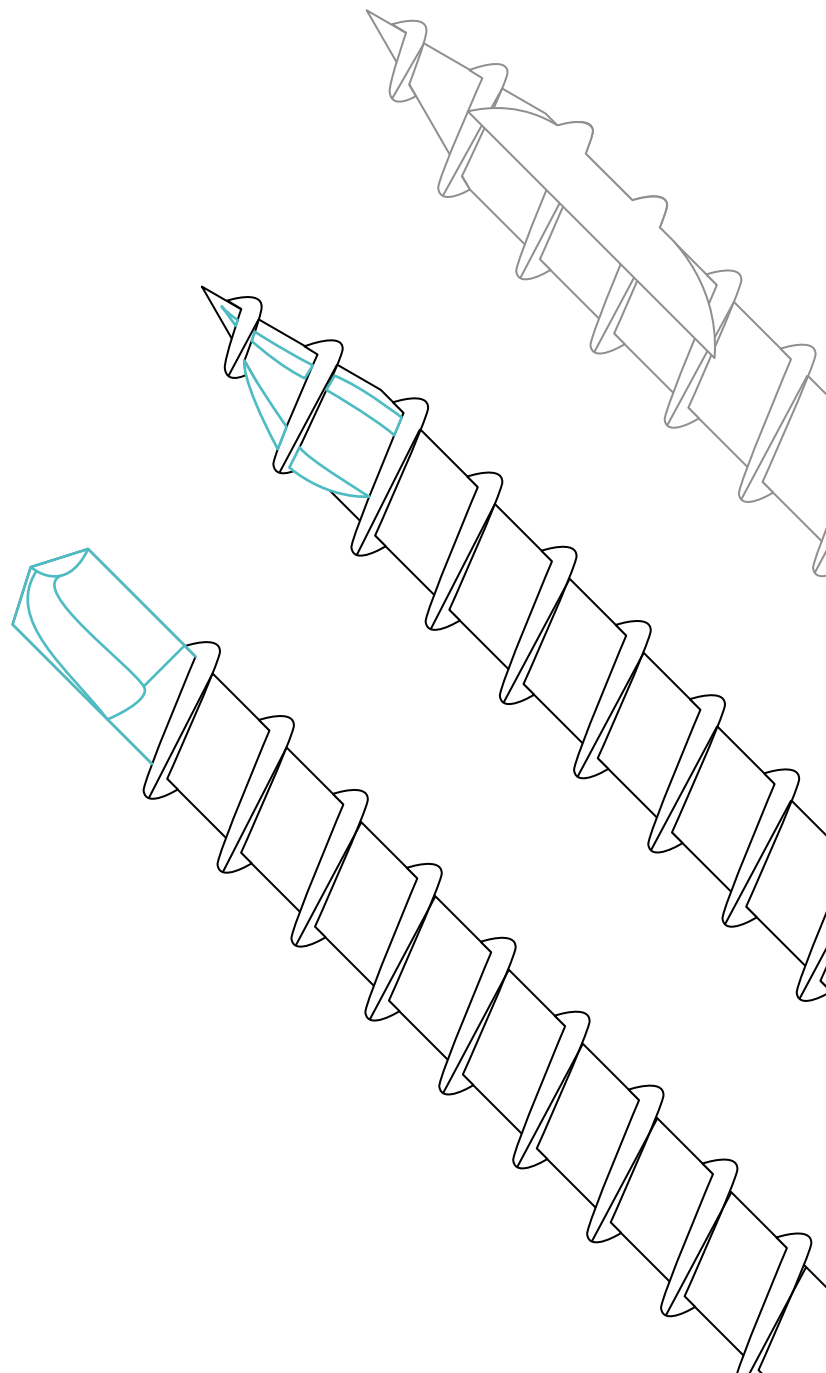


MINIMUM DISTANCES GUIDE: COMPARING TIPS

2023 - 2026 TRANSITION



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MINIMUM DISTANCES FOR SHEAR LOADS

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LEGEND



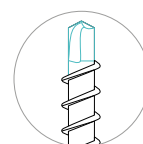
standard tip
SHARP 1 CUT
type *RBN / RBN2*

(in gradual transition to 3 THORNS and SELF-DRILLING)



tip
3 THORNS
type *RB3T*

(available from **spring 2024**)



tip
SELF-DRILLING
type *RBSD*

(available from **spring 2024**)

The complete replacement of the 3 THORNS and SELF-DRILLING tips will take place by 2026.
For information on the availability of codes for screws with specific tips, please contact your Sales technician.

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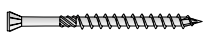
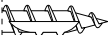
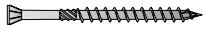
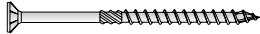
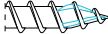
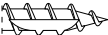
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SCREWS AND TIPS TRANSITION

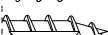
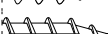
d x L

2023 >>>>>>> 2024/2026

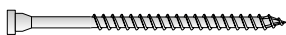
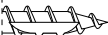
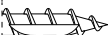
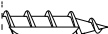
PARTIALLY THREADED - COUNTERSUNK HEAD

	SHS	all		
	SHS AISI410	all		
	HBS	all		
	HBS EVO	all		

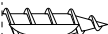
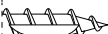
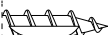
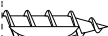
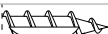
PARTIALLY THREADED - FLANGE HEAD

	TBS	all		
	TBS MAX	all		
	TBS EVO	all		

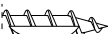
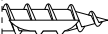
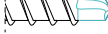
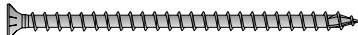
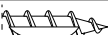
PARTIAL THREAD - PLATE FASTENING

	HBS PLATE	all		
	HBS PLATE EVO	all		
	KKF	all		

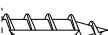
FULLY THREADED - CYLINDRICAL HEAD

	VGZ	Ø7		
		Ø9 L ≤ 520		
		Ø9 L > 520		
		Ø11 L ≤ 600		
	VGZ EVO	Ø11 L > 600	-	
		all		

FULLY THREADED - COUNTERSUNK HEAD

	VGS	Ø9 L ≤ 520		
		Ø9 L > 520		
		Ø11 L ≤ 600		
		Ø11 L > 600		
		Ø13 L ≤ 600		
		Ø13 L > 600		
	VGS EVO	Ø9		
		Ø11		
		Ø13 L ≤ 600		
		Ø13 L > 600		

DOUBLE THREAD - CYLINDRICAL HEAD

	DGZ	all		
---	-----	-----	---	---

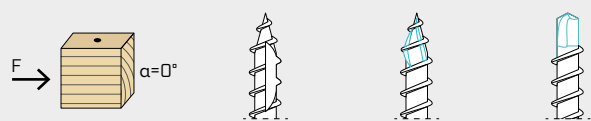
(*)SHARP SAW NIBS tip (type RBSN)

The complete replacement of the 3 THORNS and SELF-DRILLING tips will take place by 2026.
For information on the availability of codes for screws with specific tips, please contact your Sales technician.

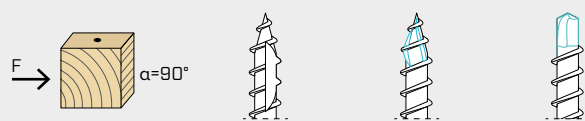
MINIMUM DISTANCES FOR SHEAR LOADS | TIMBER

COMPARISON TIPS: SHARP 1 CUT, 3 THORNS and SELF-DRILLING

 screws inserted **WITHOUT** pre-drilled hole $\rho_k \leq 420 \text{ kg/m}^3$

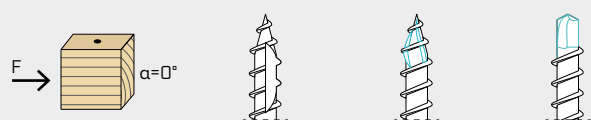


a_1	12·d	10·d	12·d
a_2	5·d	5·d	5·d
$a_{3,t}$	15·d	15·d	15·d
$a_{3,c}$	10·d	10·d	10·d
$a_{4,t}$	5·d	5·d	5·d
$a_{4,c}$	5·d	5·d	5·d

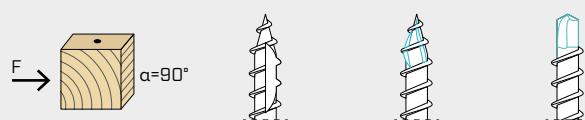


a_1	5·d	5·d	5·d
a_2	5·d	5·d	5·d
$a_{3,t}$	10·d	10·d	10·d
$a_{3,c}$	10·d	10·d	10·d
$a_{4,t}$	10·d	10·d	10·d
$a_{4,c}$	5·d	5·d	5·d

 screws inserted **WITHOUT** pre-drilled hole $420 \text{ kg/m}^3 < \rho_k \leq 500 \text{ kg/m}^3$

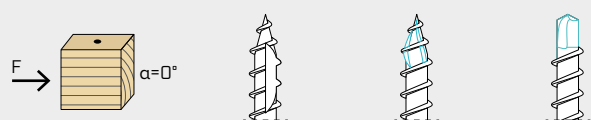


a_1	15·d	15·d	15·d
a_2	7·d	7·d	7·d
$a_{3,t}$	20·d	20·d	20·d
$a_{3,c}$	15·d	15·d	15·d
$a_{4,t}$	7·d	7·d	7·d
$a_{4,c}$	7·d	7·d	7·d

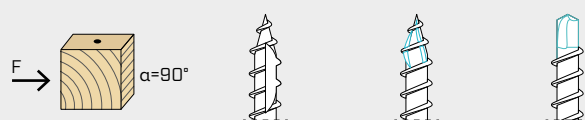


a_1	7·d	5·d	5·d
a_2	7·d	5·d	5·d
$a_{3,t}$	15·d	10·d	10·d
$a_{3,c}$	15·d	10·d	10·d
$a_{4,t}$	12·d	10·d	10·d
$a_{4,c}$	7·d	5·d	5·d

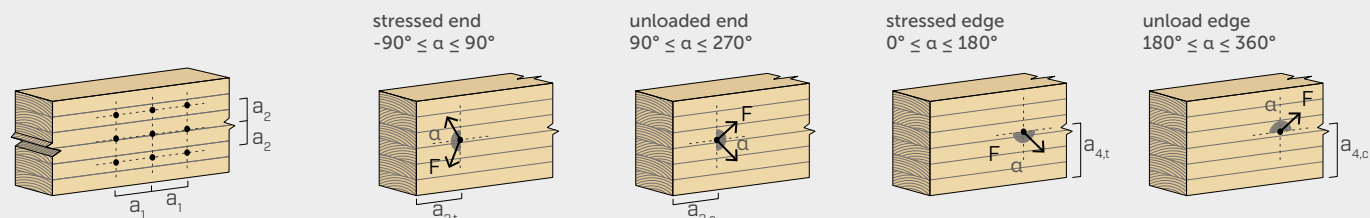
 screws inserted **WITH** pre-drilled hole



a_1	5·d	5·d	5·d
a_2	3·d	3·d	3·d
$a_{3,t}$	12·d	12·d	12·d
$a_{3,c}$	7·d	7·d	7·d
$a_{4,t}$	3·d	3·d	3·d
$a_{4,c}$	3·d	3·d	3·d



a_1	4·d	4·d	4·d
a_2	4·d	4·d	4·d
$a_{3,t}$	7·d	7·d	7·d
$a_{3,c}$	7·d	7·d	7·d
$a_{4,t}$	7·d	7·d	7·d
$a_{4,c}$	3·d	3·d	3·d



NOTE: see page 5.

LEGEND



standard tip
SHARP 1 CUT
type RBN / RBN2

(in gradual transition to 3 THORNS and SELF-DRILLING)



tip
3 THORNS
type RB3T

(available from **spring 2024**)



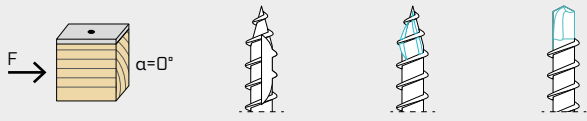
tip
SELF-DRILLING
type RBSD

(available from **spring 2024**)

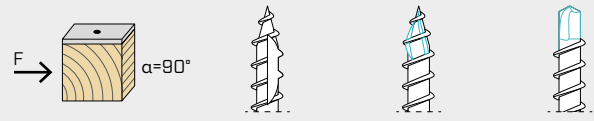
MINIMUM DISTANCES FOR SHEAR LOADS | STEEL-TO-TIMBER

COMPARISON TIPS: SHARP 1 CUT, 3 THORNS and SELF-DRILLING

 screws inserted **WITHOUT** pre-drilled hole $\rho_k \leq 420 \text{ kg/m}^3$

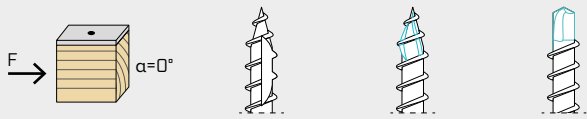


a_1	12·d·0,7	12·d·0,7	12·d·0,7
a_2	5·d·0,7	5·d·0,7	5·d·0,7
$a_{3,t}$	15·d	15·d	15·d
$a_{3,c}$	10·d	10·d	10·d
$a_{4,t}$	5·d	5·d	5·d
$a_{4,c}$	5·d	5·d	5·d

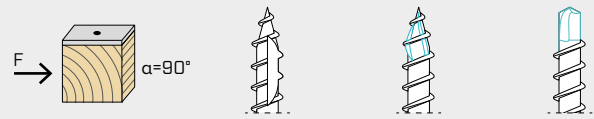


a_1	5·d·0,7	5·d·0,7	5·d·0,7
a_2	5·d·0,7	5·d·0,7	5·d·0,7
$a_{3,t}$	10·d	10·d	10·d
$a_{3,c}$	10·d	10·d	10·d
$a_{4,t}$	10·d	10·d	10·d
$a_{4,c}$	5·d	5·d	5·d

 screws inserted **WITHOUT** pre-drilled hole $420 \text{ kg/m}^3 < \rho_k \leq 500 \text{ kg/m}^3$

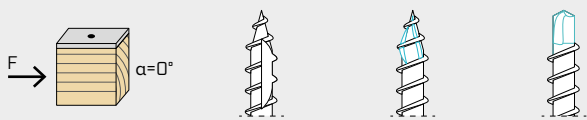


a_1	15·d·0,7	15·d·0,7	15·d·0,7
a_2	7·d·0,7	7·d·0,7	7·d·0,7
$a_{3,t}$	20·d	20·d	20·d
$a_{3,c}$	15·d	15·d	15·d
$a_{4,t}$	7·d	7·d	7·d
$a_{4,c}$	7·d	7·d	7·d

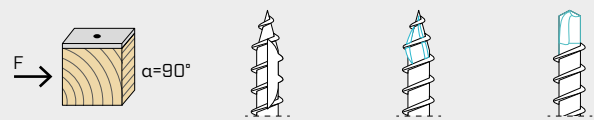


a_1	7·d·0,7	7·d·0,7	7·d·0,7
a_2	7·d·0,7	7·d·0,7	7·d·0,7
$a_{3,t}$	15·d	10·d	10·d
$a_{3,c}$	15·d	10·d	10·d
$a_{4,t}$	12·d	10·d	10·d
$a_{4,c}$	7·d	5·d	5·d

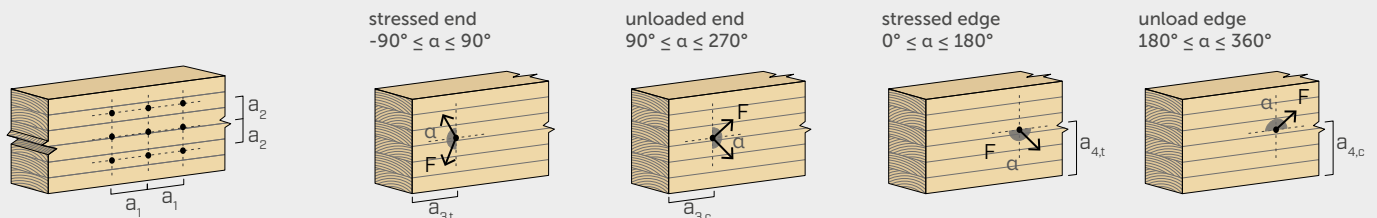
 screws inserted **WITH** pre-drilled hole



a_1	5·d·0,7	5·d·0,7	5·d·0,7
a_2	3·d·0,7	3·d·0,7	3·d·0,7
$a_{3,t}$	12·d	12·d	12·d
$a_{3,c}$	7·d	7·d	7·d
$a_{4,t}$	3·d	3·d	3·d
$a_{4,c}$	3·d	3·d	3·d



a_1	4·d·0,7	4·d·0,7	4·d·0,7
a_2	4·d·0,7	4·d·0,7	4·d·0,7
$a_{3,t}$	7·d	7·d	7·d
$a_{3,c}$	7·d	7·d	7·d
$a_{4,t}$	7·d	7·d	7·d
$a_{4,c}$	3·d	3·d	3·d



NOTES

- The minimum distances comply with the EN 1995:2014 standard in accordance with ETA-11/0030.
- The minimum distances are valid for screws with $d_1 \geq 5 \text{ mm}$.
- The distances in the table refer to screws inserted in softwood elements (solid timber or glulam). For applications on different materials (e.g. CLT, LVL), please see ETA-11/0030.
- The spacing a_1 in the table for screws with 3 THORNS tip in timber-to-timber connections inserted without pre-drilling hole in timber elements with density $\rho_k \leq 420 \text{ kg/m}^3$ with minimum height and width equal to 10·d and

load-to-grain angle $\alpha = 0^\circ$ equal to 10·d. Alternatively, adopt 12·d in accordance with EN 1995:2014.

- The spacing a_1 in the table for screws with SHARP 1 CUT/SELF-DRILLING tip inserted without pre-drilling hole in timber elements with density $\rho_k \leq 420 \text{ kg/m}^3$ and load-to-grain angle $\alpha = 0^\circ$ was assumed to be 12·d in accordance with EN 1995:2014.

MINIMUM DISTANCES FOR SHEAR LOADS | TIMBER

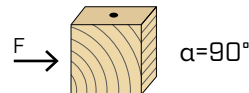
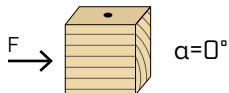
PARTIAL THREAD SCREWS

SHS - SHS AISI 410 - HBS - HBS EVO
TBS - TBS MAX - TBS EVO
HBS PLATE - HBS PLATE EVO - KKF

SHARP 1 CUT



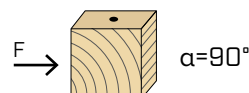
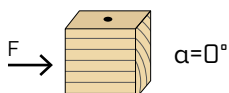
screws inserted **WITHOUT** pre-drilled hole $\rho_k \leq 420 \text{ kg/m}^3$



d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	10·d	35	40	45	12·d	60	72	96	120	144
a_2 [mm]	5·d	18	20	23	5·d	25	30	40	50	60
$a_{3,t}$ [mm]	15·d	53	60	68	15·d	75	90	120	150	180
$a_{3,c}$ [mm]	10·d	35	40	45	10·d	50	60	80	100	120
$a_{4,t}$ [mm]	5·d	18	20	23	5·d	25	30	40	50	60
$a_{4,c}$ [mm]	5·d	18	20	23	5·d	25	30	40	50	60

d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	5·d	18	20	23	5·d	25	30	40	50	60
a_2 [mm]	5·d	18	20	23	5·d	25	30	40	50	60
$a_{3,t}$ [mm]	10·d	35	40	45	10·d	50	60	80	100	120
$a_{3,c}$ [mm]	10·d	35	40	45	10·d	50	60	80	100	120
$a_{4,t}$ [mm]	7·d	25	28	32	10·d	50	60	80	100	120
$a_{4,c}$ [mm]	5·d	18	20	23	5·d	25	30	40	50	60

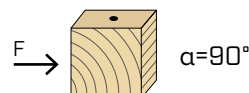
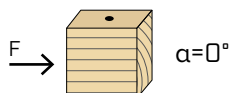
screws inserted **WITHOUT** pre-drilled hole $420 \text{ kg/m}^3 < \rho_k \leq 500 \text{ kg/m}^3$



d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	15·d	53	60	68	15·d	75	90	120	150	180
a_2 [mm]	7·d	25	28	32	7·d	35	42	56	70	84
$a_{3,t}$ [mm]	20·d	70	80	90	20·d	100	120	160	200	240
$a_{3,c}$ [mm]	15·d	53	60	68	15·d	75	90	120	150	180
$a_{4,t}$ [mm]	7·d	25	28	32	7·d	35	42	56	70	84
$a_{4,c}$ [mm]	7·d	25	28	32	7·d	35	42	56	70	84

d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	7·d	25	28	32	7·d	35	42	56	70	84
a_2 [mm]	7·d	25	28	32	7·d	35	42	56	70	84
$a_{3,t}$ [mm]	15·d	53	60	68	15·d	75	90	120	150	180
$a_{3,c}$ [mm]	15·d	53	60	68	15·d	75	90	120	150	180
$a_{4,t}$ [mm]	9·d	32	36	41	12·d	60	72	96	120	144
$a_{4,c}$ [mm]	7·d	25	28	32	7·d	35	42	56	70	84

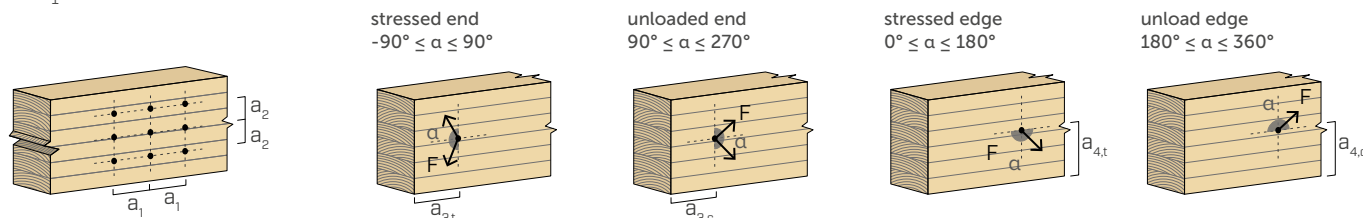
screws inserted **WITH** pre-drilled hole



d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	5·d	18	20	23	5·d	25	30	40	50	60
a_2 [mm]	3·d	11	12	14	3·d	15	18	24	30	36
$a_{3,t}$ [mm]	12·d	42	48	54	12·d	60	72	96	120	144
$a_{3,c}$ [mm]	7·d	25	28	32	7·d	35	42	56	70	84
$a_{4,t}$ [mm]	3·d	11	12	14	3·d	15	18	24	30	36
$a_{4,c}$ [mm]	3·d	11	12	14	3·d	15	18	24	30	36

d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	4·d	14	16	18	4·d	20	24	32	40	48
a_2 [mm]	4·d	14	16	18	4·d	20	24	32	40	48
$a_{3,t}$ [mm]	7·d	25	28	32	7·d	35	42	56	70	84
$a_{3,c}$ [mm]	7·d	25	28	32	7·d	35	42	56	70	84
$a_{4,t}$ [mm]	5·d	18	20	23	7·d	35	42	56	70	84
$a_{4,c}$ [mm]	3·d	11	12	14	3·d	15	18	24	30	36

α = load-to-grain angle
 d_1 = nominal screw diameter



NOTES

- The minimum distances comply with the EN 1995:2014 standard in accordance with ETA-11/0030.
- The minimum spacing for all panel-to-timber connections (a_1 , a_2) can be multiplied by a coefficient of 0,85.
- In the case of joints with elements in Douglas fir (*Pseudotsuga menziesii*), the minimum spacing and distances parallel to the grain must be multiplied by a coefficient of 1.5.
- The distances in the table refer to screws with standard SHARP 1 CUT tip.
- The distances in the table refer to screws inserted in softwood elements (solid timber or glulam). For applications on different materials (e.g. CLT, LVL), please see ETA-11/0030.

MINIMUM DISTANCES FOR SHEAR LOADS | TIMBER

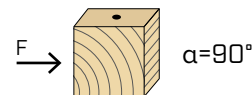
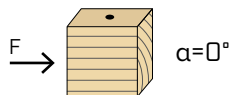
PARTIAL THREAD SCREWS

SHS - SHS AISI 410 - HBS - HBS EVO
TBS - TBS MAX - TBS EVO - TBS FRAME
HBS PLATE - HBS PLATE EVO - KKF

3 THORNS



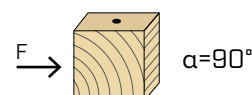
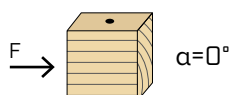
screws inserted **WITHOUT** pre-drilled hole $\rho_k \leq 420 \text{ kg/m}^3$



d ₁	[mm]	3,5	4	4,5		5	6	8	10	12	
a ₁	[mm]	10·d	35	40	45	10·d	50	60	80	100	120
a ₂	[mm]	5·d	18	20	23	5·d	25	30	40	50	60
a _{3,t}	[mm]	15·d	53	60	68	15·d	75	90	120	150	180
a _{3,c}	[mm]	10·d	35	40	45	10·d	50	60	80	100	120
a _{4,t}	[mm]	5·d	18	20	23	5·d	25	30	40	50	60
a _{4,c}	[mm]	5·d	18	20	23	5·d	25	30	40	50	60

d_1	[mm]	3,5	4	4,5		5	6	8	10	12	
a_1	[mm]	5·d	18	20	23	5·d	25	30	40	50	60
a_2	[mm]	5·d	18	20	23	5·d	25	30	40	50	60
$a_{3,t}$	[mm]	10·d	35	40	45	10·d	50	60	80	100	120
$a_{3,c}$	[mm]	10·d	35	40	45	10·d	50	60	80	100	120
$a_{4,t}$	[mm]	7·d	25	28	32	10·d	50	60	80	100	120
$a_{4,c}$	[mm]	5·d	18	20	23	5·d	25	30	40	50	60

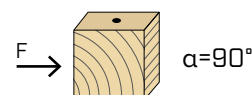
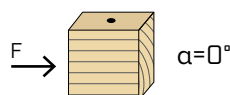
screws inserted **WITHOUT** pre-drilled hole $420 \text{ kg/m}^3 < \rho_k \leq 500 \text{ kg/m}^3$



d ₁	[mm]	3,5	4	4,5		5	6	8	10	12	
a ₁	[mm]	15·d	53	60	68	15·d	75	90	120	150	180
a ₂	[mm]	7·d	25	28	32	7·d	35	42	56	70	84
a _{3,t}	[mm]	20·d	70	80	90	20·d	100	120	160	200	240
a _{3,c}	[mm]	15·d	53	60	68	15·d	75	90	120	150	180
a _{4,t}	[mm]	7·d	25	28	32	7·d	35	42	56	70	84
a _{4,c}	[mm]	7·d	25	28	32	7·d	35	42	56	70	84

d_1	[mm]	3,5	4	4,5		5	6	8	10	12	
a_1	[mm]	7·d	25	28	32	7·d	35	42	56	70	84
a_2	[mm]	7·d	25	28	32	7·d	35	42	56	70	84
$a_{3,t}$	[mm]	15·d	53	60	68	15·d	75	90	120	150	180
$a_{3,c}$	[mm]	15·d	53	60	68	15·d	75	90	120	150	180
$a_{4,t}$	[mm]	9·d	32	36	41	12·d	60	72	96	120	144
$a_{4,c}$	[mm]	7·d	25	28	32	7·d	35	42	56	70	84

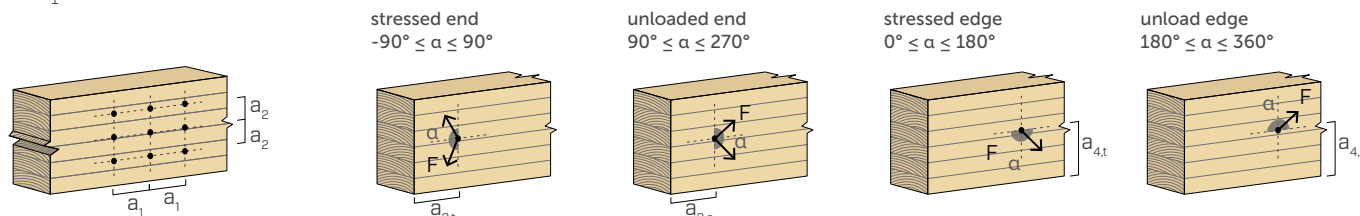
screws inserted **WITH** pre-drilled hole



d_1	[mm]		3,5	4	4,5		5	6	8	10	12
a_1	[mm]	5·d	18	20	23	5·d	25	30	40	50	60
a_2	[mm]	3·d	11	12	14	3·d	15	18	24	30	36
$a_{3,t}$	[mm]	12·d	42	48	54	12·d	60	72	96	120	144
$a_{3,c}$	[mm]	7·d	25	28	32	7·d	35	42	56	70	84
$a_{4,t}$	[mm]	3·d	11	12	14	3·d	15	18	24	30	36
$a_{4,c}$	[mm]	3·d	11	12	14	3·d	15	18	24	30	36

d_1	[mm]	3,5	4	4,5		5	6	8	10	12	
a_1	[mm]	4·d	14	16	18	4·d	20	24	32	40	48
a_2	[mm]	4·d	14	16	18	4·d	20	24	32	40	48
$a_{3,t}$	[mm]	7·d	25	28	32	7·d	35	42	56	70	84
$a_{3,c}$	[mm]	7·d	25	28	32	7·d	35	42	56	70	84
$a_{4,t}$	[mm]	5·d	18	20	23	7·d	35	42	56	70	84
$a_{4,c}$	[mm]	3·d	11	12	14	3·d	15	18	24	30	36

α = load-to-grain angle
 d_1 = nominal screw diameter



NOTES

- The minimum distances comply with the EN 1995:2014 standard in accordance with ETA-11/0030.
- The minimum spacing for all panel-to-timber connections (a_1 , a_2) can be multiplied by a coefficient of 0,85.
- In the case of joints with elements in Douglas fir (*Pseudotsuga menziesii*), the minimum spacing and distances parallel to the grain must be multiplied by a coefficient of 1.5.
- The distances in the table refer to screws with 3 THORNS tip.

- The spacing a_1 for screws inserted without pre-drilling hole in timber elements with density $\rho_k \leq 420 \text{ kg/m}^3$ with minimum height and width equal to 10·d and load-to-grain angle $\alpha = 0^\circ$ equal to 10·d. Alternatively, adopt 12·d in accordance with EN 1995:2014.
- The distances in the table refer to screws inserted in softwood elements (solid timber or glulam). For applications on different materials (e.g. CLT, LVL), please see ETA-11/0030.

MINIMUM DISTANCES FOR SHEAR LOADS | STEEL-TO-TIMBER

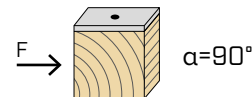
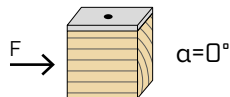
PARTIAL THREAD SCREWS

HBS - HBS EVO
HBS PLATE - HBS PLATE EVO - KKF

SHARP 1 CUT



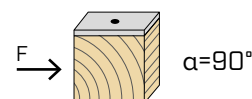
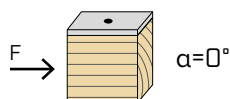
screws inserted **WITHOUT** pre-drilled hole $\rho_k \leq 420 \text{ kg/m}^3$



d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	10·d·0,7	25	28	32	12·d·0,7	42	50	67	84	101
a_2 [mm]	5·d·0,7	12	14	16	5·d·0,7	18	21	28	35	42
$a_{3,t}$ [mm]	15·d	53	60	68	15·d	75	90	120	150	180
$a_{3,c}$ [mm]	10·d	35	40	45	10·d	50	60	80	100	120
$a_{4,t}$ [mm]	5·d	18	20	23	5·d	25	30	40	50	60
$a_{4,c}$ [mm]	5·d	18	20	23	5·d	25	30	40	50	60

d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	5·d·0,7	12	14	16	5·d·0,7	18	21	28	35	42
a_2 [mm]	5·d·0,7	12	14	16	5·d·0,7	18	21	28	35	42
$a_{3,t}$ [mm]	10·d	35	40	45	10·d	50	60	80	100	120
$a_{3,c}$ [mm]	10·d	35	40	45	10·d	50	60	80	100	120
$a_{4,t}$ [mm]	7·d	25	28	32	10·d	50	60	80	100	120
$a_{4,c}$ [mm]	5·d	18	20	23	5·d	25	30	40	50	60

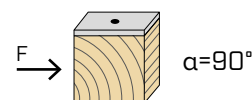
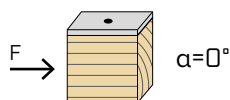
screws inserted **WITHOUT** pre-drilled hole $420 \text{ kg/m}^3 < \rho_k \leq 500 \text{ kg/m}^3$



d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	15·d·0,7	37	42	47	15·d·0,7	53	63	84	105	126
a_2 [mm]	7·d·0,7	17	20	22	7·d·0,7	25	29	39	49	59
$a_{3,t}$ [mm]	20·d	70	80	90	20·d	100	120	160	200	240
$a_{3,c}$ [mm]	15·d	53	60	68	15·d	75	90	120	150	180
$a_{4,t}$ [mm]	7·d	25	28	32	7·d	35	42	56	70	84
$a_{4,c}$ [mm]	7·d	25	28	32	7·d	35	42	56	70	84

d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	7·d·0,7	17	20	22	7·d·0,7	25	29	39	49	59
a_2 [mm]	7·d·0,7	17	20	22	7·d·0,7	25	29	39	49	59
$a_{3,t}$ [mm]	15·d	53	60	68	15·d	75	90	120	150	180
$a_{3,c}$ [mm]	15·d	53	60	68	15·d	75	90	120	150	180
$a_{4,t}$ [mm]	9·d	32	36	41	12·d	60	72	96	120	144
$a_{4,c}$ [mm]	7·d	25	28	32	7·d	35	42	56	70	84

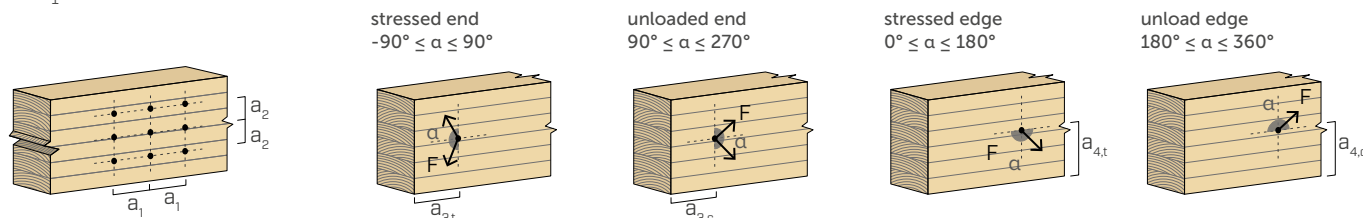
screws inserted **WITH** pre-drilled hole



d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	5·d·0,7	12	14	16	5·d·0,7	18	21	28	35	42
a_2 [mm]	3·d·0,7	7	8	9	3·d·0,7	11	13	17	21	25
$a_{3,t}$ [mm]	12·d	42	48	54	12·d	60	72	96	120	144
$a_{3,c}$ [mm]	7·d	25	28	32	7·d	35	42	56	70	84
$a_{4,t}$ [mm]	3·d	11	12	14	3·d	15	18	24	30	36
$a_{4,c}$ [mm]	3·d	11	12	14	3·d	15	18	24	30	36

d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	4·d·0,7	10	11	13	4·d·0,7	14	17	22	28	34
a_2 [mm]	4·d·0,7	10	11	13	4·d·0,7	14	17	22	28	34
$a_{3,t}$ [mm]	7·d	25	28	32	7·d	35	42	56	70	84
$a_{3,c}$ [mm]	7·d	25	28	32	7·d	35	42	56	70	84
$a_{4,t}$ [mm]	5·d	18	20	23	7·d	35	42	56	70	84
$a_{4,c}$ [mm]	3·d	11	12	14	3·d	15	18	24	30	36

α = load-to-grain angle
 d = nominal screw diameter



NOTES

- The minimum distances comply with the EN 1995:2014 standard in accordance with ETA-11/0030.
- In the case of joints with elements in Douglas fir (*Pseudotsuga menziesii*), the minimum spacing and distances parallel to the grain must be multiplied by a coefficient of 1.5.
- The distances in the table refer to screws with standard SHARP 1 CUT tip.
- The distances in the table refer to screws inserted in softwood elements (solid timber or glulam). For applications on different materials (e.g. CLT, LVL), please see ETA-11/0030.

MINIMUM DISTANCES FOR SHEAR LOADS | STEEL-TO-TIMBER

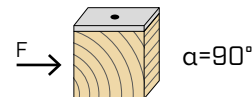
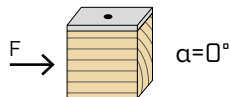
PARTIAL THREAD SCREWS

HBS - HBS EVO
HBS PLATE - HBS PLATE EVO - KKF

3 THORNS



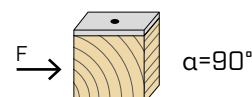
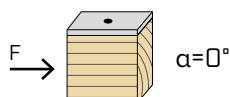
screws inserted **WITHOUT** pre-drilled hole $\rho_k \leq 420 \text{ kg/m}^3$



d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	10-d-0,7	25	28	32	12-d-0,7	42	50	67	84	101
a_2 [mm]	5-d-0,7	12	14	16	5-d-0,7	18	21	28	35	42
$a_{3,t}$ [mm]	15-d	53	60	68	15-d	75	90	120	150	180
$a_{3,c}$ [mm]	10-d	35	40	45	10-d	50	60	80	100	120
$a_{4,t}$ [mm]	5-d	18	20	23	5-d	25	30	40	50	60
$a_{4,c}$ [mm]	5-d	18	20	23	5-d	25	30	40	50	60

d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	5-d-0,7	12	14	16	5-d-0,7	18	21	28	35	42
a_2 [mm]	5-d-0,7	12	14	16	5-d-0,7	18	21	28	35	42
$a_{3,t}$ [mm]	10-d	35	40	45	10-d	50	60	80	100	120
$a_{3,c}$ [mm]	10-d	35	40	45	10-d	50	60	80	100	120
$a_{4,t}$ [mm]	7-d	25	28	32	10-d	50	60	80	100	120
$a_{4,c}$ [mm]	5-d	18	20	23	5-d	25	30	40	50	60

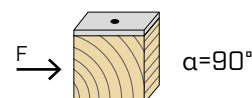
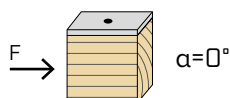
screws inserted **WITHOUT** pre-drilled hole $420 \text{ kg/m}^3 < \rho_k \leq 500 \text{ kg/m}^3$



d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	15-d-0,7	37	42	47	15-d-0,7	53	63	84	105	126
a_2 [mm]	7-d-0,7	17	20	22	7-d-0,7	25	29	39	49	59
$a_{3,t}$ [mm]	20-d	70	80	90	20-d	100	120	160	200	240
$a_{3,c}$ [mm]	15-d	53	60	68	15-d	75	90	120	150	180
$a_{4,t}$ [mm]	7-d	25	28	32	7-d	35	42	56	70	84
$a_{4,c}$ [mm]	7-d	25	28	32	7-d	35	42	56	70	84

d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	7-d-0,7	17	20	22	7-d-0,7	25	29	39	49	59
a_2 [mm]	7-d-0,7	17	20	22	7-d-0,7	25	29	39	49	59
$a_{3,t}$ [mm]	15-d	53	60	68	15-d	75	90	120	150	180
$a_{3,c}$ [mm]	15-d	53	60	68	15-d	75	90	120	150	180
$a_{4,t}$ [mm]	9-d	32	36	41	12-d	60	72	96	120	144
$a_{4,c}$ [mm]	7-d	25	28	32	7-d	35	42	56	70	84

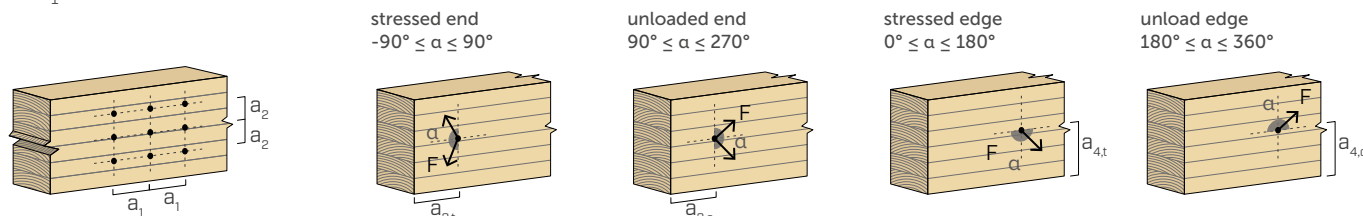
screws inserted **WITH** pre-drilled hole



d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	5-d-0,7	12	14	16	5-d-0,7	18	21	28	35	42
a_2 [mm]	3-d-0,7	7	8	9	3-d-0,7	11	13	17	21	25
$a_{3,t}$ [mm]	12-d	42	48	54	12-d	60	72	96	120	144
$a_{3,c}$ [mm]	7-d	25	28	32	7-d	35	42	56	70	84
$a_{4,t}$ [mm]	3-d	11	12	14	3-d	15	18	24	30	36
$a_{4,c}$ [mm]	3-d	11	12	14	3-d	15	18	24	30	36

d_1 [mm]		3,5	4	4,5		5	6	8	10	12
a_1 [mm]	4-d-0,7	10	11	13	4-d-0,7	14	17	22	28	34
a_2 [mm]	4-d-0,7	10	11	13	4-d-0,7	14	17	22	28	34
$a_{3,t}$ [mm]	7-d	25	28	32	7-d	35	42	56	70	84
$a_{3,c}$ [mm]	7-d	25	28	32	7-d	35	42	56	70	84
$a_{4,t}$ [mm]	5-d	18	20	23	7-d	35	42	56	70	84
$a_{4,c}$ [mm]	3-d	11	12	14	3-d	15	18	24	30	36

α = load-to-grain angle
 d = d_1 = nominal screw diameter



NOTES

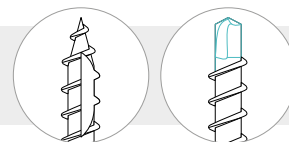
- The minimum distances comply with the EN 1995:2014 standard in accordance with ETA-11/0030.
- In the case of joints with elements in Douglas fir (*Pseudotsuga menziesii*), the minimum spacing and distances parallel to the grain must be multiplied by a coefficient of 1.5.
- The distances in the table refer to screws with 3 THORNS tip.
- The distances in the table refer to screws inserted in softwood elements (solid timber or glulam). For applications on different materials (e.g. CLT, LVL), please see ETA-11/0030.

MINIMUM DISTANCES FOR SHEAR LOADS | TIMBER

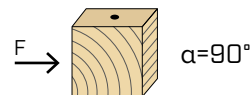
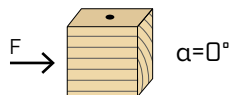
FULLY THREADED SCREW

VGZ - VGZ EVO
VGS - VGS EVO

SHARP 1 CUT
SELF-DRILLING



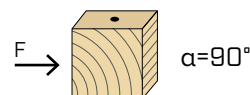
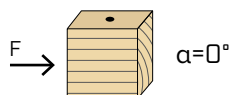
screws inserted **WITHOUT** pre-drilled hole $\rho_k \leq 420 \text{ kg/m}^3$



d_1 [mm]		5,3	5,6	7	9	11	13
a_1 [mm]	12·d	64	67	84	108	132	156
a_2 [mm]	5·d	27	28	35	45	55	65
$a_{3,t}$ [mm]	15·d	80	84	105	135	165	195
$a_{3,c}$ [mm]	10·d	53	56	70	90	110	130
$a_{4,t}$ [mm]	5·d	27	28	35	45	55	65
$a_{4,c}$ [mm]	5·d	27	28	35	45	55	65

d_1 [mm]		5,3	5,6	7	9	11	13
a_1 [mm]	5·d	27	28	35	45	55	65
a_2 [mm]	5·d	27	28	35	45	55	65
$a_{3,t}$ [mm]	10·d	53	56	70	90	110	130
$a_{3,c}$ [mm]	10·d	53	56	70	90	110	130
$a_{4,t}$ [mm]	10·d	53	56	70	90	110	130
$a_{4,c}$ [mm]	5·d	27	28	35	45	55	65

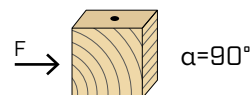
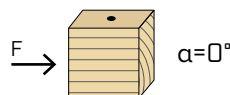
screws inserted **WITHOUT** pre-drilled hole $420 \text{ kg/m}^3 < \rho_k \leq 500 \text{ kg/m}^3$



d_1 [mm]		5,3	5,6	7	9	11	13
a_1 [mm]	15·d	80	84	105	135	165	195
a_2 [mm]	7·d	37	39	49	63	77	91
$a_{3,t}$ [mm]	20·d	106	112	140	180	220	260
$a_{3,c}$ [mm]	15·d	80	84	105	135	165	195
$a_{4,t}$ [mm]	7·d	37	39	49	63	77	91
$a_{4,c}$ [mm]	7·d	37	39	49	63	77	91

d_1 [mm]		5,3	5,6	7	9	11	13
a_1 [mm]	7·d	37	39	49	63	77	91
a_2 [mm]	7·d	37	39	49	63	77	91
$a_{3,t}$ [mm]	15·d	80	84	105	135	165	195
$a_{3,c}$ [mm]	15·d	80	84	105	135	165	195
$a_{4,t}$ [mm]	12·d	64	67	84	108	132	156
$a_{4,c}$ [mm]	7·d	37	39	49	63	77	91

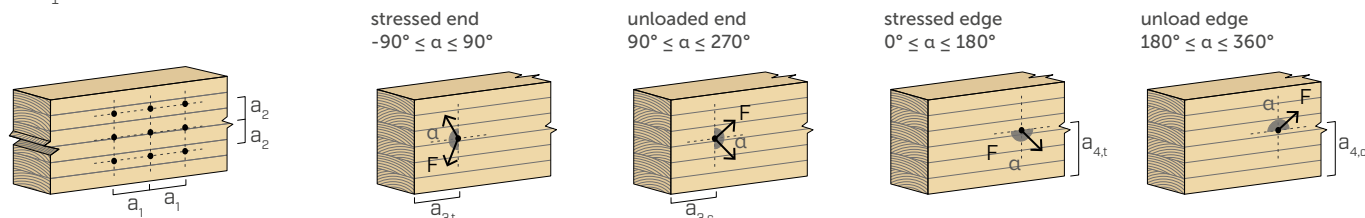
screws inserted **WITH** pre-drilled hole



d_1 [mm]		5,3	5,6	7	9	11	13
a_1 [mm]	5·d	27	28	35	45	55	65
a_2 [mm]	3·d	16	17	21	27	33	39
$a_{3,t}$ [mm]	12·d	64	67	84	108	132	156
$a_{3,c}$ [mm]	7·d	37	39	49	63	77	91
$a_{4,t}$ [mm]	3·d	16	17	21	27	33	39
$a_{4,c}$ [mm]	3·d	16	17	21	27	33	39

d_1 [mm]		5,3	5,6	7	9	11	13
a_1 [mm]	4·d	21	22	28	36	44	52
a_2 [mm]	4·d	21	22	28	36	44	52
$a_{3,t}$ [mm]	7·d	37	39	49	63	77	91
$a_{3,c}$ [mm]	7·d	37	39	49	63	77	91
$a_{4,t}$ [mm]	7·d	37	39	49	63	77	91
$a_{4,c}$ [mm]	3·d	16	17	21	27	33	39

α = load-to-grain angle
 d_1 = nominal screw diameter



NOTES

- The minimum distances comply with the EN 1995:2014 standard in accordance with ETA-11/0030.
- The minimum spacing for all panel-to-timber connections (a_1 , a_2) can be multiplied by a coefficient of 0,85.
- In the case of joints with elements in Douglas fir (*Pseudotsuga menziesii*), the minimum spacing and distances parallel to the grain must be multiplied by a coefficient of 1.5.
- The distances in the table refer to screws with standard SHARP 1 CUT/SELF-DRILLING tip.
- The distances in the table refer to screws inserted in softwood elements (solid timber or glulam). For applications on different materials (e.g. CLT, LVL), please see ETA-11/0030.

MINIMUM DISTANCES FOR SHEAR LOADS | TIMBER

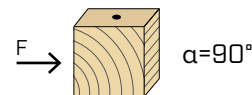
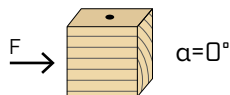
FULLY THREADED SCREW

VGZ - VGZ EVO
VGS - VGS EVO

3 THORNS



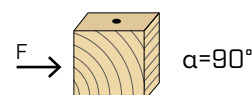
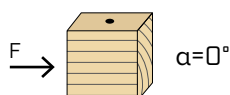
screws inserted **WITHOUT** pre-drilled hole $\rho_k \leq 420 \text{ kg/m}^3$



d_1 [mm]		5,3	5,6	7	9	11	13
a_1 [mm]	10·d	53	56	70	90	110	130
a_2 [mm]	5·d	27	28	35	45	55	65
$a_{3,t}$ [mm]	15·d	80	84	105	135	165	195
$a_{3,c}$ [mm]	10·d	53	56	70	90	110	130
$a_{4,t}$ [mm]	5·d	27	28	35	45	55	65
$a_{4,c}$ [mm]	5·d	27	28	35	45	55	65

d_1 [mm]		5,3	5,6	7	9	11	13
a_1 [mm]	5·d	27	28	35	45	55	65
a_2 [mm]	5·d	27	28	35	45	55	65
$a_{3,t}$ [mm]	10·d	53	56	70	90	110	130
$a_{3,c}$ [mm]	10·d	53	56	70	90	110	130
$a_{4,t}$ [mm]	10·d	53	56	70	90	110	130
$a_{4,c}$ [mm]	5·d	27	28	35	45	55	65

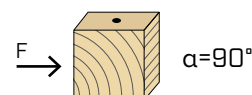
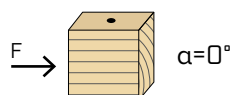
screws inserted **WITHOUT** pre-drilled hole $420 \text{ kg/m}^3 < \rho_k \leq 500 \text{ kg/m}^3$



d_1 [mm]		5,3	5,6	7	9	11	13
a_1 [mm]	15·d	80	84	105	135	165	195
a_2 [mm]	7·d	37	39	49	63	77	91
$a_{3,t}$ [mm]	20·d	106	112	140	180	220	260
$a_{3,c}$ [mm]	15·d	80	84	105	135	165	195
$a_{4,t}$ [mm]	7·d	37	39	49	63	77	91
$a_{4,c}$ [mm]	7·d	37	39	49	63	77	91

d_1 [mm]		5,3	5,6	7	9	11	13
a_1 [mm]	7·d	37	39	49	63	77	91
a_2 [mm]	7·d	37	39	49	63	77	91
$a_{3,t}$ [mm]	15·d	80	84	105	135	165	195
$a_{3,c}$ [mm]	15·d	80	84	105	135	165	195
$a_{4,t}$ [mm]	12·d	64	67	84	108	132	156
$a_{4,c}$ [mm]	7·d	37	39	49	63	77	91

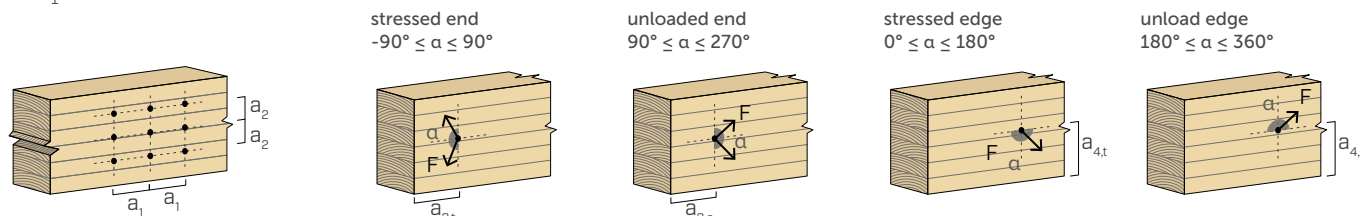
screws inserted **WITH** pre-drilled hole



d_1 [mm]		5,3	5,6	7	9	11	13
a_1 [mm]	5·d	27	28	35	45	55	65
a_2 [mm]	3·d	16	17	21	27	33	39
$a_{3,t}$ [mm]	12·d	64	67	84	108	132	156
$a_{3,c}$ [mm]	7·d	37	39	49	63	77	91
$a_{4,t}$ [mm]	3·d	16	17	21	27	33	39
$a_{4,c}$ [mm]	3·d	16	17	21	27	33	39

d_1 [mm]		5,3	5,6	7	9	11	13
a_1 [mm]	4·d	21	22	28	36	44	52
a_2 [mm]	4·d	21	22	28	36	44	52
$a_{3,t}$ [mm]	7·d	37	39	49	63	77	91
$a_{3,c}$ [mm]	7·d	37	39	49	63	77	91
$a_{4,t}$ [mm]	7·d	37	39	49	63	77	91
$a_{4,c}$ [mm]	3·d	16	17	21	27	33	39

α = load-to-grain angle
 d_1 = nominal screw diameter



NOTES

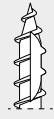
- The minimum distances comply with the EN 1995:2014 standard in accordance with ETA-11/0030.
- The minimum spacing for all panel-to-timber connections (a_1 , a_2) can be multiplied by a coefficient of 0,85.
- In the case of joints with elements in Douglas fir (*Pseudotsuga menziesii*), the minimum spacing and distances parallel to the grain must be multiplied by a coefficient of 1.5.
- The distances in the table refer to screws with 3 THORNS tip.
- The spacing a_1 for screws inserted without pre-drilling hole in timber elements with density $\rho_k \leq 420 \text{ kg/m}^3$ with minimum height and width equal to 10·d and load-to-grain angle $\alpha = 0^\circ$ equal to 10·d. Alternatively, adopt 12·d in accordance with EN 1995:2014.
- The distances in the table refer to screws inserted in softwood elements (solid timber or glulam). For applications on different materials (e.g. CLT, LVL), please see ETA-11/0030.

MINIMUM DISTANCES FOR AXIAL STRESSES | TIMBER

COMPARISON TIPS: SHARP 1 CUT, 3 THORNS and SELF-DRILLING

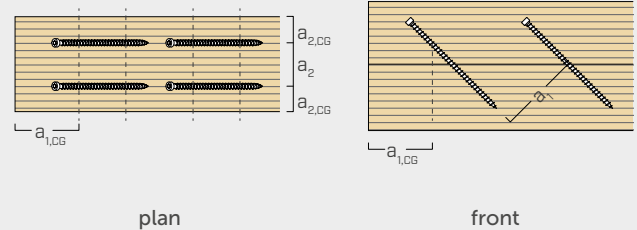
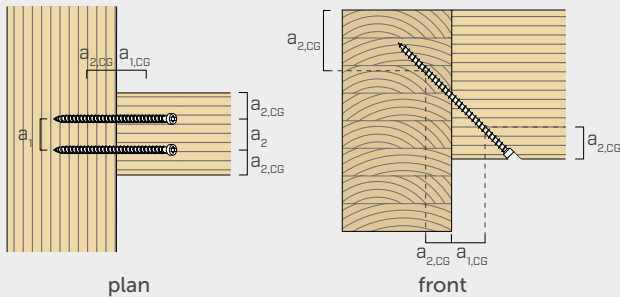


screws inserted **WITH** and **WITHOUT** pre-drilled hole

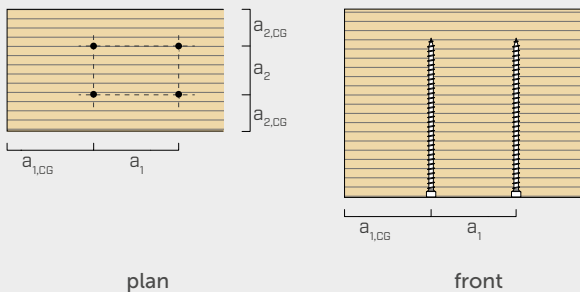


a_1	5·d	5·d	5·d
a_2	5·d	5·d	5·d
$a_{2,LIM}$	3·d	3·d	3·d
$a_{1,CG}$	10·d	10·d	10·d
$a_{2,CG}$	4·d	4·d	4·d
a_{CROSS}	1,5·d	1,5·d	1,5·d

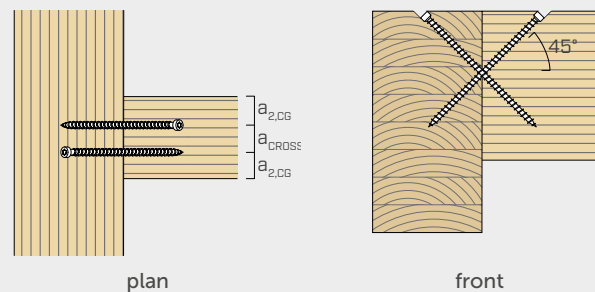
SCREWS UNDER TENSION INSERTED WITH AN ANGLE α WITH RESPECT TO THE GRAIN



SCREWS INSERTED WITH $\alpha = 90^\circ$ ANGLE WITH RESPECT TO THE GRAIN



CROSSED SCREWS INSERTED WITH AN ANGLE α WITH RESPECT TO THE GRAIN



NOTES

- The minimum distances comply with the EN 1995:2014 standard in accordance with ETA-11/0030.
- The minimum distances are independent of the insertion angle of the connector and the angle of the force with respect to the grain.
- The axial distance a_2 can be reduced down to $a_{2,LIM}$ if for each connector a "joint surface" $a_1 a_2 = 25 d_1$ is maintained.
- For main beam-secondary beam joints with VGZ screws $d = 7$ mm inclined or crossed, inserted at an angle of 45° to the secondary beam head, with a minimum secondary beam height of $18 d$, the minimum distance $a_{1,CG}$ can be assumed equal to $8 \cdot d_1$ and the minimum distance $a_{2,CG}$ equal to $3 \cdot d_1$.
- The distances in the table refer to screws inserted in softwood elements (solid timber or glulam). For applications on different materials (e.g. CLT, LVL) please see ETA-11/0030.

LEGEND



standard tip
SHARP 1 CUT
type RBN / RBN2

(in gradual transition to 3 THORNS and SELF-DRILLING)



tip
3 THORNS
type RB3T

(available from **spring 2024**)



tip
SELF-DRILLING
type RBSD

(available from **spring 2024**)

MINIMUM DISTANCES FOR AXIAL STRESSES | TIMBER

FULLY THREADED SCREW

VGZ - VGZ EVO
VGS - VGS EVO

SHARP 1 CUT



screws inserted **WITH** and **WITHOUT** pre-drilled hole

d ₁	[mm]		5,3	5,6	7	9	11	13
a ₁	[mm]	5·d	27	28	35	45	55	65
a ₂	[mm]	5·d	27	28	35	45	55	65
a _{2,LIM}	[mm]	2,5·d	13	14	18	23	28	33
a _{1,CG}	[mm]	10·d	53	56	70	90	110	130
a _{2,CG}	[mm]	4·d	21	22	28	36	44	52
a _{CROSS}	[mm]	1,5·d	8	8	11	14	17	20

FULLY THREADED SCREW

VGZ - VGZ EVO
VGS - VGS EVO

3 THORNS



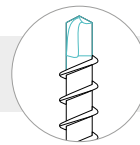
screws inserted **WITH** and **WITHOUT** pre-drilled hole

d ₁	[mm]		5,3	5,6	7	9	11	13
a ₁	[mm]	5·d	27	28	35	45	55	65
a ₂	[mm]	5·d	27	28	35	45	55	65
a _{2,LIM}	[mm]	2,5·d	13	14	18	23	28	33
a _{1,CG}	[mm]	10·d	53	56	70	90	110	130
a _{2,CG}	[mm]	4·d	21	22	28	36	44	52
a _{CROSS}	[mm]	1,5·d	8	8	11	14	17	20

FULLY THREADED SCREW

VGZ - VGZ EVO
VGS - VGS EVO

SELF-DRILLING



screws inserted **WITH** and **WITHOUT** pre-drilled hole

d ₁	[mm]		9	11	13
a ₁	[mm]	5·d	45	55	65
a ₂	[mm]	5·d	45	55	65
a _{2,LIM}	[mm]	2,5·d	23	28	33
a _{1,CG}	[mm]	10·d	90	110	130
a _{2,CG}	[mm]	4·d	36	44	52
a _{CROSS}	[mm]	1,5·d	14	17	20

d = d₁ = nominal screw diameter

NOTES

- The minimum distances comply with the EN 1995:2014 standard in accordance with ETA-11/0030.
- The minimum distances are independent of the insertion angle of the connector and the angle of the force with respect to the grain.
- The axial distance a₂ can be reduced down to a_{2,LIM} if for each connector a "joint surface" a₁ a₂ = 25 d₁ is maintained.
- For main beam-secondary beam joints with VGZ screws d = 7 mm inclined or crossed, inserted at an angle of 45° to the secondary beam head, with a minimum secondary beam height of 18 d, the minimum distance a_{1,CG} can be assumed equal to 8·d₁ and the minimum distance a_{2,CG} equal to 3·d₁.
- The distances in the table refer to screws inserted in softwood elements (solid timber or glulam). For applications on different materials (e.g. CLT, LVL), please see ETA-11/0030.
- For the indication of distances and spacing, see the diagrams on page 12.

MINIMUM DISTANCES FOR CROSSED CONNECTORS

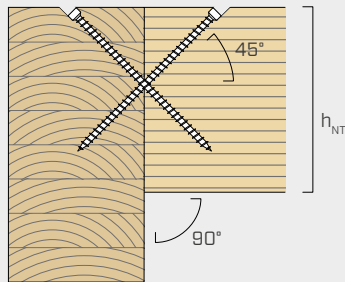
COMPARISON TIPS: SHARP 1 CUT, 3 THORNS and SELF-DRILLING



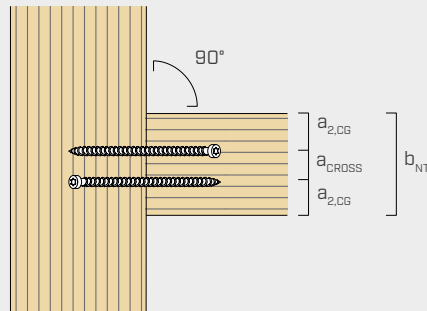
screws inserted **WITH** and **WITHOUT** pre-drilled hole



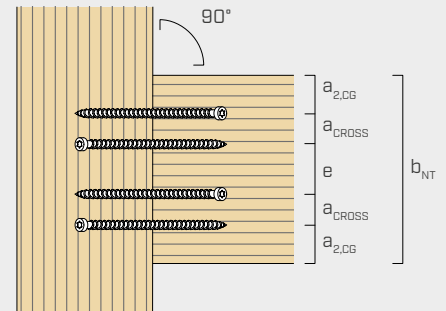
$a_{2,CG}$	$4 \cdot d$	$4 \cdot d$	$4 \cdot d$
a_{CROSS}	$1,5 \cdot d$	$1,5 \cdot d$	$1,5 \cdot d$
e	$3,5 \cdot d$	$3,5 \cdot d$	$3,5 \cdot d$



section



plan - 1 PAIR



plan - 2 OR MORE PAIRS

SECONDARY BEAM WIDTH



1 PAIR- $b_{NT,min}$	$2 \cdot a_{2,CG} + a_{CROSS}$	$9,5 \cdot d$	$9,5 \cdot d$	$9,5 \cdot d$
2 PAIRS- $b_{NT,min}$	$2 \cdot a_{2,CG} + 2 \cdot a_{CROSS} + e$	$14,5 \cdot d$	$14,5 \cdot d$	$14,5 \cdot d$
3 PAIRS- $b_{NT,min}$	$2 \cdot a_{2,CG} + 3 \cdot a_{CROSS} + 2 \cdot e$	$19,5 \cdot d$	$19,5 \cdot d$	$19,5 \cdot d$

NOTES

- The minimum distances comply with the EN 1995:2014 standard in accordance with ETA-11/0030.
- The minimum distances are independent of the insertion angle of the connector and the angle of the force with respect to the grain.
- The axial distance a_2 can be reduced down to $a_{2,LIM}$ if for each connector a "joint surface" $a_1 a_2 = 25 d_1$ is maintained.
- For main beam-secondary beam joints with VGZ screws $d = 7$ mm inclined or crossed, inserted at an angle of 45° to the secondary beam head, with a minimum secondary beam height of $18 d$, the minimum distance $a_{2,CG}$ can be assumed equal to $3 \cdot d_1$.
- The distances in the table refer to screws inserted in softwood elements (solid timber or glulam). For applications on different materials (e.g. CLT, LVL), please see ETA-11/0030.

LEGEND



standard tip
SHARP 1 CUT
type RBN / RBN2

(in gradual transition to 3 THORNS and SELF-DRILLING)



tip
3 THORNS
type RB3T

(available from **spring 2024**)



tip
SELF-DRILLING
type RBSD

(available from **spring 2024**)

MINIMUM DISTANCES FOR CROSSED CONNECTORS

FULLY THREADED SCREW

VGZ - VGZ EVO
VGS - VGS EVO

SHARP 1 CUT



screws inserted **WITH and WITHOUT** pre-drilled hole

d ₁	[mm]		5,3	5,6	7	9	11	13
a _{2,CG}	[mm]	4·d	21	22	21(*)	36	44	52
a _{CROSS}	[mm]	1,5·d	8	8	11	14	17	20
e	[mm]	3,5·d	19	20	25	32	39	46

d ₁	[mm]		5,3	5,6	7	9	11	13
1 PAIR- b _{NT,min}	[mm]	9,5·d	50	53	53(*)	86	105	124
2 PAIRS- b _{NT,min}	[mm]	14,5·d	77	81	88(*)	131	160	189
3 PAIRS- b _{NT,min}	[mm]	19,5·d	103	109	123(*)	176	215	254

FULLY THREADED SCREW

VGZ - VGZ EVO
VGS - VGS EVO

3 THORNS



screws inserted **WITH and WITHOUT** pre-drilled hole

d ₁	[mm]		5,3	5,6	7	9	11	13
a _{2,CG}	[mm]	4·d	21	22	21(*)	36	44	52
a _{CROSS}	[mm]	1,5·d	8	8	11	14	17	20
e	[mm]	3,5·d	19	20	25	32	39	46

d ₁	[mm]		5,3	5,6	7	9	11	13
1 PAIR- b _{NT,min}	[mm]	9,5·d	50	53	53(*)	86	105	124
2 PAIRS- b _{NT,min}	[mm]	14,5·d	77	81	88(*)	131	160	189
3 PAIRS- b _{NT,min}	[mm]	19,5·d	103	109	123(*)	176	215	254

FULLY THREADED SCREW

VGZ - VGZ EVO
VGS - VGS EVO

SELF-DRILLING



screws inserted **WITH and WITHOUT** pre-drilled hole

d ₁	[mm]		9	11	13
a _{2,CG}	[mm]	4·d	36	44	52
a _{CROSS}	[mm]	1,5·d	14	17	20
e	[mm]	3,5·d	32	39	46

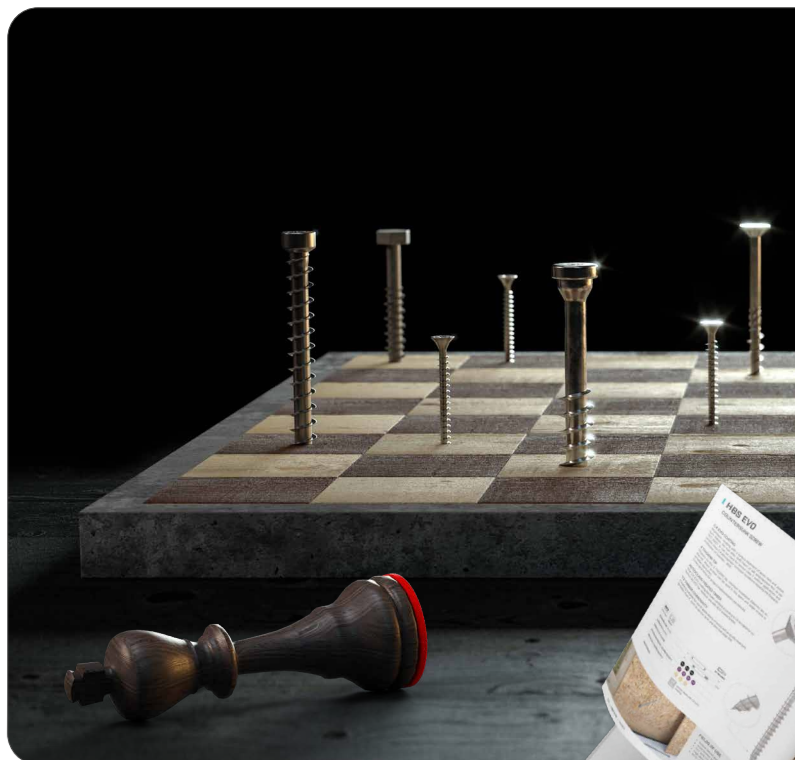
d ₁	[mm]		9	11	13
1 PAIR- b _{NT,min}	[mm]	9,5·d	86	105	124
2 PAIRS- b _{NT,min}	[mm]	14,5·d	131	160	189
3 PAIRS- b _{NT,min}	[mm]	19,5·d	176	215	254

d = d₁ = nominal screw diameter

NOTES

- The minimum distances comply with the EN 1995:2014 standard in accordance with ETA-11/0030.
- The distances in the table refer to screws inserted in softwood elements (solid timber or glulam). For applications on different materials (e.g. CLT, LVL), please see ETA-11/0030.

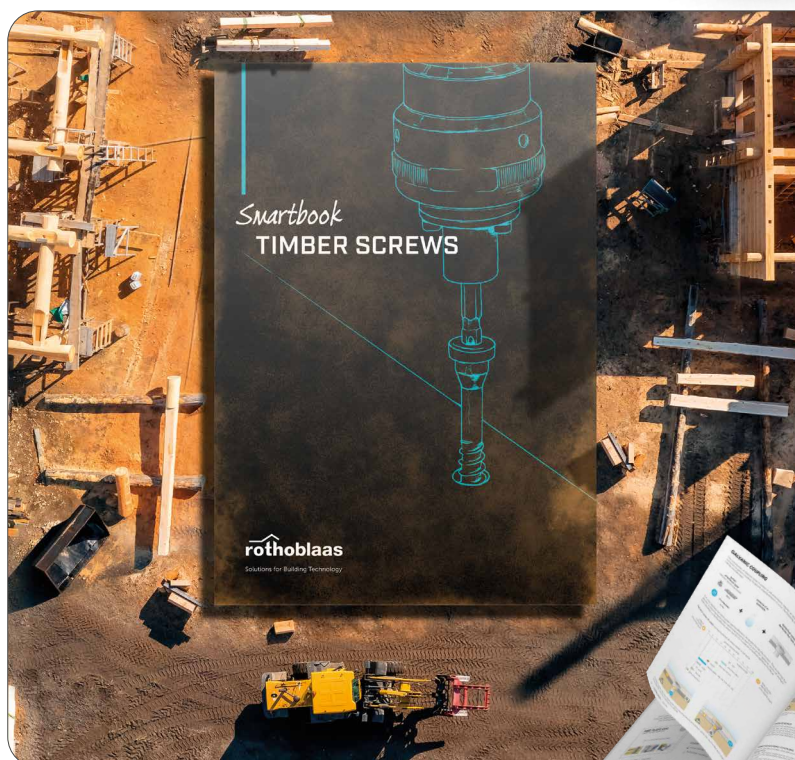
(*) For main beam-secondary beam joints with VGZ screws d = 7 mm inclined or crossed, inserted at an angle of 45° to the secondary beam head, with a minimum secondary beam height of 18 d, the minimum distance a_{2,CG} can be assumed equal to 3·d₁.



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