# LBV

PERFORATED PLATES

WIDE RANGE

Several versions are available, designed to face all timber construction needs. The LBV plates can realise simple beam and joist joints through to the most important inter-story connections.

READY FOR USE

An "off the shelf solution" that meets the most common requirements and minimises installation times. It offers an excellent cost to performance ratio.

CERTIFIED

Perfect for wide range of structural joints in timber that require tensile strength. The geometry and material characteristics are guaranteed by the CE marking.
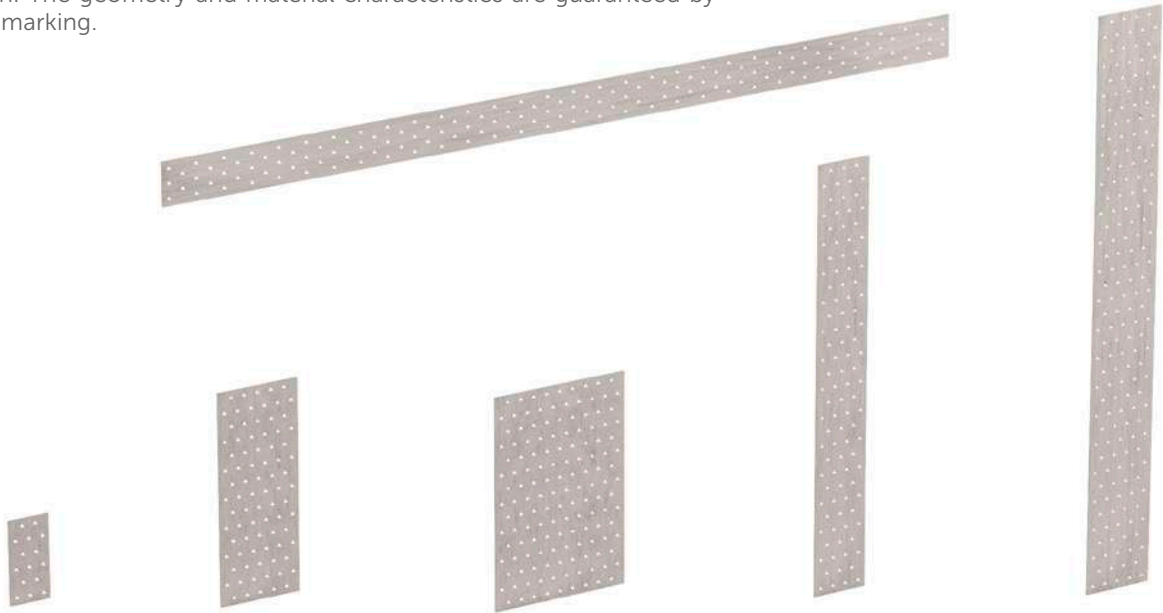
CHARACTERISTICS

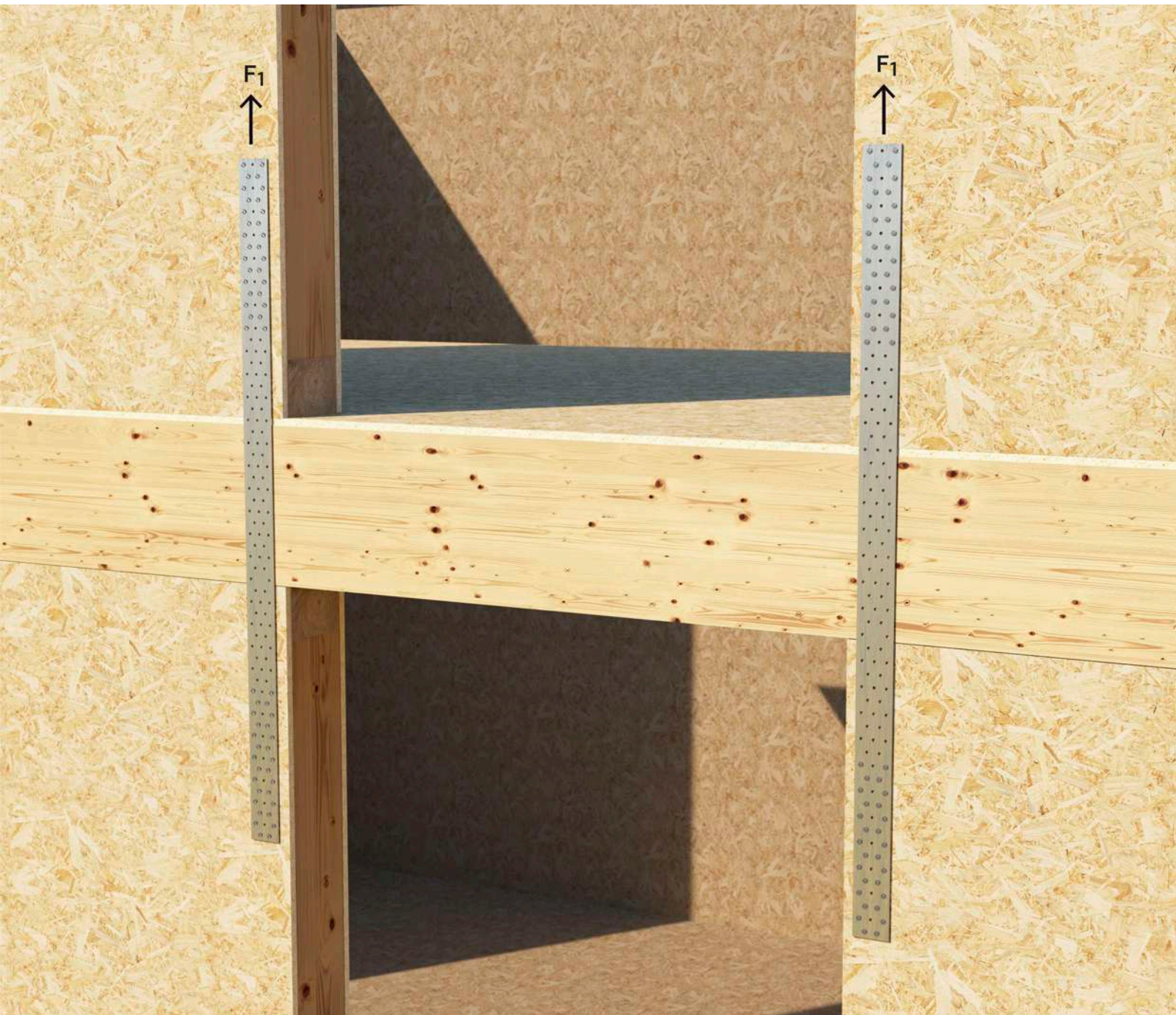| FOCUS	tension fastening
HEIGHT	from 120 to 1200 mm
THICKNESS	from 1,5 to 2,5 mm
FASTENERS	LBA, LBS

MATERIAL

Carbon steel with bright zinc plated perforated plate.

FIELD OF USE

Timber-to-timber joints
- solid timber and glulam
- CLT, LVL
- timber based panels

TENSION

The range is dimensioned for most common timber joints and applications that require tensile capacity. The 1200 mm long versions are ideal for structural joints.
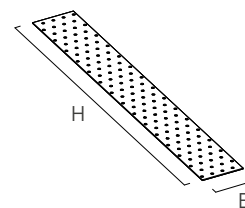
TIMBER-TO-TIMBER

Solves situations that require the transfer of tensile forces between timber elements, including, beams, structural panels and claddings.

CODES AND DIMENSIONS

LBV 1,5 mm

CODE	B	H	n Ø5	s		pcs
	[mm]	[mm]	pcs	[mm]		
LBV60600	60	600	75	1,5	●	10
LBV60800	60	800	100	1,5	●	10
LBV80600	80	600	105	1,5	●	10
LBV80800	80	800	140	1,5	●	10
LBV100800	100	800	180	1,5	●	10

LBV 2,0 mm

CODE	B	H	n Ø5	s		pcs
	[mm]	[mm]	pcs	[mm]		
LBV40120	40	120	9	2,0	●	200
LBV40160	40	160	12	2,0	●	50
LBV60140	60	140	18	2,0	●	50
LBV60200	60	200	25	2,0	●	100
LBV60240	60	240	30	2,0	●	100
LBV80200	80	200	35	2,0	●	50
LBV80240	80	240	42	2,0	●	50
LBV80300	80	300	53	2,0	●	50
LBV100140	100	140	32	2,0	●	50
LBV100200	100	200	45	2,0	●	50
LBV100240	100	240	54	2,0	●	50
LBV100300	100	300	68	2,0	●	50
LBV100400	100	400	90	2,0	●	20
LBV100500	100	500	112	2,0	●	20
LBV120200	120	200	55	2,0	●	50
LBV120240	120	240	66	2,0	●	50
LBV120300	120	300	83	2,0	●	50
LBV140400	140	400	130	2,0	●	15
LBV160400	160	400	150	2,0	●	15
LBV200300	200	300	142	2,0	●	15
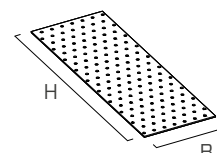
LBV 2,0 x 1200 mm

| CODE	B	H	n Ø5	s		pcs
	[mm]	[mm]	pcs	[mm]		
LBV401200	40	1200	90	2,0	●	20
LBV601200	60	1200	150	2,0	●	20
LBV801200	80	1200	210	2,0	●	20
LBV1001200	100	1200	270	2,0	●	10
LBV1201200	120	1200	330	2,0	●	10
LBV1401200	140	1200	390	2,0	●	10
LBV1601200	160	1200	450	2,0	●	10
LBV1801200	180	1200	510	2,0	●	10
LBV2001200	200	1200	570	2,0	●	5
LBV2201200	220	1200	630	2,0	●	5
LBV2401200	240	1200	690	2,0	●	5
LBV2601200	260	1200	750	2,0	●	5
LBV2801200	280	1200	810	2,0	●	5
LBV3001200	300	1200	870	2,0	●	5
LBV4001200	400	1200	1170	2,0	●	5
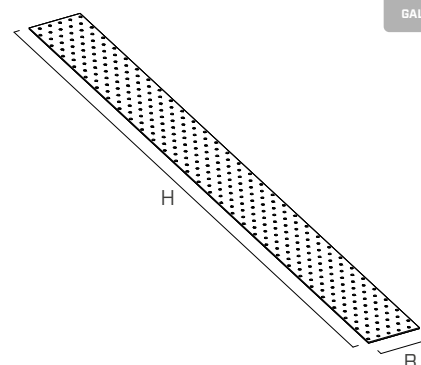
MATERIAL AND DURABILITY

LBV: carbon steel S250GD+Z275.
To be used in service classes 1 and 2 (EN 1995-1-1).
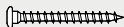
FIELD OF USE

- Timber-to-timber joints

EXTERNAL LOADS
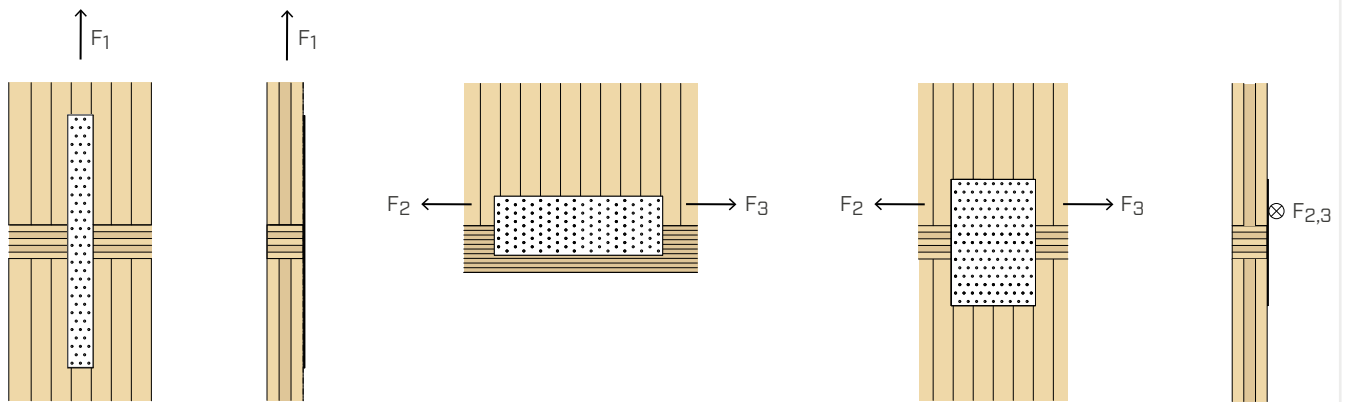
ADDITIONAL PRODUCTS - FASTENING

type	description		d	support	page
			[mm]		
LBA	Anker nail		4		548
LBS	screw for plates		5		552

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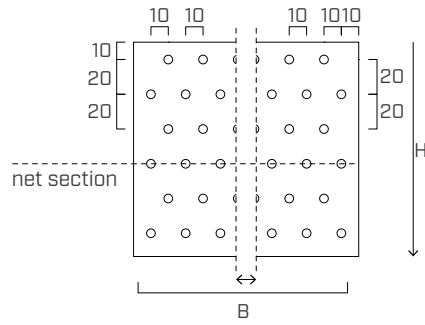
B	net area holes	B	net area holes	B	net area holes
[mm]	pcs	[mm]	pcs	[mm]	pcs
40	2	140	7	240	12
60	3	160	8	260	13
80	4	180	9	280	14
100	5	200	10	300	15
120	6	220	11	400	20

INSTALLATION

TIMBER - MINIMUM DISTANCES
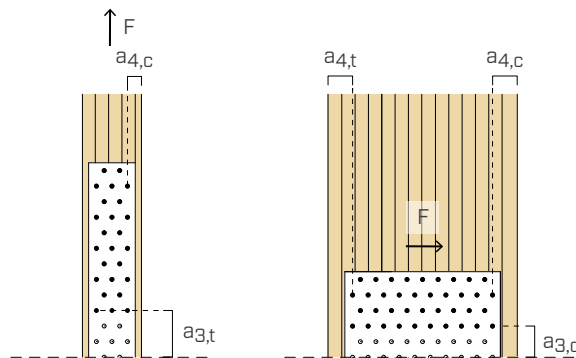
Load-to-grain angle α = 0°			Anker nail	screw
			LBA Ø4	LBS Ø5
Lateral connector - unloaded edge	$a_{4,c}$	[mm]	≥ 20	≥ 25
Connector - loaded end	$a_{3,t}$	[mm]	≥ 60	≥ 75

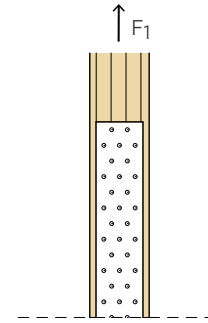| Load-to-grain angle α = 90°			Anker nail	screw
			LBA Ø4	LBS Ø5
Lateral connector - loaded edge	$a_{4,t}$	[mm]	≥ 28	≥ 50
Lateral connector - unloaded edge	$a_{4,c}$	[mm]	≥ 20	≥ 25
Connector - unloaded end	$a_{3,c}$	[mm]	≥ 40	≥ 50

STATIC VALUES | TIMBER-TO-TIMBER TENSILE JOINT

STRENGTH OF THE SYSTEM

The tensile strength of the $R_{1,d}$ system is the minimum between the $R_{ax,d}$ plate side tensile strength 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.

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

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.

PLATE - TENSILE STRENGTH

type	B	s	net area holes	CHARACTERISTIC VALUES
				$R_{ax,k}$
	[mm]	[mm]	pcs	[kN]
LBV 1,5 mm	60	1,5	3	20,0
	80	1,5	4	26,7
	100	1,5	5	33,4
LBV 2,0 mm	40	2,0	2	17,8
	60	2,0	3	26,7
	80	2,0	4	35,6
	100	2,0	5	44,6
	120	2,0	6	53,5
	140	2,0	7	62,4
	160	2,0	8	71,3
	180	2,0	9	80,2
	200	2,0	10	89,1
	220	2,0	11	98,0
	240	2,0	12	106,9
	260	2,0	13	115,8
	280	2,0	14	124,7
	300	2,0	15	133,7
	400	2,0	20	178,2

CALCULATION EXAMPLE | TIMBER-TO-TIMBER JOINT

GENERAL PRINCIPLES:

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

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

γ_{steel} should be taken as γ_{M2}

The coefficients γ_{M2} should be taken according to the current regulations used for the calculation.

- 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.