LBB

PERFORATED STRAP

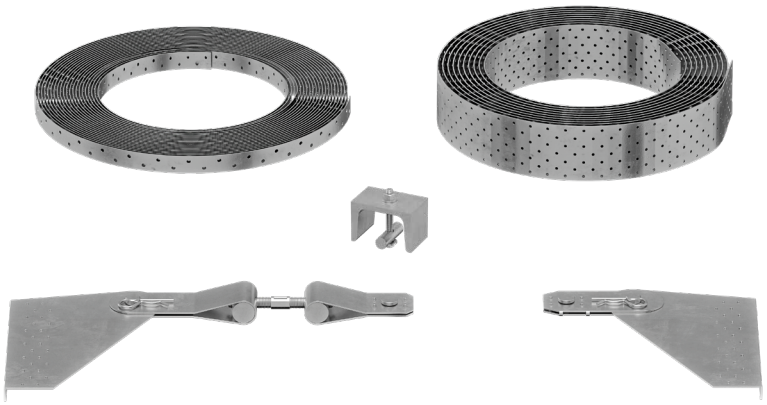
CE
EN 14545

REDUCED WEIGHT
Reduced thicknesses and optimised lengths reduce weight by 20% to 50%, making on-site handling easier.

OPTIMISED STRENGTH
Thanks to the new S450GD steel, the thickness is reduced without compromising strength. The 3 mm version achieves a 55% increase in strength.

TENSIONING
It can be tensioned and anchored at the ends with CLIPFIX60, or tensioned using the CLIPTIE40 tensioner. Alternatively, a GEKO or SKORPIO panel puller can be used together with the CLAMP1 accessory.

SLIM VERSION
New 25 mm wide version for small applications, also suitable for timber elements of reduced thickness (38 mm).



SERVICE CLASS

SC1 SC2

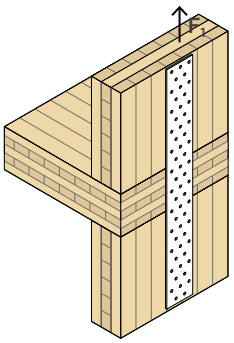
MATERIAL

S450 Z275 S450GD + Z275 carbon steel

THICKNESS [mm]

1,2 mm | 3,0 mm

EXTERNAL LOADS



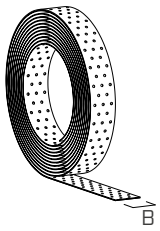
FIELD OF USE
Simple system for tensile joints subject to medium to low stresses.
Suitable for:
- solid timber and glulam
- timber frame
- CLT and LVL panels

WALL BRACING
The new CLIPTIE40 tensioner allows quick and easy tensioning, also when used as bracing for timber frame walls.

CODES AND DIMENSIONS

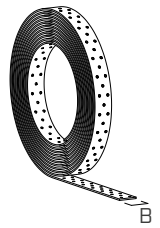
LBB 1,2 mm

CODE	B [mm]	L [m]	s [mm]	*B [in]*	*H [in]*	*s [in]*	n Ø5 *n Ø.0.20* [pcs]	n Ø6,5 *n Ø.0.26* [pcs]		pcs
LBB1225	25	50	1,2	*1*	*1 15/16*	*0.047*	50/m	1/m	●	1
LBB1240	40	50	1,2	*1 9/16*	*1 15/16*	*0.047*	76/m	1/m	●	1
LBB1260	60	50	1,2	*2 3/8*	*1 15/16*	*0.047*	126/m	1/m	●	1
LBB1280	80	25	1,2	*3 1/8*	*1*	*0.047*	176/m	1/m	●	1



LBB 3,0 mm

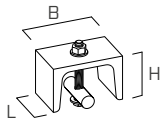
CODE	B [mm]	L [m]	s [mm]	*B [in]*	*H [in]*	*s [in]*	n Ø5 *n Ø.0.20* [pcs]	n Ø6,5 *n Ø.0.26* [pcs]		pcs
LBB3040	40	25	3	*1 9/16*	*1*	*0.118*	76/m	1/m	●	1



TENSIONERS

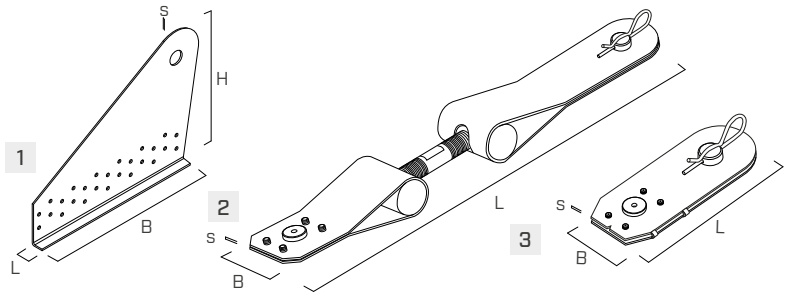
CODE	LBB type	LBB width	pcs
CLIPTIE40	LBB1225 | LBB1240	B = 25 mm | 40 mm	1
CLIPFIX60	LBB1240 | LBB1260	B = 40 mm | 60 mm	1

CLIPTIE40



CODE	B [mm]	H [mm]	L [mm]
CLIPTIE40	65	42	40

CLIPFIX60



SET COMPRISED OF:		B [mm]	H [mm]	L [mm]	s [mm]	n Ø5 [pcs]	pcs
1	End plate	289	198	15	2	26	4[(1)]
2	Tensioner	60	-	300-350	2	5	2
3	End element	60	-	157	2	5	2

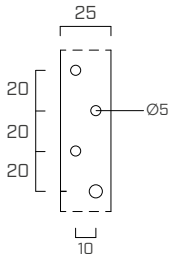
[(1)]The set includes two right-hand and two left-hand end plates.

SIMPLIFIED TENSIONING

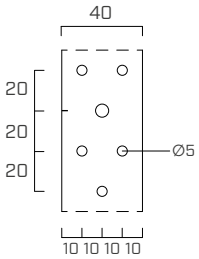
Using a GEKO or SKORPIO panel puller and the CLAMP1 accessory, the perforated steel strap can be tensioned without the need for additional components.

GEOMETRY

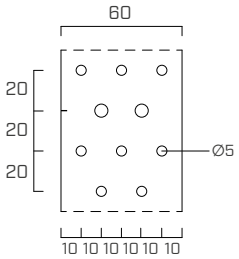
LBB1225



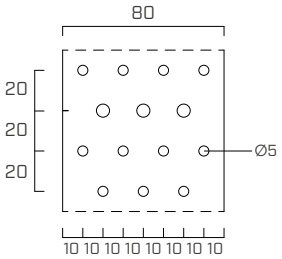
LBB1240
LBB3040



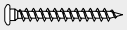
LBB1260



LBB1280



FASTENERS

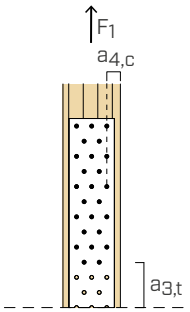
type	description		d [mm]	support
LBA	high bond nail		4	
LBS	round head screw		5	

INSTALLATION

MINIMUM DISTANCES

TIMBER			nails LBA Ø4	screws LBS Ø5
C/GL	$a_{4,c}$	[mm]	≥ 20	≥ 25
	$a_{3,t}$	[mm]	≥ 60	≥ 75

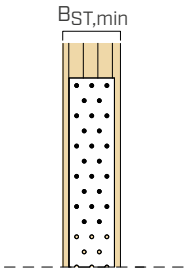
C/GL: minimum distances for solid timber or glulam consistent with EN 1995:2014 considering a timber density $\rho_k \leq 420$ kg/m^3.



STUD MINIMUM DIMENSION

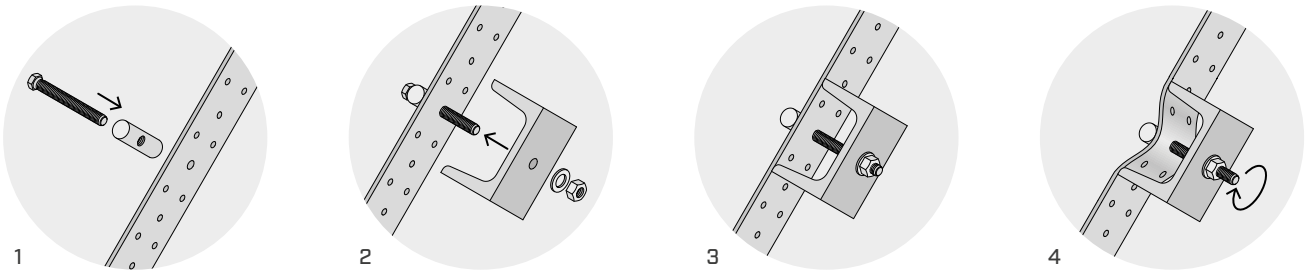
CODE	$B_{ST, min}$ LBA [mm]	$B_{ST, min}$ LBS [mm]
LBB1225	38(*)	38(*)
LBB1240	45(*)	45(*)
LBB1260	80	90
LBB1280	100	110
LBB3040	45(*)	45(*)

(*)Minimum distance values on solid timber and glulam waived based on Rothoblaas experience

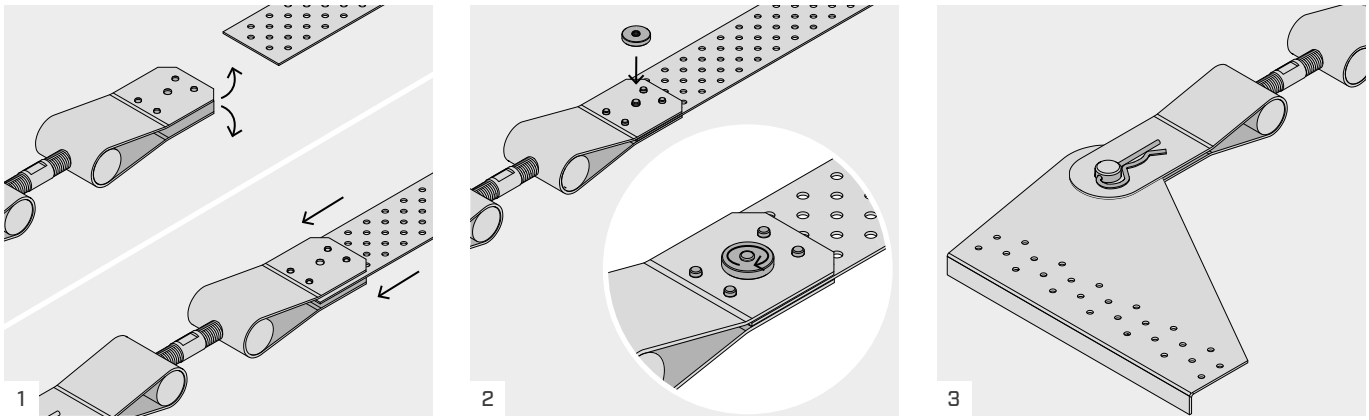


ASSEMBLY

CLIPTIE40



CLIPFIX60 | TENSIONER

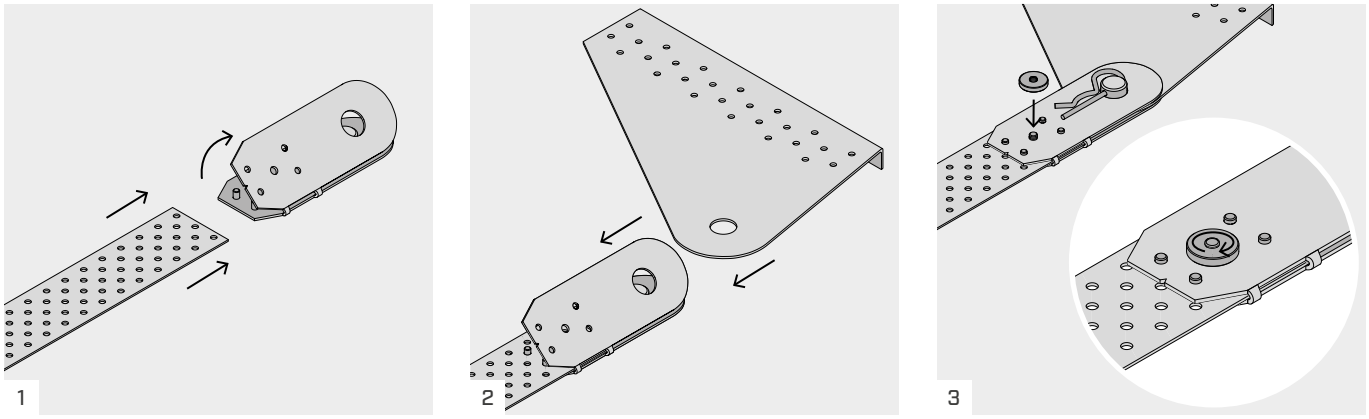


Open the tensioner and insert the perforated steel strap.

Tighten with a knurled nut.

Hook the end plate.

CLIPFIX60 | END ELEMENT

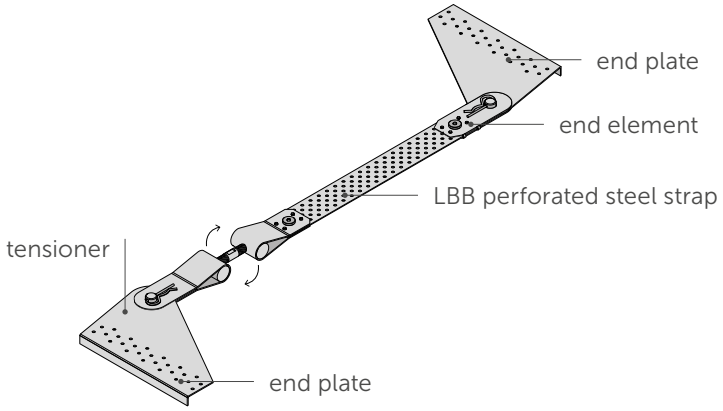


Open the end element and insert the perforated steel strap.

Hook the end plate.

Tighten with a knurled nut.

ADJUSTING THE SYSTEM

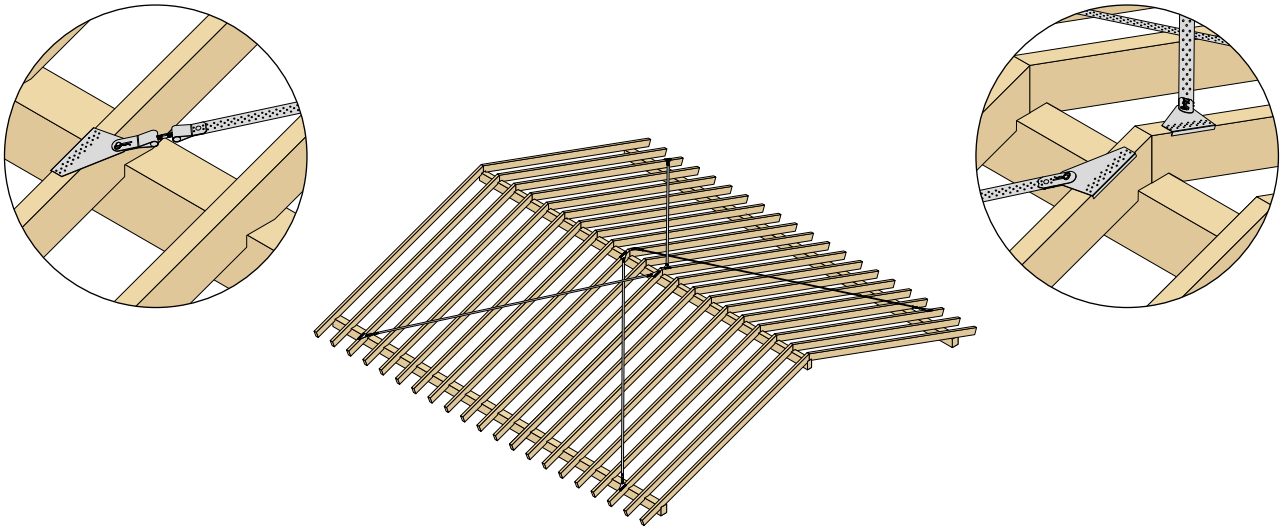


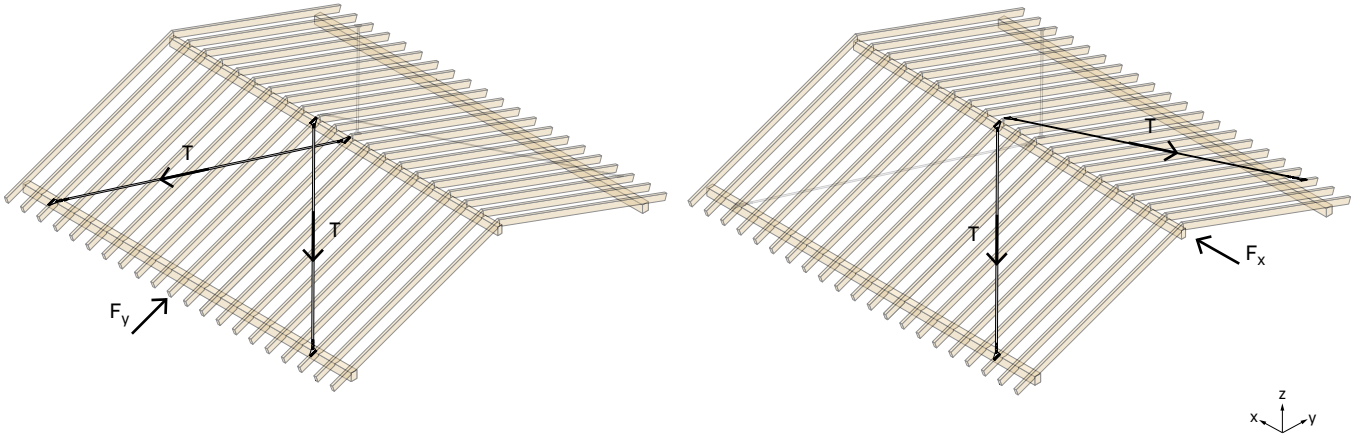
Use the tensioner to regulate the length of the bracing system.

APPLICATION | ROOF BRACING

CLIPFIX60

To stabilise the roof against wind and seismic actions, LBB perforated steel straps can be installed crosswise. As they work only in tension, they must be installed in pairs between the main members of the structural frame and secured at the ends with end plates. The straps must be tensioned using CLIPFIX60 to prevent displacement of the principal rafters under load. It is also important to correctly design the connection at the base of the principal rafters, avoiding tensile stresses perpendicular to the wood grain.

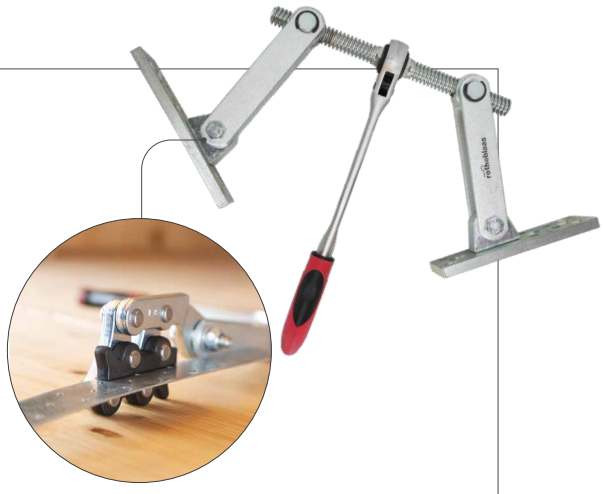




GEKO

PANEL PULLER

The perforated steel straps can also be tensioned using GEKO combined with the CLAMP1 accessory.

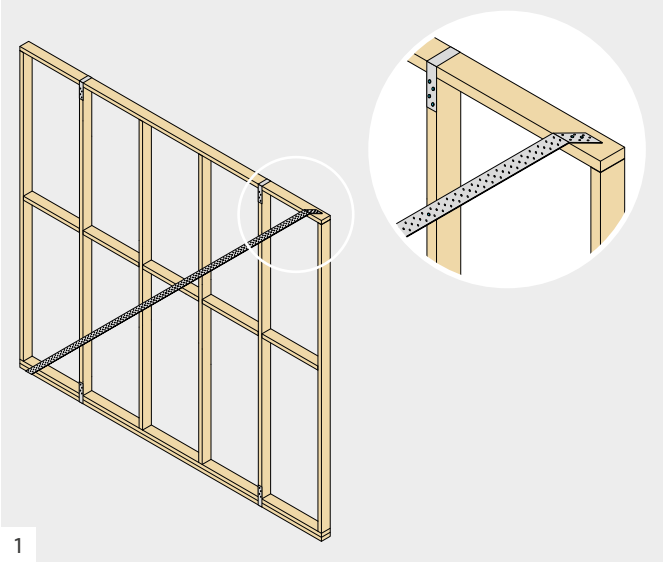


CODE	description	pcs
GEKO	panel puller	1

CODE	description	pcs
GEKOP	60 x 160 mm zinc plated spare plates	1
CLAMP1	ratchet for perforated strap	1

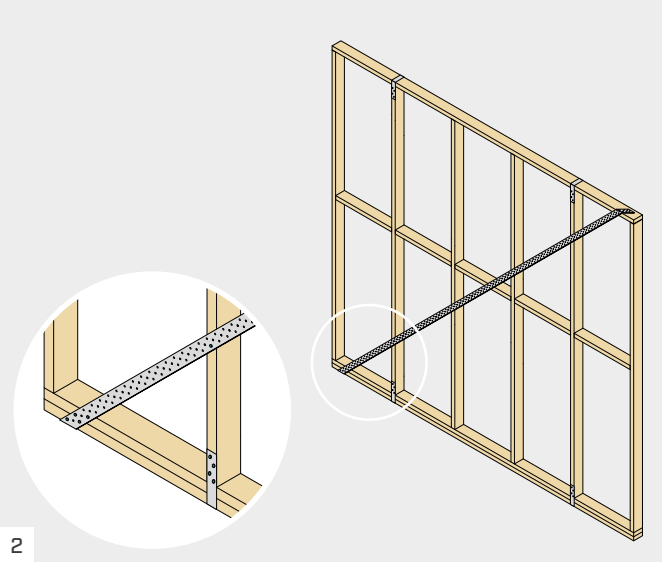
For further details, see the "**TOOLS FOR TIMBER CONSTRUCTION**" catalogue, available in the "Catalogues" section of the website www.rothoblaas.com.

CLIPTIE40



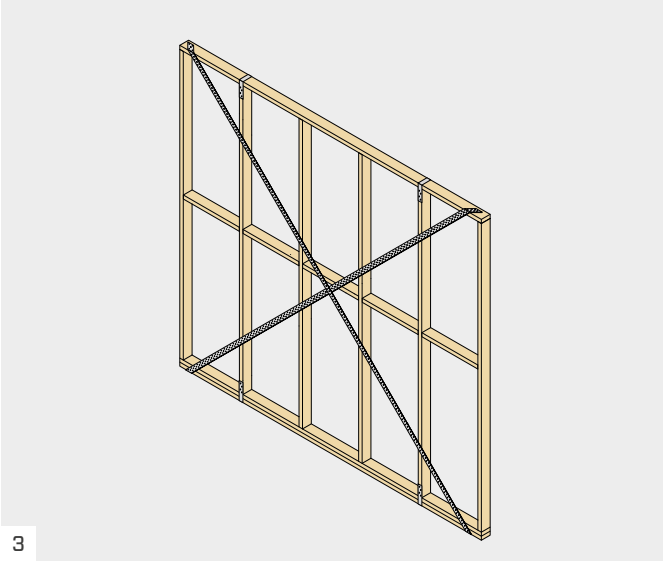
1

Position the strap at an inclination between 30° and 60° and secure it to the top rail.



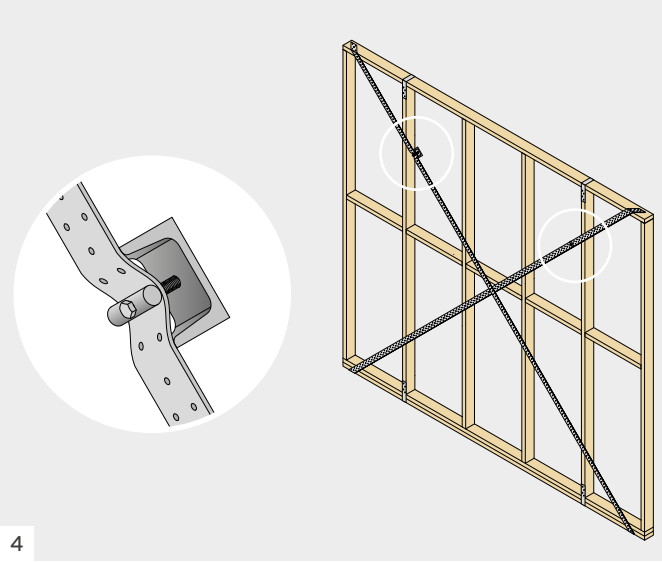
2

Secure the strap to the bottom rail.



3

Repeat the previous operations to secure the second strap.



4

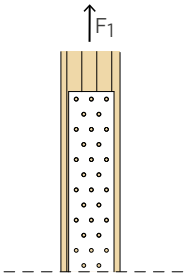
Apply CLIPTIE40 to each strap at the Ø6.5 holes (present every metre) and tension the straps evenly.

Tension should be gradually and evenly applied to both straps, in order to prevent deformation of the timber elements caused by excessive tension on one of the tensioners. Once tensioned, the strap should be secured to the intermediate studs.

STRUCTURAL VALUES | TIMBER-TO-TIMBER | F_1

STRENGTH OF THE SYSTEM

The tensile strength of the system $R_{1,d}$ is equal to the lesser of the tensile strength of the strap $R_{ax,d}$, and the shear resistance of the connectors used for fastening $n_{tot} \cdot R_{v,d}$.
If the connectors are placed in several consecutive rows and the load direction is parallel to the grain, the following sizing criteria must be applied:



$$R_{1,d} = min \begin{cases} R_{ax,d} \\ \sum m_i \cdot n_i^k \cdot R_{v,d} \end{cases} \qquad k = \begin{cases} 0{,}85 & LBA \quad Ø = 4 \\ 0{,}75 & LBS \quad Ø = 5 \end{cases}$$

where m_i is the number of rows of connectors parallel to the grain and n_i is the number of connectors arranged in the same row.

The table below shows the minimum number of fasteners to be applied at both ends of the strap to balance its tensile strength.

CODE	B	s	fastening holes Ø5			$R_{1,k\ timber}$	$R_{1,k\ steel}$	
			type	Ø x L	n_v			
	[mm]	[mm]		[mm]	[pcs]	[kN]	[kN]	γ_{steel}
LBB1225	25	1,2	LBA	Ø 4 x 60	5	**11,1**	**10,2**	γ_{M2}
			LBS	Ø 5 x 50	6	**10,3**		
LBB1240	40	1,2	LBA	Ø 4 x 60	8	**19,5**	**16,5**	γ_{M2}
			LBS	Ø 5 x 50	9	**17,3**		
LBB1260	60	1,2	LBA	Ø 4 x 60	10	**25,5**	**24,8**	γ_{M2}
			LBS	Ø 5 x 50	13	**25,5**		
LBB1280	80	1,2	LBA	Ø 4 x 60	13	**33,4**	**33,0**	γ_{M2}
			LBS	Ø 5 x 50	16	**32,1**		
LBB3040	40	3	LBA	Ø 4 x 60	20	**42,6**	**41,3**	γ_{M2}
			LBS	Ø 5 x 50	26	**42,3**		

When using the CLIPTIE40 tensioner, the resistance value $R_{1,k,steel}$ for the LBB1225 model must be limited to 7 kN.
For the LBB1240 model, the resistance value remains unchanged.

GENERAL PRINCIPLES

- Characteristic values according to EN 1995:2014 and EN 1993:2014.
- The plate design strength values can be obtained as follows:

$$R_{ax,d} = \frac{R_{ax,k}}{\gamma_{M2}}$$

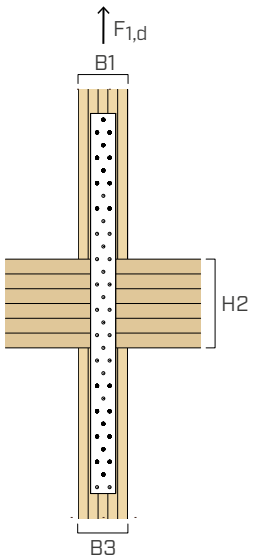
- The connectors design strength values can be obtained as follows:

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

The coefficients k_{mod}, γ_M and γ_{M2} should be taken according to the current regulations used for the calculation.

- For the calculation process a timber density ρ_k = 385 kg/m$_3$ has been considered.
- Dimensioning and verification of the timber elements must be carried out separately.
- It is recommended to place the connectors symmetrically with respect to the load direction.

CALCULATION EXAMPLE | DETERMINING RESISTANCE R1d



Project data		
Strength	$F_{1,d}$	12,0 kN
Service class		2
Load duration		short
Solid timber C24		
Element 1	**B1**	80 mm
Element 2	**H2**	140 mm
Element 3	**B3**	80 mm

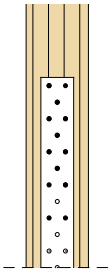
perforated strap LBB1240
B = 40 mm
s = 1,2 mm

Anker nail LBA440(1)
d_1 = 4,0 mm
L = 40 mm

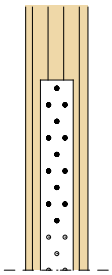
perforated plate LBV401200(2)
B = 40 mm
s = 2 mm
H = 600 mm

Anker nail LBA440(1)
d_1 = 4,0 mm
L = 40 mm

EVALUATION OF THE STRENGTH OF THE SYSTEM



perforated strap
LBB1240



perforated plate
LBV401200

TAPE/PLATE - TENSILE STRENGTH

perforated strap LBB1240			
$R_{ax,k}$	=	16,5	kN
γ_{M2}	=	1,25	
$R_{ax,d}$	**=**	**13,2**	**kN**

perforated plate LBV401200(2)			
$R_{ax,k}$	=	17,8	kN
γ_{M2}	=	1,25	
$R_{ax,d}$	**=**	**14,2**	**kN**

CONNECTOR - SHEAR STRENGTH

perforated strap LBB1240			
$R_{v,k}$	=	2,19	kN
n_{tot}	=	13	pcs
n_1	=	5	pcs
m_1	=	2	lines
n_2	=	3	pcs
m_2	=	1	lines
k_{LBA}	=	0,85	
k_{mod}	=	0,90	
γ_M	=	1,30	
$R_{v,d}$	=	1,52	kN
$\sum m_i \cdot n_i^k \cdot R_{v,d}$	**=**	**15,8**	**kN**

perforated plate LBV401200(2)			
$R_{v,k}$	=	2,17	kN
n_{tot}	=	13	pcs
n_1	=	4	pcs
m_1	=	2	lines
n_2	=	5	pcs
m_2	=	1	lines
k_{LBA}	=	0,85	
k_{mod}	=	0,90	
γ_M	=	1,30	
$R_{v,d}$	=	1,50	kN
$\sum m_i \cdot n_i^k \cdot R_{v,d}$	**=**	**15,7**	**kN**

STRENGTH OF THE SYSTEM

$$R_{1,d} = min \begin{cases} R_{ax,d} \\ \sum m_i \cdot n_i^k \cdot R_{v,d} \end{cases}$$

perforated strap LBB1240			
$R_{1,d}$	=	13,2	kN

perforated plate LBV401200(2)			
$R_{1,d}$	=	14,2	kN

VERIFICATION	$R_{1,d} \geq F_{1,d}$	13,2 kN	≥	12,0	kN ✓
		verification passed			

VERIFICATION	$R_{1,d} \geq F_{1,d}$	14,2	≥	12,0	kN ✓
		verification passed			

NOTES

(1) In the calculation example LBA Anker nails are used. The fastening can also be made with LBS screws.

(2) LBV401200 plate is considered cut to length 600 mm.

GENERAL PRINCIPLES

- To optimize the connection system, it is recommended to use a number of connectors which can provide a shear capacity that does not exceed the tensile strength of the tape/plate.
- It is recommended to place the connectors symmetrically with respect to the load direction.