \cdot k_{mod}}{\gamma_M} \\ R_{v,d\ concrete} \end{cases}$$

$$R_{ax,d} = min \begin{cases} R_{ax,d\ timber} = \dfrac{R_{ax,k\ timber} \cdot k_{mod}}{\gamma_M} \\ R_{ax,d\ alu} = \dfrac{R_{ax,k\ alu}}{\gamma_{M2}} \\ R_{ax,d\ concrete} \end{cases}$$

where:

- γ_{M2} is the partial safety coefficient of the aluminium material subject to tensile stress, to be taken according to the national standards used for calculation. If there are no other provisions, it is suggested to use the value provided by EN 1999-1-1, equal to γ_{M2} = 1.25.

CONNECTION STIFFNESS | F_V

- Connection stiffness can be calculated according to ETA-19/0831, with the following equation:

$$K_{v,ser} = \frac{n \cdot \rho_m^{1,5} \cdot d^{0,8}}{30} \ N/mm$$

where:

- d is the nominal diameter of the screw in the secondary beam, in mm;
- ρ_m is the average density of the secondary beam, in kg/m^3;
- n is the number of screws in the secondary beam.

INTELLECTUAL PROPERTY

- A LOCKTFLOOR model is protected by the Registered Community Design RCD 008254353-0011.