LBA

HIGH BOND NAIL

ANKER NAIL
Threaded annular ring nail for improved pull-out strength.

CE MARKING
Nails with CE marking, in accordance with ETA for fastening metallic plates to timber structures.

STAINLESS STEEL
Also available in A4 | AISI316 stainless steel.

CHARACTERISTICS

FOCUS	threaded, annular ring nail
HEAD	flat
DIAMETER	4,0 | 6,0 mm
LENGTH	from 40 to 100 mm

MATERIAL

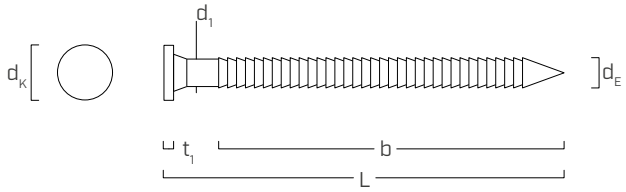
Carbon steel with bright zinc plated or stainless steel A4.

FIELDS OF USE

- timber based panels
- fibre board and MDF panels
- solid timber
- glulam (Glued Laminated Timber)
- CLT, LVL

Service classes 1 and 2.

GEOMETRY AND MECHANICAL CHARACTERISTICS | LBA



Nominal diameter	d_1	[mm]	4	6
Head diameter	d_K	[mm]	8,00	12,00
External diameter	d_E	[mm]	4,40	6,65
Head thickness	t_1	[mm]	1,40	2,00
Pre-drilling hole diameter	d_V	[mm]	3,0	4,5
Characteristic yield moment	$M_{y,k}$	[Nm]	6,5	19,0
Characteristic withdrawal-resistance parameter	$f_{ax,k}$	[N/mm²]	7,5	7,5
Characteristic tensile strength	$f_{tens,k}$	[kN]	6,9	11,4

CODES AND DIMENSIONS

LBA

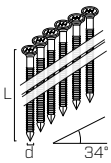
d_1 [mm]	[in]	CODE	L [mm]	L [in]	b [mm]	pcs
4	0.16	**LBA440**	40	1 9/16	30	250
		LBA450	50	1 15/16	40	250
		LBA460	60	2 3/8	50	250
		LBA475	75	2 15/16	60	250
		LBA4100	100	4	80	250
6	0.24	**LBA660**	60	2 3/8	50	250
		LBA680	80	3 1/8	70	250
		LBA6100	100	4	80	250

LBAI A4 | AISI316

A4 AISI 316

d_1 [mm]	[in]	CODE	L [mm]	L [in]	b [mm]	pcs
4	0.16	**LBAI450**	50	1 15/16	40	250

ANKER COIL NAIL - K34°



d_1 [mm]	CODE	L [mm]	pcs
4	**HH20006080**	40	2000
	HH20006085	50	2000
	HH20006090	60	2000

3731 PALMAR RIVETER

CODE	d_{NAIL} [mm]	trigger	pcs
HH3731	4 - 6	single	1

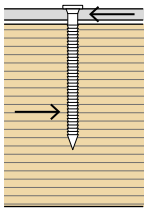
0116 ANKER RIVETER 34°

CODE	d_{NAIL} [mm]	trigger	pcs
ATEU0116	4	single	1

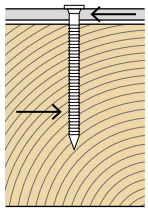
WHT

Values also tested, certified and calculated for fastening standard Rothoblaas plates. Using a handheld riveter speeds up installation.

MINIMUM DISTANCES FOR NAILS SUBJECT TO SHEAR | STEEL-TO-TIMBER



Load-to-grain angle α = 0°

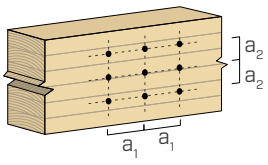


Load-to-grain angle α = 90°

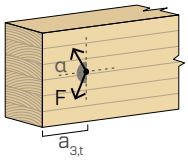
		NAILS INSERTED WITH PRE-DRILLING HOLES				NAILS INSERTED WITH PRE-DRILLING HOLES			
d_1	[mm]		4		6		4		6
a_1	[mm]	**5·d · 0,7**	14	**5·d · 0,7**	21	**4·d · 0,7**	11	**4·d · 0,7**	17
a_2	[mm]	**3·d · 0,7**	8	**3·d · 0,7**	13	**4·d · 0,7**	11	**4·d · 0,7**	17
$a_{3,t}$	[mm]	**12·d**	48	**12·d**	72	**7·d**	28	**7·d**	42
$a_{3,c}$	[mm]	**7·d**	28	**7·d**	42	**7·d**	28	**7·d**	42
$a_{4,t}$	[mm]	**3·d**	12	**3·d**	18	**5·d**	20	**7·d**	42
$a_{4,c}$	[mm]	**3·d**	12	**3·d**	18	**3·d**	12	**3·d**	18

		NAILS INSERTED WITHOUT PRE-DRILLING HOLE				NAILS INSERTED WITHOUT PRE-DRILLING HOLE			
d_1	[mm]		4		6		4		6
a_1	[mm]	**10·d · 0,7**	28	**12·d · 0,7**	50	**5·d · 0,7**	14	**5·d · 0,7**	21
a_2	[mm]	**5·d · 0,7**	14	**5·d · 0,7**	21	**5·d · 0,7**	14	**5·d · 0,7**	21
$a_{3,t}$	[mm]	**15·d**	60	**15·d**	90	**10·d**	40	**10·d**	60
$a_{3,c}$	[mm]	**10·d**	40	**10·d**	60	**10·d**	40	**10·d**	60
$a_{4,t}$	[mm]	**5·d**	20	**5·d**	30	**7·d**	28	**10·d**	60
$a_{4,c}$	[mm]	**5·d**	20	**5·d**	30	**5·d**	20	**5·d**	30

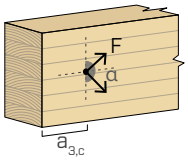
d = nominal nail diameter



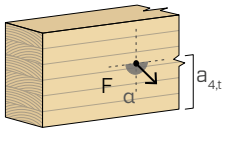
stressed end
-90° < α < 90°



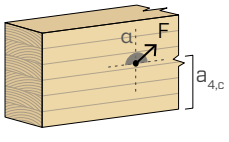
unloaded end
90° < α < 270°



stressed edge
0° < α < 180°



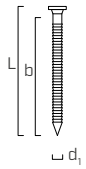
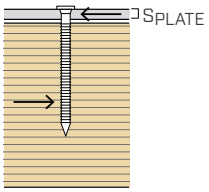
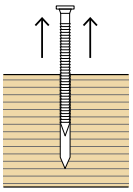
unload edge
180° < α < 360°

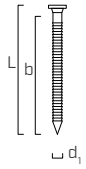
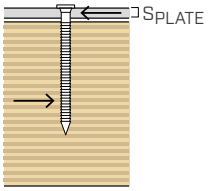
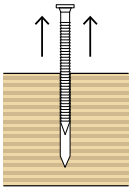


NOTES:

- The minimum distances are compliant with EN 1995:2014, according to ETA, considering a timber characteristic density of $\rho_k \leq 420$ kg/m^3 and calculation diameter of d = nominal nail diameter.
- In the case of timber-to-timber joints, the minimum spacing (a_1, a_2) can be multiplied by a coefficient of 1,5.

STATIC VALUES | STEEL-TO-TIMBER

geometry			SHEAR steel-to-timber(1)														TENSION thread withdrawal(2)
																	
d_1 [mm]	L [mm]	b [mm]	$R_{V,k}$ [kN]														$R_{ax,k}$ [kN]
4	40	30	S_{PLATE} = 1,5 mm	2,05	S_{PLATE} = 2,0 mm	2,03	S_{PLATE} = 2,5 mm	2,02	S_{PLATE} = 3,0 mm	2,00	S_{PLATE} = 4,0 mm	1,98	S_{PLATE} = 5,0 mm	1,95	S_{PLATE} = 6,0 mm	1,92	0,97
	50	40		2,34		2,34		2,34		2,34		2,34		2,34		2,34	1,30
	60	50		2,50		2,50		2,50		2,50		2,50		2,50		2,50	1,62
	75	60		2,66		2,66		2,66		2,66		2,66		2,66		2,66	1,94
	100	80		2,99		2,99		2,99		2,99		2,99		2,99		2,99	2,59
6	60	50	S_{PLATE} = 1,5 mm	2,59	S_{PLATE} = 2,0 mm	2,57	S_{PLATE} = 2,5 mm	3,43	S_{PLATE} = 3,0 mm	4,29	S_{PLATE} = 4,0 mm	4,25	S_{PLATE} = 5,0 mm	4,21	S_{PLATE} = 6,0 mm	4,17	2,43
	80	70		3,47		3,45		4,23		5,03		5,03		5,03		5,03	3,40
	100	80		4,30		4,30		4,79		5,28		5,28		5,28		5,28	3,89

geometry			SHEAR steel-to-LVL (1)														TENSION thread withdrawal(2)
																	
d_1 [mm]	L [mm]	b [mm]	$R_{V,k}$ [kN]														$R_{ax,k}$ [kN]
4	40	30	S_{PLATE} = 1,5 mm	2,47	S_{PLATE} = 2 mm	2,45	S_{PLATE} = 2,5 mm	2,43	S_{PLATE} = 3 mm	2,41	S_{PLATE} = 4 mm	2,38	S_{PLATE} = 5 mm	2,34	S_{PLATE} = 6 mm	2,31	1,16
	50	40		2,66		2,66		2,66		2,66		2,66		2,66		2,66	1,54
	60	50		2,86		2,86		2,86		2,86		2,86		2,86		2,86	1,93
	75	60		3,05		3,05		3,05		3,05		3,05		3,05		3,05	2,32
	100	80		3,43		3,43		3,43		3,43		3,43		3,43		3,43	3,09
6	60	50		3,23		3,20		4,17		5,17		5,12		5,07		5,02	2,90
	80	70		4,33		4,30		5,01		5,75		5,75		5,75		5,75	4,06
	100	80		4,95		4,95		5,50		6,04		6,04		6,04		6,04	4,63

NOTES:

(1) The characteristic shear-strength value for LBA Ø4 nails has been evaluated assuming a plate thickness = S_{PLATE} , always considering the case of thick plate according to ETA ($S_{PLATE} \geq 1,5$ mm).

The characteristic shear-strength value for LBA Ø6 screws has been evaluated assuming a plate thickness = S_{PLATE} , and considering the thin ($S_{PLATE} \leq 2,0$ mm), and thick-plate case scenarios ($2,0 < S_{PLATE} < 3,0$ mm) according to ETA ($S_{PLATE} \geq 3,0$ mm).

(2) The axial thread-withdrawal resistance was calculated considering a 90° angle between the grain and the connector and for a fixing length of b.

GENERAL PRINCIPLES:

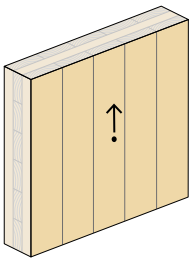
- Characteristic values are consistent with EN 1995:2014 and in accordance with ETA.
- Design values can be obtained from characteristic values as follows:

$$R_d = \frac{R_k \cdot k_{mod}}{\gamma_M}$$

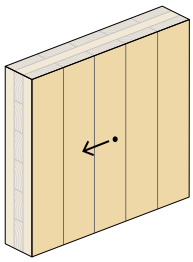
The coefficients γ_M and k_{mod} should be taken according to the current regulations used for the calculation.

- For the calculation process, a mass density equal to ρ_k = 385 kg/m^3 has been considered for timber elements and a mass density equal to ρ_k = 480 kg/m^3 has been considered for LVL elements.
- Dimensioning and verification of timber elements and steel plates must be carried out separately.
- The shear characteristic resistances are calculated for nails inserted without pre-drilling holes. In the case of nails inserted with pre-drilling holes, greater resistance values can be obtained.

MINIMUM DISTANCES FOR NAILS SUBJECT TO SHEAR | CLT[1]



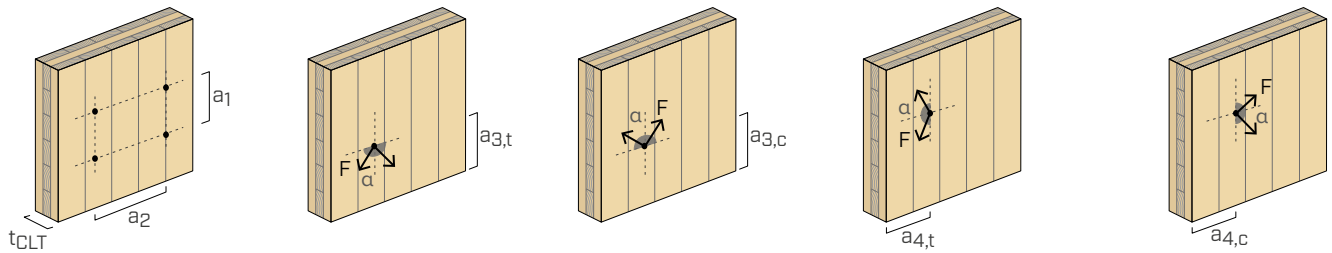
Load-to-grain angle [2] α = 0°



Load-to-grain angle [2] α = 90°

		SCREWS INSERTED WITHOUT PRE-DRILLING HOLE lateral face[3]			SCREWS INSERTED WITHOUT PRE-DRILLING HOLE lateral face[3]		
d_1	[mm]		4	6		4	6
a_1	[mm]	**4·d**	24	36	**10·d**	12	18
a_2	[mm]	**2.5·d**	12	18	**4·d**	12	18
$a_{3,t}$	[mm]	**6·d**	40	60	**12·d**	28	42
$a_{3,c}$	[mm]	**6·d**	24	36	**7·d**	24	36
$a_{4,t}$	[mm]	**6·d**	12	18	**6·d**	28	42
$a_{4,c}$	[mm]	**2.5·d**	12	18	**3·d**	12	18

d = nominal screw diameter



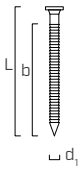
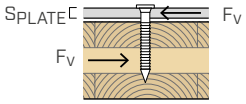
NOTES:

(1) The minimum distances are compliant with national specification ÖNORM EN 1995-1-1 - Annex K and are to be considered valid unless otherwise specified in the technical documents for the CLT panels.

(2) Angle between force and direction of the grain of the CLT panel outer layer.

(3) CLT panel minimum thickness $t_{CLT,min}$ = 10·d - single layer minimum thickness t_i = 9 mm.

STATIC VALUES | STEEL-TO-CLT

geometry of the nail			SHEAR[1] steel-to-CLT[2]													
																
d_1 [mm]	L [mm]	b [mm]	$R_{V,k}$ [kN]													
4	40	30	S_{PLATE} = 1,5 mm	2,23	S_{PLATE} = 2,0 mm	2,23	S_{PLATE} = 2,5 mm	2,23	S_{PLATE} = 3,0 mm	2,23	S_{PLATE} = 4,0 mm	2,23	S_{PLATE} = 5,0 mm	2,19	S_{PLATE} = 6,0 mm	2,15
	50	40		2,30		2,30		2,30		2,30		2,30		2,30		2,30
	60	50		2,36		2,36		2,36		2,36		2,36		2,36		2,36
	75	60		2,43		2,43		2,43		2,43		2,43		2,43		2,43
	100	80		2,55		2,55		2,55		2,55		2,55		2,55		2,55
6	60	50	S_{PLATE} = 3,0 mm	4,35	S_{PLATE} = 4,0 mm	4,35	S_{PLATE} = 5,0 mm	4,34	S_{PLATE} = 6,0 mm	4,29	S_{PLATE} = 8,0 mm	4,18	S_{PLATE} = 10,0 mm	4,08	S_{PLATE} = 12,0 mm	3,96
	80	70		4,55		4,55		4,55		4,55		4,55		4,55		4,53
	100	80		4,66		4,66		4,66		4,66		4,66		4,66		4,66

NOTES:

(1) The characteristic shear-strength value for LBA Ø4 nails has been evaluated assuming a plate thickness = S_{PLATE}, always considering the case of thick plate according to ETA ($S_{PLATE} \geq 1,5$ mm). The characteristic shear-strength value for LBA Ø6 screws has been evaluated assuming a plate thickness = S_{PLATE} , and considering the thin ($S_{PLATE} \leq 2,0$ mm), and thick-plate case scenarios ($2,0 < S_{PLATE} < 3,0$ mm) according to ETA ($S_{PLATE} \geq 3,0$ mm).

(2) The characteristic values for the steel-CLT joint are according to EN 1995-1-1 according to the national ÖNORM EN 1995 - Annex K specifications, to be considered valid unless otherwise specified in the technical documents of the CLT panels.

The table values are valid for CLT panels with minimum thickness $t_{CLT,min} = 10 \cdot d$ and with minimum thickness of the single layer $t_i = 9$ mm.

GENERAL PRINCIPLES:

- Design values can be obtained from characteristic values as follows:

$$R_d = \frac{R_k \cdot k_{mod}}{\gamma_M}$$

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

- For the mechanical strength values and the geometry of the nails, reference was made to ETA.
- For the calculation process a timber characteristic density $\rho_k = 350$ kg/m^3 has been considered.
- The values in the table are independent of the load-to-grain angle.
- Dimensioning and verification of timber elements and steel plates must be carried out separately.
- The shear characteristic resistances are calculated for nails inserted without pre-drilling holes. In the case of nails inserted with pre-drilling holes, greater resistance values can be obtained.