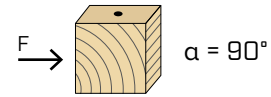
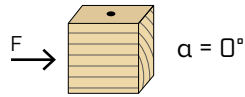


MINIMUM DISTANCES FOR SHEAR LOADS | TIMBER

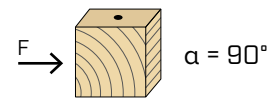
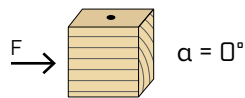
screws inserted **WITHOUT** pre-drilled hole $G \leq 0.50$



d_1	[in]	0.36	0.44	0.52	0.60
	[mm]	9	11	13	15
a_1	[in]	15·d	5 5/16	6 1/2	7 11/16
a_2	[in]	5·d	1 3/4	2 3/16	2 9/16
$a_{3,t}$	[in]	15·d	5 5/16	6 1/2	7 11/16
$a_{3,c}$	[in]	10·d	3 1/2	4 3/8	5 1/8
$a_{4,t}$	[in]	10·d	3 1/2	4 3/8	5 1/8
$a_{4,c}$	[in]	5·d	1 3/4	2 3/16	2 9/16

	0.36	0.44	0.52	0.60
	9	11	13	15
10·d	3 1/2	4 3/8	5 1/8	6
5·d	1 3/4	2 3/16	2 9/16	2 15/16
15·d	5 5/16	6 1/2	7 11/16	8 7/8
10·d	3 1/2	4 3/8	5 1/8	6
10·d	3 1/2	4 3/8	5 1/8	6
5·d	1 3/4	2 3/16	2 9/16	2 15/16

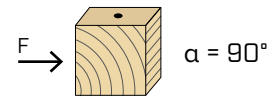
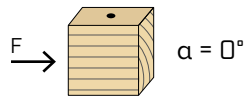
screws inserted **WITHOUT** pre-drilled hole $G > 0.50$



d_1	[in]	0.36	0.44	0.52	0.60
	[mm]	9	11	13	15
a_1	[in]	15·d	5 5/16	6 1/2	7 11/16
a_2	[in]	7·d	2 1/2	3 1/16	3 9/16
$a_{3,t}$	[in]	20·d	7 1/8	8 5/8	10 1/4
$a_{3,c}$	[in]	15·d	5 5/16	6 1/2	7 11/16
$a_{4,t}$	[in]	12·d	4 1/4	5 3/16	6 1/8
$a_{4,c}$	[in]	7·d	2 1/2	3 1/16	3 9/16

	0.36	0.44	0.52	0.60
	9	11	13	15
10·d	3 1/2	4 3/8	5 1/8	6
7·d	2 1/2	3 1/16	3 9/16	4 1/8
20·d	7 1/8	8 5/8	10 1/4	11 3/4
15·d	5 5/16	6 1/2	7 11/16	8 7/8
12·d	4 1/4	5 3/16	6 1/8	7 1/8
7·d	2 1/2	3 1/16	3 9/16	4 1/8

screws inserted **WITH** pre-drilled hole



d_1	[in]	0.36	0.44	0.52	0.60
	[mm]	9	11	13	15
a_1	[in]	10·d	3 1/2	5·d	2 3/16
a_2	[in]	4·d	1 7/16	5·d	2 3/16
$a_{3,t}$	[in]	12·d	4 1/4	7·d	3 1/16
$a_{3,c}$	[in]	7·d	2 1/2	4·d	1 3/4
$a_{4,t}$	[in]	7·d	2 1/2	4·d	1 3/4
$a_{4,c}$	[in]	3·d	1 1/16	3·d	1 5/16

	0.36	0.44	0.52	0.60
	9	11	13	15
5·d	1 3/4	5·d	2 3/16	2 9/16
4·d	1 7/16	5·d	2 3/16	2 9/16
12·d	4 1/4	7·d	3 1/16	3 9/16
7·d	2 1/2	4·d	1 3/4	2 1/16
7·d	2 1/2	4·d	1 3/4	2 1/16
3·d	1 1/16	3·d	1 5/16	1 9/16

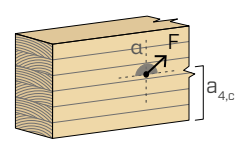
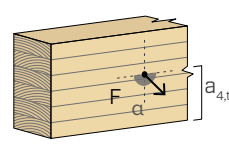
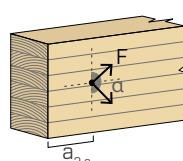
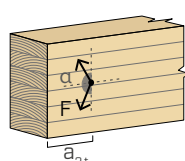
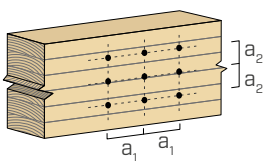
α = load-to-grain angle
 d = d_1 = nominal diameter of the screw

stressed end
 $-90^\circ < \alpha < 90^\circ$

unloaded end
 $90^\circ < \alpha < 270^\circ$

stressed edge
 $0^\circ < \alpha < 180^\circ$

unload edge
 $180^\circ < \alpha < 360^\circ$



NOTES

- The minimum spacing and distances comply with Table 8 of ESR-4645, where d refers to the nominal diameter of the screw;
- Wood member stresses must be checked in accordance with the corresponding Sections of the NDS; end distances, edge distances and fastener spacing may need to be increased accordingly.

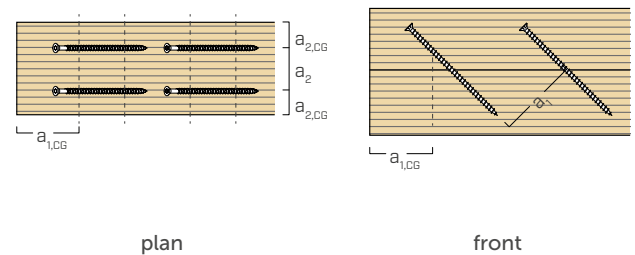
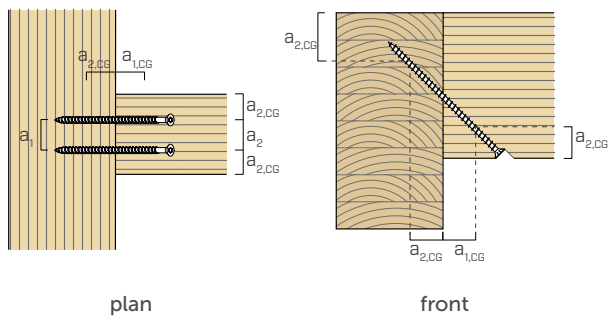
MINIMUM DISTANCES FOR AXIAL STRESSES | TIMBER

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

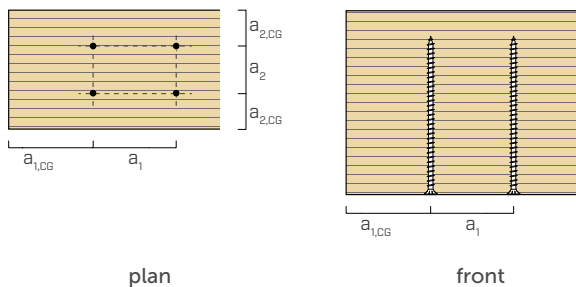
d_1	[in]	0.36	0.44	0.52	0.60
	[mm]	9	11	13	15
a_1	[in]	7·d 2 1/2	7·d 3 1/16	3 9/16	4 1/8
a_2	[in]	4·d 1 7/16	5·d 2 3/16	2 9/16	2 15/16
$a_{1,CG}$	[in]	10·d 3 1/2	10·d 4 3/8	5 1/8	6
$a_{2,CG}$	[in]	4·d 1 7/16	4·d 1 3/4	2 1/16	2 3/8
a_{CROSS}	[in]	1,5·d 9/16	1,5·d 11/16	13/16	7/8

d_1	[in]	0.36	0.44	0.52	0.60
	[mm]	9	11	13	15
a_1	[in]	7·d 2 1/2	5·d 2 3/16	2 9/16	2 15/16
a_2	[in]	3·d 1 1/16	5·d 2 3/16	2 9/16	2 15/16
$a_{1,CG}$	[in]	7·d 2 1/2	4·d 1 3/4	2 1/16	2 3/8
$a_{2,CG}$	[in]	3·d 1 1/16	3·d 1 5/16	1 9/16	1 3/4
a_{CROSS}	[in]	1,5·d 9/16	1,5·d 11/16	13/16	7/8

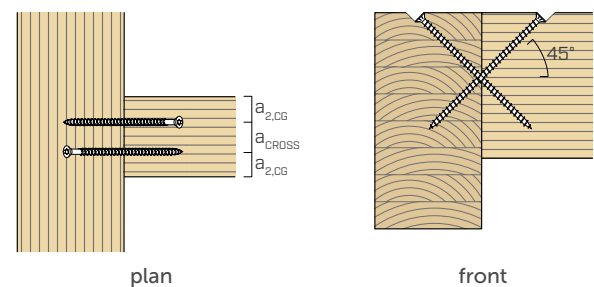
SCREWS UNDER TENSION INSERTED WITH AN ANGLE α WITH RESPECT TO THE GRAIN



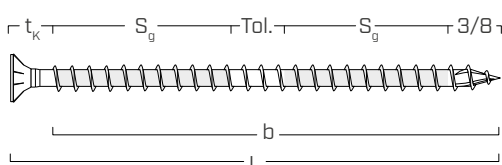
SCREWS INSERTED WITH $\alpha = 90^\circ$ ANGLE WITH RESPECT TO THE GRAIN



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



EFFECTIVE THREAD USED IN CALCULATION



$$b = S_{g,tot} = L - t_K$$

$$S_g = (L - t_K - 3/8" - Tol.) / 2$$

$$t_K = 3/8" \text{ (countersunk head)}$$

$$t_K = 3/4" \text{ (hexagonal head)}$$

represents the entire length of the threaded part

represents the partial length of the threaded part net of a laying tolerance (Tol.) of 3/8"

NOTES

- The minimum spacing and distances comply with Table 8 of ESR-4645, where d refers to the nominal diameter of the screw;
- Wood member stresses must be checked in accordance with the corresponding Sections of the NDS; end distances, edge distances and fastener spacing may need to be increased accordingly.