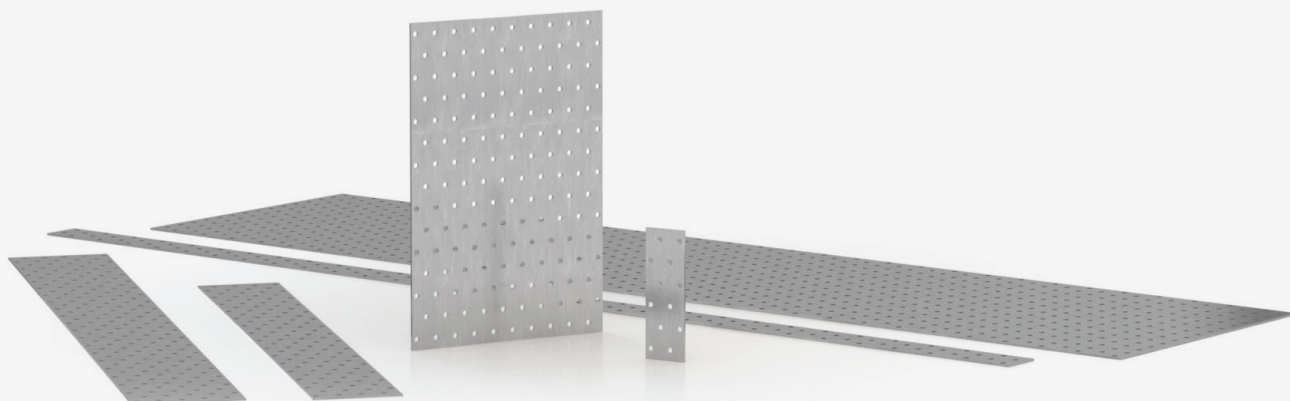


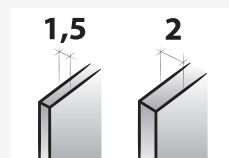
Perforated plates

Bright zinc plated carbon steel strap ties



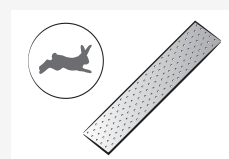
TWO THICKNESSES

Simple and effective system, commercialized in numerous versions 1,5 mm or 2,0 mm thick



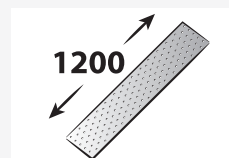
READY FOR USE

The formats respond to all the most common needs and minimize the installation time. Optimal cost/performance ratio.



1,2 m LENGTH

Product range of 1200 mm long plates, ideal for multistorey timber buildings or for the design in seismic or windy areas



CERTIFIED

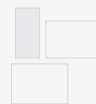
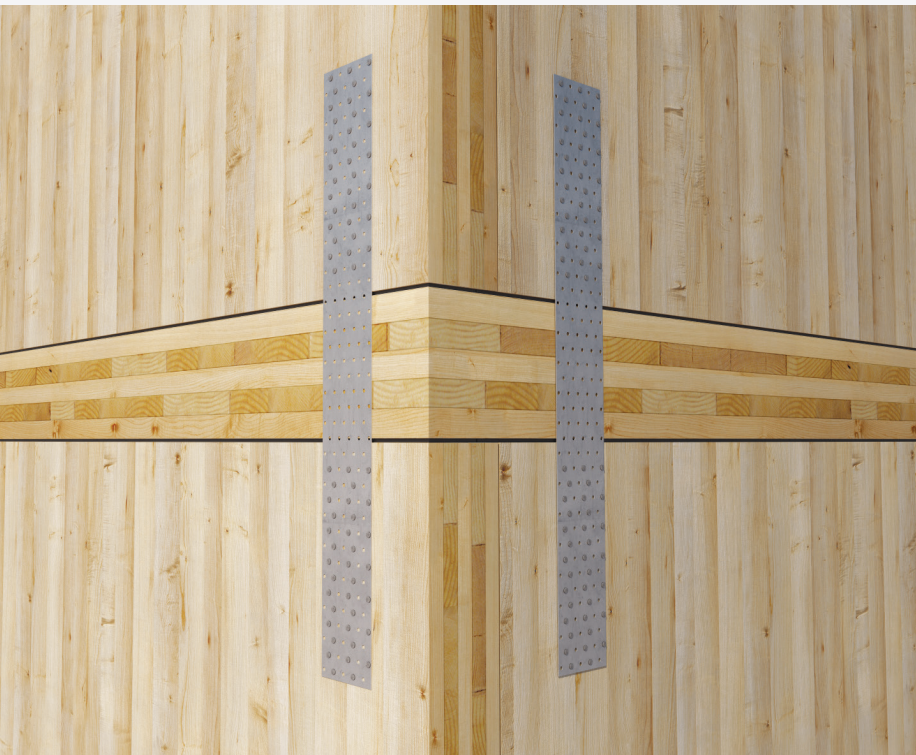
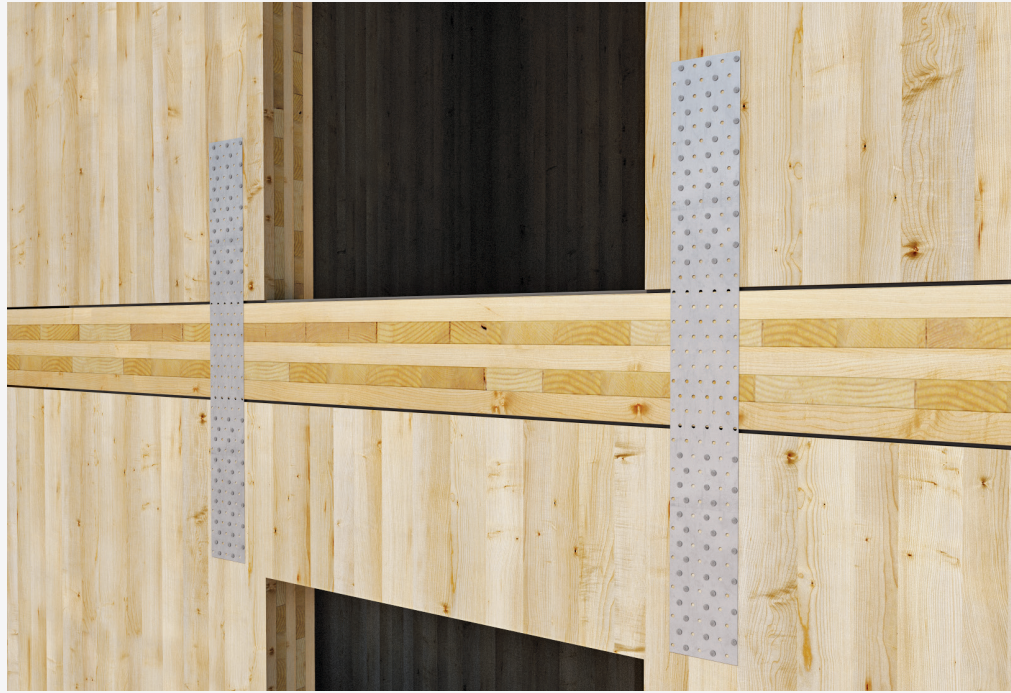
Ideal for structural joints requiring tensile strength. Geometry and material guaranteed by CE marking



FIELD OF USE

Timber-to-timber joints

- solid timber
- glulam timber
- XLAM (Cross Laminated Timber)
- LVL
- wood-based panels



WIDE PRODUCT RANGE

Available in several versions, designed to face any construction need, from simple beam/joint connections to the most important interstorey connections



TIMBER TO TIMBER

Ideal to solve particular situations requiring the transfer of tensile forces between timber elements such as beams, structural panels and claddings

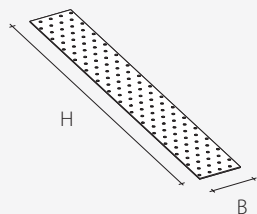


TENSION

Formats dimensioned for the most common timber joints and for all those applications requiring tensile capacity. 1200 mm long versions, ideal for structural joints

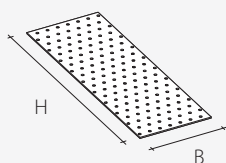
CODES AND DIMENSIONS

LBV 1,5 mm



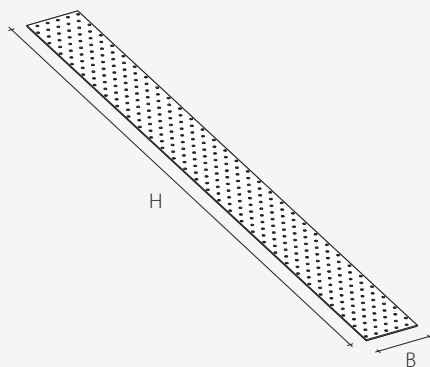
code	type	B [mm]	H [mm]	n Ø5 [pcs]	s [mm]		pcs/box
PF703100	LBV60600	60	600	90	1,5	•	10
PF703105	LBV60800	60	800	120	1,5	•	10
PF703110	LBV80600	80	600	120	1,5	•	10
PF703115	LBV80800	80	800	160	1,5	•	10
PF703120	LBV100800	100	800	200	1,5	•	10
PF703125	LBV1001000	100	1000	250	1,5	•	10

LBV 2,0 mm



code	type	B [mm]	H [mm]	n Ø5 [pcs]	s [mm]		pcs/box
PF703000	LBV40120	40	120	12	2	•	200
PF703005	LBV40160	40	160	16	2	•	50
PF703010	LBV60140	60	140	21	2	•	50
PF703015	LBV60200	60	200	30	2	•	100
PF703020	LBV60240	60	240	36	2	•	100
PF703025	LBV80200	80	200	40	2	•	50
PF703030	LBV80240	80	240	48	2	•	50
PF703035	LBV80300	80	300	60	2	•	50
PF703040	LBV100140	100	140	35	2	•	50
PF703045	LBV100200	100	200	50	2	•	50
PF703050	LBV100240	100	240	60	2	•	50
PF703055	LBV100300	100	300	75	2	•	50
PF703060	LBV100400	100	400	100	2	•	20
PF703065	LBV100500	100	500	125	2	•	20
PF703070	LBV120200	120	200	60	2	•	50
PF703075	LBV120240	120	240	72	2	•	50
PF703080	LBV120300	120	300	90	2	•	50
PF703085	LBV140400	140	400	140	2	•	15
PF703090	LBV160400	160	400	160	2	•	15
PF703095	LBV200300	200	300	150	2	•	15

LBV 2,0 mm x 1200 mm



code	type	B [mm]	H [mm]	n Ø5 [pcs]	s [mm]		pcs/box
PF704010	LBV401200	40	1200	120	2	•	20
PF704015	LBV601200	60	1200	180	2	•	20
PF704020	LBV801200	80	1200	240	2	•	20
PF704025	LBV1001200	100	1200	300	2	•	10
PF704030	LBV1201200	120	1200	360	2	•	10
PF704035	LBV1401200	140	1200	420	2	•	10
PF704040	LBV1601200	160	1200	480	2	•	10
PF704045	LBV1801200	180	1200	540	2	•	10
PF704050	LBV2001200	200	1200	600	2	•	5
PF704055	LBV2201200	220	1200	660	2	•	5
PF704060	LBV2401200	240	1200	720	2	•	5
PF704065	LBV2601200	260	1200	780	2	•	5
PF704070	LBV2801200	280	1200	840	2	•	5
PF704075	LBV3001200	300	1200	900	2	•	5
PF704080	LBV4001200	400	1200	1200	2	•	5

MATERIAL AND DURABILITY

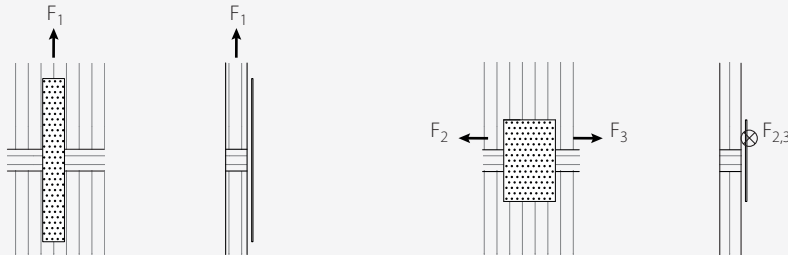
LBV: Z275 bright zinc plated S250GD carbon steel.
To be used in Service class 1 and 2 (EN 1995:2008).

FIELD OF USE

Timber to timber joints



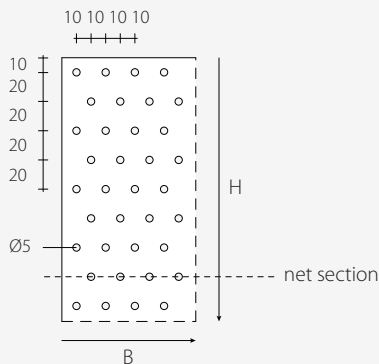
EXTERNAL LOADS



ADDITIONAL PRODUCTS - FASTENERS

type	description		d [mm]	support	p.
LBA	Anker nail		4		364
LBS	screw for plates		5		364

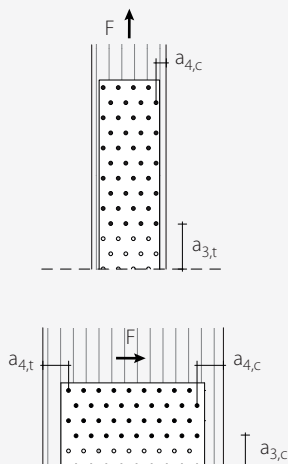
GEOMETRY



B [mm]	net area holes [pcs]	B [mm]	net area holes [pcs]	B [mm]	net area holes [pcs]
40	2	140	7	240	12
60	3	160	8	260	13
80	4	180	9	280	14
100	5	200	10	300	15
120	6	220	11	400	20

INSTALLATION

TIMBER - MINIMUM DISTANCES



Angle of load to grain $\alpha = 0^\circ$		anker nail LBA Ø4	screw LBS Ø5
Lateral fastener-Loaded edge	$a_{4,c}$ [mm]	≥ 20	≥ 25
Fastener-Loaded end	$a_{3,t}$ [mm]	≥ 60	≥ 75

Angle of load to grain $\alpha = 90^\circ$		anker nail LBA Ø4	screw LBS Ø5
Lateral fastener-Loaded edge	$a_{4,t}$ [mm]	≥ 28	≥ 50
Lateral fastener-Loaded edge	$a_{4,c}$ [mm]	≥ 20	≥ 25
Fastener-Loaded end	$a_{3,c}$ [mm]	≥ 40	≥ 50

STATIC VALUES - TENSILE JOINT - TIMBER-TO-TIMBER

STRENGTH OF THE SYSTEM

The tensile strength of the system $R_{1,d}$ is the minimum between the plate tensile strength $R_{ax,d}$ and the shear strength of the fasteners $n \cdot R_{v,d}$.

In case of connectors placed in rows, the correction coefficient m_{ef} shall be applied.

$$R_{1,d} = \min \left\{ \begin{array}{l} R_{ax,d} \\ n \cdot m_{ef} \cdot R_{v,d} \end{array} \right.$$

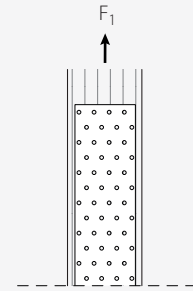


PLATE - TENSILE STRENGTH

				CHARACTERISTIC VALUES	ADMISSIBLE VALUES
TYPE	B [mm]	s [mm]	net area holes [pcs]	$R_{ax,k}$ [kN]	N_{amm} [kg]
LBV 1,5 mm	60	1,5	3	20,0	1023
	80	1,5	4	26,7	1364
	100	1,5	5	33,4	1705
LBV 2,0 mm	40	2,0	2	17,8	909
	60	2,0	3	26,7	1364
	80	2,0	4	35,6	1818
	100	2,0	5	44,6	2273
	120	2,0	6	53,5	2727
	140	2,0	7	62,4	3182
	160	2,0	8	71,3	3636
	180	2,0	9	80,2	4091
	200	2,0	10	89,1	4545
	220	2,0	11	98,0	5000
	240	2,0	12	106,9	5455
	260	2,0	13	115,8	5909
	280	2,0	14	124,7	6364
	300	2,0	15	133,7	6818
	400	2,0	20	178,2	9091

GENERAL PRINCIPLES

- Characteristic values according to EN 1993 and EN1995:2008.
- The plate design strength values can be obtained as follows:

$$R_{ax,d} = \frac{R_{ax,k}}{\gamma_{m2}}$$

The fasteners design strength values can be obtained as follows:

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

Coefficients γ_{m2} , γ_m and k_{mod} must be taken according to the current Standard adopted for the design.

- For calculations, a timber density $\rho_k = 380 \text{ kg/m}^3$ has been considered.
- Dimensioning and verification of timber elements must be carried out separately.
- The characteristic shear strengths are evaluated for nails/screws inserted

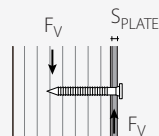
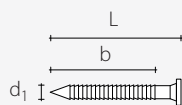
without predrilling; in case of nails / screws inserted in predrilled holes it is possible to obtain higher strength values.

- Admissible values are obtained according to DIN 1052:1988.
- It is recommended to place the fasteners symmetrically with respect to the load direction.

NOTES

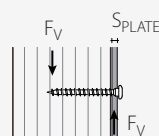
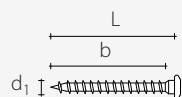
- (1) The characteristic shear strength of LBA Ø4 nails is evaluated assuming plates of thickness = S_{PLATE} , always referring to the thick plate condition ($S_{PLATE} \geq 1,5 \text{ mm}$) as suggested by ETA.
- (2) The characteristic shear strength of LBS Ø5 screws is evaluated assuming plates of thickness = S_{PLATE} , always referring to the thin plate condition ($S_{PLATE} \leq 0,5 d_1$).

FASTENERS - SHEAR STRENGTH OF STEEL-TO-TIMBER JOINTS



LBA NAILS

d ₁ [mm]	L [mm]	b [mm]	CHARACTERISTIC VALUES ⁽¹⁾		ADMISSIBLE VALUES
			R _{V,k} [kN]		V _{adm} [kg]
			LBV 1,5 mm	LBV 2,0 mm	
4	40	30	2,02	2,01	71
	50	40	2,32	2,32	71
	60	50	2,48	2,48	71
	75	60	2,64	2,64	71
	100	80	2,96	2,96	71



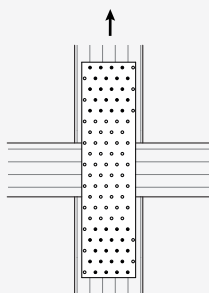
LBS SCREWS

d ₁ [mm]	L [mm]	b [mm]	CHARACTERISTIC VALUES ⁽²⁾		ADMISSIBLE VALUES
			R _{V,k} [kN]		V _{adm} [kg]
			LBV 1,5 mm	LBV 2,0 mm	
5	40	36	1,48	1,46	53
	50	46	1,86	1,85	53
	60	56	2,05	2,05	53
	70	66	2,20	2,20	53

CORRECTION COEFFICIENT m_{ef}

LOAD ANGLE TO THE GRAIN α = 0°				LOAD ANGLE TO THE GRAIN α = 90°			
	number of nailed rows	nails LBA	m _{ef}		number of nailed rows	nails LBA	m _{ef}
			screws LBS				screws LBS
	≤ 2	1,00	1,00		≥ 1	1,00	1,00
	≤ 4	0,90	0,84				
	≤ 6	0,85	0,76				
	≤ 8	0,81	0,71				
	≤ 10	0,79	0,67				
	≤ 12	0,76	0,64				
	≤ 14	0,75	0,61				
	≤ 16	0,73	0,59				
	≤ 18	0,72	0,58				
	≤ 20	0,71	0,56				

CALCULATION EXAMPLE - TIMBER-TO-TIMBER JOINTS



The joint can be realized either with perforated plate (LBV) or perforated tape (LBB).
A calculation example is reported at p. 261.