TBS EVO

FLANGE HEAD SCREW

ELC-4645 ESR-4645 UKTA-0836 22/6195 ETA-11/0030

C4 EVO COATING

Multilayer coating with a surface treatment of epoxy resin and aluminium flakes. No rust after 1440 hours of salt spray exposure test, as per ISO 9227. Can be used in service class 3 outdoor applications and under class C4 atmospheric corrosion conditions.

INTEGRATED WASHER

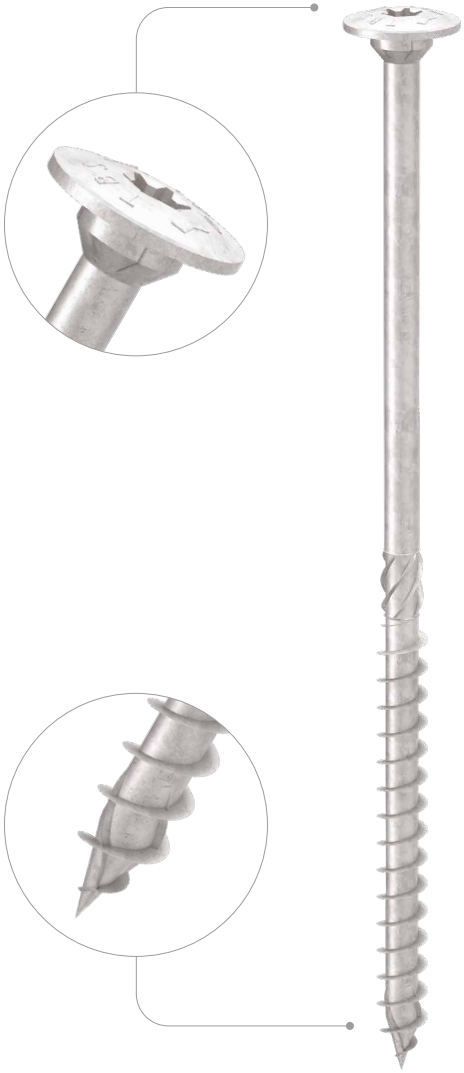
The flange head serves as washer and ensures high head strength and pull-through. Ideal in the presence of wind or variations in timber dimensions.

AUTOCLAVE-TREATED TIMBER

The C4 EVO coating has been certified according to US acceptance criterion AC257 for outdoor use in ACQ-treated wood.

T3 TIMBER CORROSIVITY

Coating suitable for use in applications on wood with an acidity level (pH) greater than 4, such as spruce, larch and pine. For more information see the "TIMBER SCREWS AND DECK FASTENING" catalogue at www.rothoblaas.com



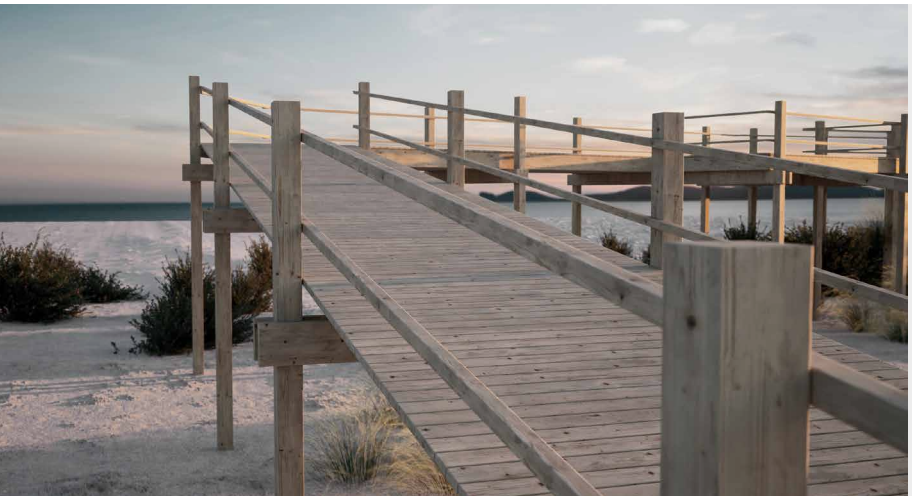
MANUALS

BIT INCLUDED

DIAMETER [mm]	6 **6 – 10** 16
LENGTH [mm]	40 **60 – 400** 1000
SERVICE CONDITION	EC1 EC3
ATMOSPHERIC CORROSIVITY	C1 C2 C3 C4
WOOD CORROSIVITY	T1 T2 T3
MATERIAL	C4 EVO COATING — carbon steel with C4 EVO coating
CORE HARDNESS	<390 HV — as required in CSA 086:24(1)

CANADIAN DESIGN VALUES

USA, EU and more design values available online.



FIELDS OF USE

- timber based panels
- solid timber and glulam
- CLT and LVL
- high density woods
- ACQ, CCA treated timber

(1) Core hardness < 390 HV guaranteed for structural timber screws diameter 6 mm and above.

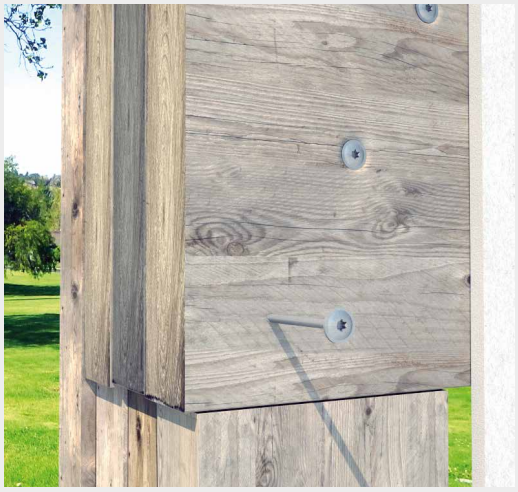
OUTDOOR WALKWAYS

Ideal for the construction of outdoor structures such as walkways and arcades. Values also certified for screw insertion parallel to the grain. Ideal for fastening aggressive woods containing tannins.

SIP PANELS

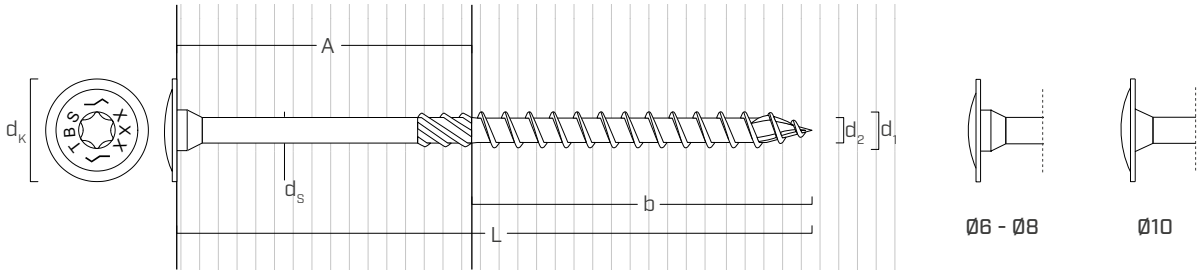
Values also tested, certified and calculated for CLT and high density woods such as Microllam® LVL. Suitable for fastening SIP and sandwich panels.

Fastening Wood Trusses outdoors.



Multi-ply beam fastening.

GEOMETRY AND MECHANICAL CHARACTERISTICS



GEOMETRY

Nominal diameter	**d_1**	**[mm]**	**6**	**8**	**10**
Head diameter	d_K	[mm]	15,50	19,00	25,00
Root diameter	d_2	[mm]	3,95	5,40	6,40
Shank diameter	d_S	[mm]	4,30	5,80	7,00
Pre-drilling hole diameter(1)	$d_{V,S}$	[mm]	4,0	5,0	6,0
Pre-drilling hole diameter(2)	$d_{V,H}$	[mm]	4,0	6,0	7,0

(1) Pre-drilling valid for softwood.
(2) Pre-drilling valid for hardwood and beech LVL.

MECHANICAL PROPERTIES

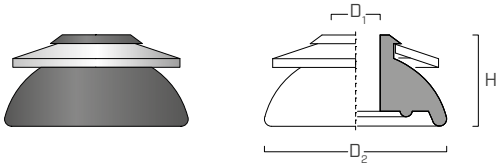
Nominal diameter	**d_1**	**[mm]**		**6**	**8**	**10**
Factored tensile strength	Φf_u	[kN]		8,56	14,70	19,51
Bending yield strength	F_{yb}	[MPa]		1188	1047	1080
Factored shear strength of the screw	Φv_s	[kN]		4,71	8,79	12,35
Specified withdrawal resistance per millimeter of threaded shank (tip included)	Y_w	[N/mm]	G=0.35	52,38	69,83	87,29
			G=0.42	60,60	80,80	101,00
			G=0.49	68,55	91,40	114,26
			G=0.55	75,19	100,25	125,32
Specified head pull-through resistance per screw	F_{pt}	[kN]	G=0.35	1,79	2,51	3,85
			G=0.42	2,15	3,01	4,62
			G=0.49	2,50	3,51	5,39
			G=0.55	2,81	3,94	6,05

CODES AND DIMENSIONS

d_1 [mm]	d_K [mm]	CODE	L [mm]	b [mm]	A [mm]	pcs
6 TX 30	15,5	**TBSEVO660**	60	40	20	100
		TBSEVO680	80	50	30	100
		TBSEVO6100	100	60	40	100
		TBSEVO6120	120	75	45	100
		TBSEVO6140	140	75	65	100
		TBSEVO6160	160	75	85	100
		TBSEVO6180	180	75	105	100
		TBSEVO6200	200	75	125	100
8 TX 40	19,0	**TBSEVO8100**	100	52	48	50
		TBSEVO8120	120	80	40	50
		TBSEVO8140	140	80	60	50
		TBSEVO8160	160	100	60	50
		TBSEVO8180	180	100	80	50
		TBSEVO8200	200	100	100	50
		TBSEVO8220	220	100	120	50
		TBSEVO8240	240	100	140	50
		TBSEVO8280	280	100	180	50
		TBSEVO8320	320	100	220	50
		TBSEVO8360	360	100	260	50
		TBSEVO8400	400	100	300	50

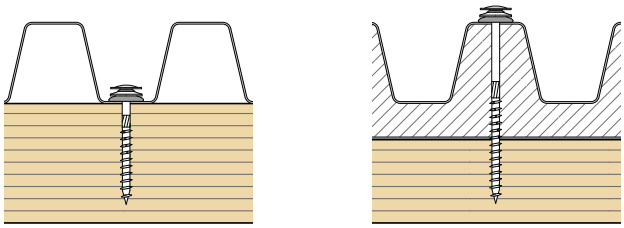
d_1 [mm]	d_K [mm]	CODE	L [mm]	b [mm]	A [mm]	pcs
10 TX 50	25,0	**TBSEVO10120**	120	60	60	50
		TBSEVO10140	140	60	80	50
		TBSEVO10160	160	80	80	50
		TBSEVO10180	180	80	100	50
		TBSEVO10200	200	100	100	50
		TBSEVO10220	220	100	120	50
		TBSEVO10240	240	100	140	50
		TBSEVO10280	280	100	180	50

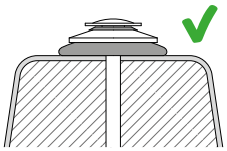
WBAZ WASHER



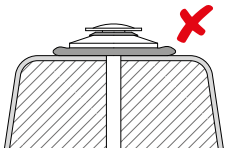
CODE	screw [mm]	D_2 [mm]	H [mm]	D_1 [mm]	pcs
WBAZ25A2	6,0 - 6,5	25	15	6,5	100

INSTALLATION

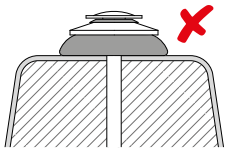




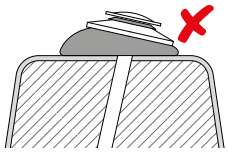
Correct tightening



Excessive tightening



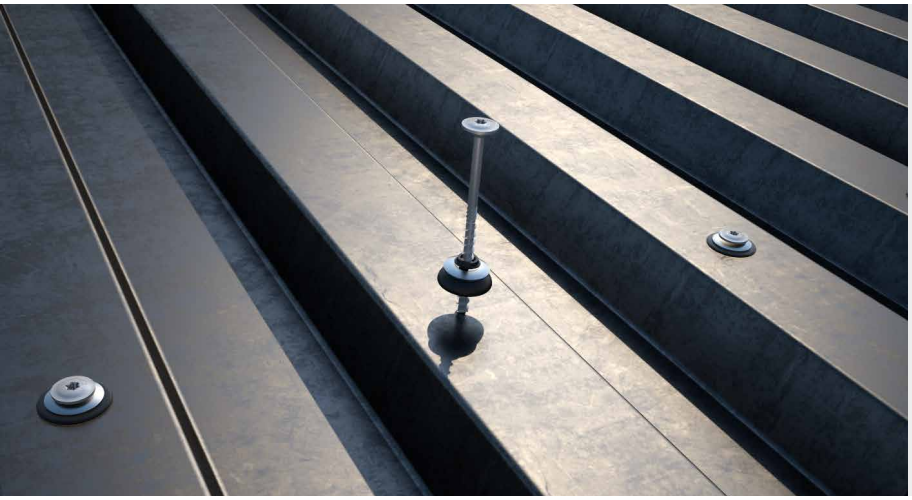
Insufficient tightening



Tightening off axis

TBS EVO + WBAZ Ø x L	fastening package [mm]
6 x 60	min. 0 - max. 30
6 x 80	min. 10 - max. 50
6 x 100	min. 30 - max. 70
6 x 120	min. 50 - max. 90
6 x 140	min. 70 - max. 110
6 x 160	min. 90 - max. 130
6 x 180	min. 110 - max. 150
6 x 200	min. 130 - max. 170

NOTE: The thickness of the washer after installation is approximately 8-9 mm.
The maximum thickness of the fastening package was calculated by ensuring a minimum penetration length into the wood of 4·d.

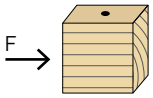


FASTENING METAL SHEET

Can be installed on sheets up to 0,7 mm thick without pre-drilling. TBS EVO Ø6 mm is ideal when used in combination with washer WBAZ. For outdoor use (Service class 3).

MINIMUM DISTANCES FOR SHEAR LOADS | TIMBER

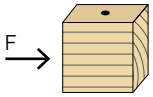
screws inserted **WITHOUT pre-drilled hole** — **G ≤ 0.44**



d_1		6 [mm]	*0.24 [in]*	8 [mm]	*0.32 [in]*	10 [mm]	*0.40 [in]*
S_P	**12·d‡**	72	*2 13/16*	96	*3 3/4*	120	*4 3/4*
S_Q	**5·d**	30	*1 3/16*	40	*1 9/16*	50	*1 15/16*
a_L	**15·d‡**	90	*3 1/2*	120	*4 3/4*	150	*6*
a	**10·d‡**	60	*2 3/8*	80	*3 1/8*	100	*4*
e_Q	**10·d**	60	*2 3/8*	80	*3 1/8*	100	*4*
e_P	**5·d**	30	*1 3/16*	40	*1 9/16*	50	*1 15/16*

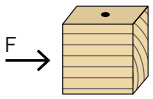
‡ For Western Red Cedar, this minimum spacing shall be increased by 50%.

screws inserted **WITHOUT pre-drilled hole** — **0.44 < G ≤ 0.50**



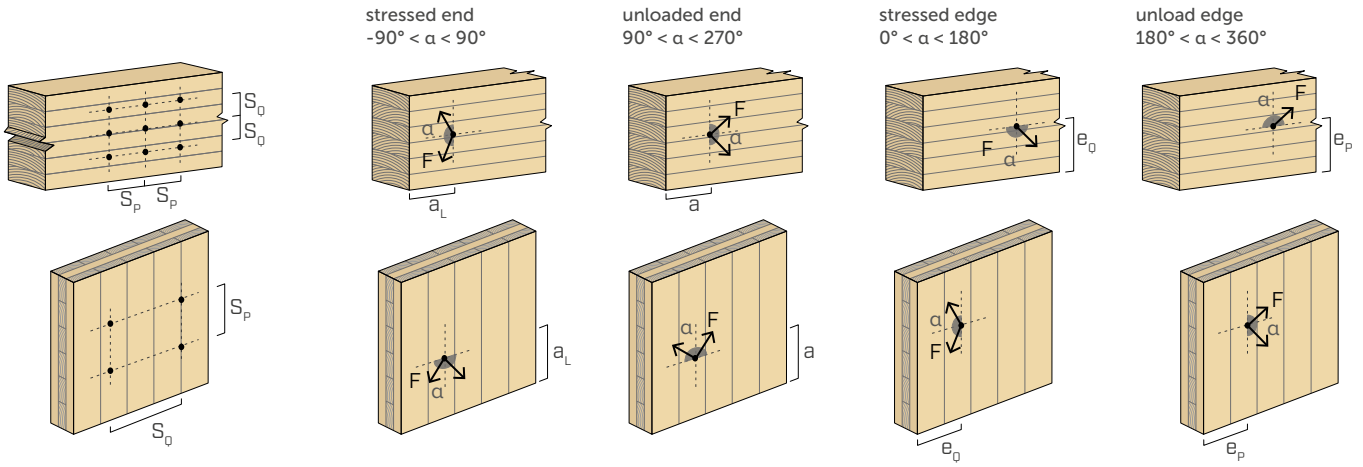
d_1		6 [mm]	*0.24 [in]*	8 [mm]	*0.32 [in]*	10 [mm]	*0.40 [in]*
S_P	**18·d**	108	*4 1/4*	144	*5 11/16*	180	*7 1/8*
S_Q	**7·d**	42	*1 5/8*	56	*2 3/16*	70	*2 3/4*
a_L	**22·d**	132	*5 3/16*	176	*6 15/16*	220	*8 5/8*
a	**15·d**	90	*3 1/2*	120	*4 3/4*	150	*6*
e_Q	**12·d**	72	*2 13/16*	96	*3 3/4*	120	*4 3/4*
e_P	**7·d**	42	*1 5/8*	56	*2 3/16*	70	*2 3/4*

screws inserted **WITH pre-drilled hole**



d_1		6 [mm]	*0.24 [in]*	8 [mm]	*0.32 [in]*	10 [mm]	*0.40 [in]*
S_P	**5·d†**	30	*1 3/16*	40	*1 9/16*	50	*1 15/16*
S_Q	**4·d**	24	*15/16*	32	*1 1/4*	40	*1 9/16*
a_L	**12·d†**	72	*2 13/16*	96	*3 3/4*	120	*4 3/4*
a	**7·d†**	42	*1 5/8*	56	*2 3/16*	70	*2 3/4*
e_Q	**7·d**	42	*1 5/8*	56	*2 3/16*	70	*2 3/4*
e_P	**3·d**	18	*11/16*	24	*15/16*	30	*1 3/16*

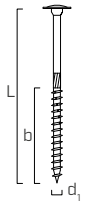
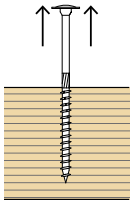
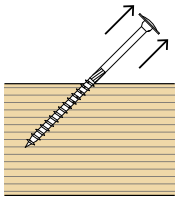
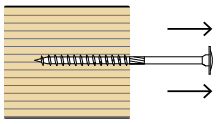
† For Douglas Fir–Larch and Western Red Cedar, this minimum spacing shall be increased by 50%.
d = d_1 = nominal diameter of the screw
α = load-to-grain angle



NOTES

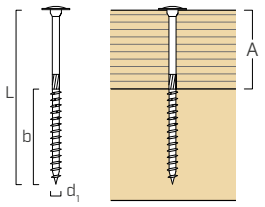
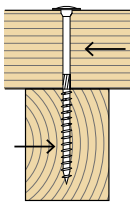
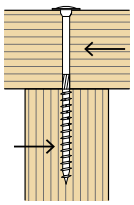
- The minimum spacing and distances comply with Clause 12.12.5 of CSA O86:24, where d_1 refers to the nominal diameter of the self-tapping screw.
- The spacing, end, and edge distances for Rothoblaas screws installed in the narrow face of CLT panels shall comply with the specifications outlined in ETA-11/0030.
- The placement of fasteners subjected to axial loading shall be determined in accordance with Clause 12.12.5 of CSA O86:24.

TENSION[1]

geometry			thread withdrawal α = 90°				thread withdrawal α = 45°				end grain α = 0°				steel tension
															
			factored withdrawal resistance P_{rw}				factored withdrawal resistance P_{rw}				factored withdrawal resistance P_{rw}[2][3]				factored tension resistance T_{rs}
d_1	L		b	G 0.35	G 0.42	G 0.49	G 0.55	G 0.35	G 0.42	G 0.49	G 0.55	G 0.35	G 0.42	G 0.49	G 0.55	
[mm] *[in]*	[mm]	*[in]*	[mm]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
6 *0.24*	60	*2 3/8*	40	1,25	1,44	1,63	1,79	1,13	1,31	1,48	1,63	0,62	0,72	0,82	0,89	8,56
	80	*3 1/8*	50	1,61	1,87	2,11	2,32	1,47	1,70	1,92	2,11	0,81	0,93	1,06	1,16	
	100	*4*	60	1,98	2,29	2,59	2,84	1,80	2,08	2,36	2,58	0,99	1,15	1,30	1,42	
	120	*4 3/4*	75	2,53	2,93	3,31	3,63	2,30	2,66	3,01	3,30	1,26	1,46	1,66	1,82	
	140	*5 1/2*	75	2,53	2,93	3,31	3,63	2,30	2,66	3,01	3,30	1,26	1,46	1,66	1,82	
	160	*6 1/4*	75	2,53	2,93	3,31	3,63	2,30	2,66	3,01	3,30	1,26	1,46	1,66	1,82	
	180	*7 1/8*	75	2,53	2,93	3,31	3,63	2,30	2,66	3,01	3,30	1,26	1,46	1,66	1,82	
	200	*8*	75	2,53	2,93	3,31	3,63	2,30	2,66	3,01	3,30	1,26	1,46	1,66	1,82	
8 *0.32*	100	*4*	52	2,15	2,49	2,82	3,09	1,96	2,26	2,56	2,81	1,08	1,24	1,41	1,54	14,7
	120	*4 3/4*	80	3,52	4,07	4,61	5,05	3,20	3,70	4,19	4,59	1,76	2,04	2,30	2,53	
	140	*5 1/2*	80	3,52	4,07	4,61	5,05	3,20	3,70	4,19	4,59	1,76	2,04	2,30	2,53	
	160	*6 1/4*	100	4,50	5,20	5,89	6,46	4,09	4,73	5,35	5,87	2,25	2,60	2,94	3,23	
	180	*7 1/8*	100	4,50	5,20	5,89	6,46	4,09	4,73	5,35	5,87	2,25	2,60	2,94	3,23	
	200	*8*	100	4,50	5,20	5,89	6,46	4,09	4,73	5,35	5,87	2,25	2,60	2,94	3,23	
	220	*8 5/8*	100	4,50	5,20	5,89	6,46	4,09	4,73	5,35	5,87	2,25	2,60	2,94	3,23	
	240	*9 1/2*	100	4,50	5,20	5,89	6,46	4,09	4,73	5,35	5,87	2,25	2,60	2,94	3,23	
	280	*11*	100	4,50	5,20	5,89	6,46	4,09	4,73	5,35	5,87	2,25	2,60	2,94	3,23	
	320	*12 5/8*	100	4,50	5,20	5,89	6,46	4,09	4,73	5,35	5,87	2,25	2,60	2,94	3,23	
	360	*14 1/4*	100	4,50	5,20	5,89	6,46	4,09	4,73	5,35	5,87	2,25	2,60	2,94	3,23	
	400	*15 3/4*	100	4,50	5,20	5,89	6,46	4,09	4,73	5,35	5,87	2,25	2,60	2,94	3,23	
10 *0.40*	120	*4 3/4*	60	3,06	3,54	4,00	4,39	2,78	3,21	3,64	3,99	1,53	1,77	2,00	2,19	19,51
	140	*5 1/2*	60	3,06	3,54	4,00	4,39	2,78	3,21	3,64	3,99	1,53	1,77	2,00	2,19	
	160	*6 1/4*	80	4,28	4,95	5,60	6,14	3,89	4,50	5,09	5,58	2,14	2,47	2,80	3,07	
	180	*7 1/8*	80	4,28	4,95	5,60	6,14	3,89	4,50	5,09	5,58	2,14	2,47	2,80	3,07	
	200	*8*	100	5,50	6,36	7,20	7,90	5,00	5,78	6,55	7,18	2,75	3,18	3,60	3,95	
	220	*8 5/8*	100	5,50	6,36	7,20	7,90	5,00	5,78	6,55	7,18	2,75	3,18	3,60	3,95	
	240	*9 1/2*	100	5,50	6,36	7,20	7,90	5,00	5,78	6,55	7,18	2,75	3,18	3,60	3,95	
	280	*11*	100	5,50	6,36	7,20	7,90	5,00	5,78	6,55	7,18	2,75	3,18	3,60	3,95	

α = screw-to-grain angle

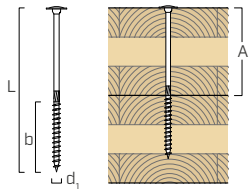
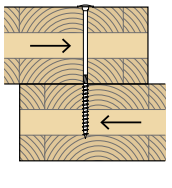
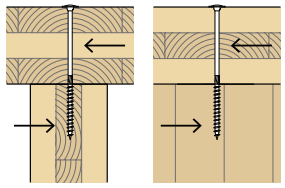
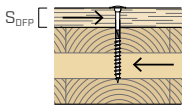
NOTES and GENERAL PRINCIPLES on page 10.

geometry					SHEAR[4]							
					timber-to-timber α = 90°				timber-to-timber α = 0°			
												
					factored lateral resistance N_r				factored lateral resistance N_r[2][3]			
					G				G			
d_1	L		b	A	0.35	0.42	0.49	0.55	0.35	0.42	0.49	0.55
[mm] *[in]*	[mm]	*[in]*	[mm]	[mm]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
	60	*2 3/8*	40	20	0,90	1,07	1,23	1,37	0,51	0,60	0,70	0,78
	80	*3 1/8*	50	30	1,10	1,27	1,43	1,57	0,69	0,82	0,95	1,06
	100	*4*	60	40	1,19	1,38	1,57	1,72	0,85	0,97	1,09	1,19
6	120	*4 3/4*	75	45	1,24	1,44	1,60	1,72	0,98	1,12	1,26	1,38
0.24	140	*5 1/2*	75	65	1,29	1,45	1,60	1,72	0,98	1,12	1,26	1,38
	160	*6 1/4*	75	85	1,29	1,45	1,60	1,72	0,98	1,12	1,26	1,38
	180	*7 1/8*	75	105	1,29	1,45	1,60	1,72	0,98	1,12	1,26	1,38
	200	*8*	75	125	1,29	1,45	1,60	1,72	0,98	1,12	1,26	1,38
	100	*4*	52	48	1,64	1,97	2,29	2,58	1,09	1,28	1,43	1,55
	120	*4 3/4*	80	40	1,73	1,99	2,25	2,46	1,30	1,55	1,79	1,99
	140	*5 1/2*	80	60	1,97	2,28	2,54	2,73	1,44	1,64	1,84	2,00
	160	*6 1/4*	100	60	1,97	2,28	2,54	2,73	1,53	1,77	2,01	2,21
	180	*7 1/8*	100	80	2,06	2,31	2,54	2,73	1,53	1,77	2,01	2,21
8	200	*8*	100	100	2,06	2,31	2,54	2,73	1,53	1,77	2,01	2,21
0.32	220	*8 5/8*	100	120	2,06	2,31	2,54	2,73	1,53	1,77	2,01	2,21
	240	*9 1/2*	100	140	2,06	2,31	2,54	2,73	1,53	1,77	2,01	2,21
	280	*11*	100	180	2,06	2,31	2,54	2,73	1,53	1,77	2,01	2,21
	320	*12 5/8*	100	220	2,06	2,31	2,54	2,73	1,53	1,77	2,01	2,21
	360	*14 1/4*	100	260	2,06	2,31	2,54	2,73	1,53	1,77	2,01	2,21
	400	*15 3/4*	100	300	2,06	2,31	2,54	2,73	1,53	1,77	2,01	2,21
	120	*4 3/4*	60	60	2,36	2,83	3,30	3,70	1,56	1,80	2,00	2,17
	140	*5 1/2*	60	80	2,64	3,08	3,48	3,82	1,59	1,80	2,00	2,17
	160	*6 1/4*	80	80	2,92	3,33	3,67	3,94	1,85	2,11	2,36	2,56
10	180	*7 1/8*	80	100	2,95	3,33	3,67	3,94	1,85	2,11	2,36	2,56
0.40	200	*8*	100	100	2,97	3,33	3,67	3,94	2,10	2,42	2,72	2,96
	220	*8 5/8*	100	120	2,97	3,33	3,67	3,94	2,10	2,42	2,72	2,96
	240	*9 1/2*	100	140	2,97	3,33	3,67	3,94	2,10	2,42	2,72	2,96
	280	*11*	100	180	2,97	3,33	3,67	3,94	2,10	2,42	2,72	2,96

α = screw-to-grain angle

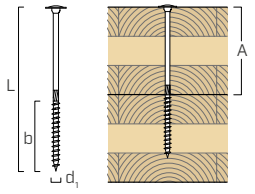
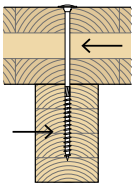
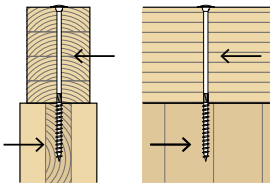
NOTES and **GENERAL PRINCIPLES** on page 10.

SHEAR[4]

geometry					CLT-CLT lateral face α = 90°				CLT-CLT α = 0°				spline joint lateral face α = 90°				
																	
					factored lateral resistance N_r (5)				factored lateral resistance N_r (2)(3)					factored lateral resistance N_r			
d_1	L		b	A	G				G				S_{DFP}	G			
					0.35	0.42	0.49	0.55	0.35	0.42	0.49	0.55		0.35	0.42	0.49	0.55
[mm] *[in]*	[mm]	*[in]*	[mm]	[mm]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[mm] *[in]*	[kN]	[kN]	[kN]	[kN]
	60	*2 3/8*	40	35	0,70	0,84	0,97	1,08	0,48	0,58	0,65	0,70		1,00	1,13	1,27	1,35
	80	*3 1/8*	50	45	0,97	1,16	1,33	1,45	0,61	0,69	0,76	0,83		1,23	1,30	1,33	1,35
	100	*4*	60	55	1,17	1,36	1,54	1,66	0,69	0,78	0,87	0,95		1,26	1,30	1,33	1,35
6	120	*4 3/4*	75	65	1,24	1,39	1,54	1,66	0,77	0,88	0,98	1,07	12,7	1,26	1,30	1,33	1,35
0.24	140	*5 1/2*	75	75	1,24	1,39	1,54	1,66	0,85	0,97	1,09	1,19	*1/2*	1,26	1,30	1,33	1,35
	160	*6 1/4*	75	85	1,24	1,39	1,54	1,66	0,93	1,07	1,20	1,31		1,26	1,30	1,33	1,35
	180	*7 1/8*	75	105	1,24	1,39	1,54	1,66	0,93	1,07	1,20	1,31		1,26	1,30	1,33	1,35
	200	*8*	75	125	1,24	1,39	1,54	1,66	0,93	1,07	1,20	1,31		1,26	1,30	1,33	1,35
	100	*4*	52	55	1,52	1,82	2,10	2,35	1,00	1,13	1,26	1,36		1,91	2,09	2,14	2,18
	120	*4 3/4*	80	65	1,73	2,08	2,36	2,59	1,11	1,26	1,40	1,52		2,03	2,09	2,14	2,18
	140	*5 1/2*	80	75	1,91	2,21	2,44	2,62	1,21	1,38	1,54	1,67		2,03	2,09	2,14	2,18
	160	*6 1/4*	100	85	1,98	2,21	2,44	2,62	1,32	1,50	1,68	1,83		2,03	2,09	2,14	2,18
	180	*7 1/8*	100	95	1,98	2,21	2,44	2,62	1,39	1,61	1,82	1,98		2,03	2,09	2,14	2,18
8	200	*8*	100	100	1,98	2,21	2,44	2,62	1,45	1,68	1,91	2,10	19,1	2,03	2,09	2,14	2,18
0.32	220	*8 5/8*	100	120	1,98	2,21	2,44	2,62	1,45	1,68	1,91	2,10	*3/4*	2,03	2,09	2,14	2,18
	240	*9 1/2*	100	140	1,98	2,21	2,44	2,62	1,45	1,68	1,91	2,10		2,03	2,09	2,14	2,18
	280	*11*	100	180	1,98	2,21	2,44	2,62	1,45	1,68	1,91	2,10		2,03	2,09	2,14	2,18
	320	*12 5/8*	100	220	1,98	2,21	2,44	2,62	1,45	1,68	1,91	2,10		2,03	2,09	2,14	2,18
	360	*14 1/4*	100	260	1,98	2,21	2,44	2,62	1,45	1,68	1,91	2,10		2,03	2,09	2,14	2,18
	400	*15 3/4*	100	300	1,98	2,21	2,44	2,62	1,45	1,68	1,91	2,10		2,03	2,09	2,14	2,18
	120	*4 3/4*	60	60	2,19	2,63	3,06	3,44	1,44	1,71	1,90	2,06		2,74	3,05	3,18	3,23
	140	*5 1/2*	60	80	2,44	2,91	3,30	3,62	1,51	1,71	1,90	2,06		2,84	3,05	3,18	3,23
	160	*6 1/4*	80	80	2,69	3,20	3,53	3,80	1,76	2,01	2,24	2,44		3,02	3,10	3,18	3,23
10	180	*7 1/8*	80	100	2,78	3,20	3,53	3,80	1,76	2,01	2,24	2,44	25,4	3,02	3,10	3,18	3,23
0.40	200	*8*	100	100	2,86	3,20	3,53	3,80	2,00	2,31	2,58	2,82	*1*	3,02	3,10	3,18	3,23
	220	*8 5/8*	100	120	2,86	3,20	3,53	3,80	2,00	2,31	2,58	2,82		3,02	3,10	3,18	3,23
	240	*9 1/2*	100	140	2,86	3,20	3,53	3,80	2,00	2,31	2,58	2,82		3,02	3,10	3,18	3,23
	280	*11*	100	180	2,86	3,20	3,53	3,80	2,00	2,31	2,58	2,82		3,02	3,10	3,18	3,23

α = screw-to-grain angle

NOTES and GENERAL PRINCIPLES on page 10.

geometry					SHEAR[4]							
					CLT-timber lateral face α = 90°				timber-CLT narrow face α = 0°			
												
					factored lateral resistance N_r				factored lateral resistance N_r [2][3]			
d_1	L		b	A	G				G			
					0.35	0.42	0.49	0.55	0.35	0.42	0.49	0.55
[mm] *[in]*	[mm]	*[in]*	[mm]	[mm]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
	60	*2 3/8*	40	20	0,88	1,04	1,20	1,32	0,49	0,59	0,68	0,75
	80	*3 1/8*	50	30	1,05	1,22	1,37	1,51	0,67	0,80	0,92	1,01
	100	*4*	60	40	1,14	1,32	1,50	1,64	0,82	0,93	1,04	1,13
6	120	*4 3/4*	75	45	1,19	1,37	1,56	1,69	0,93	1,07	1,21	1,32
0.24	140	*5 1/2*	75	65	1,27	1,42	1,57	1,69	0,93	1,07	1,21	1,32
	160	*6 1/4*	75	85	1,27	1,42	1,57	1,69	0,93	1,07	1,21	1,32
	180	*7 1/8*	75	105	1,27	1,42	1,57	1,69	0,93	1,07	1,21	1,32
	200	*8*	75	125	1,27	1,42	1,57	1,69	0,93	1,07	1,21	1,32
	100	*4*	52	48	1,58	1,90	2,21	2,48	1,07	1,23	1,37	1,48
	120	*4 3/4*	80	40	1,66	1,91	2,15	2,36	1,26	1,50	1,73	1,92
	140	*5 1/2*	80	60	1,88	2,17	2,46	2,67	1,38	1,57	1,76	1,92
	160	*6 1/4*	100	60	1,88	2,17	2,46	2,67	1,46	1,69	1,92	2,11
	180	*7 1/8*	100	80	2,02	2,26	2,48	2,67	1,46	1,69	1,92	2,11
8	200	*8*	100	100	2,02	2,26	2,48	2,67	1,46	1,69	1,92	2,11
0.32	220	*8 5/8*	100	120	2,02	2,26	2,48	2,67	1,46	1,69	1,92	2,11
	240	*9 1/2*	100	140	2,02	2,26	2,48	2,67	1,46	1,69	1,92	2,11
	280	*11*	100	180	2,02	2,26	2,48	2,67	1,46	1,69	1,92	2,11
	320	*12 5/8*	100	220	2,02	2,26	2,48	2,67	1,46	1,69	1,92	2,11
	360	*14 1/4*	100	260	2,02	2,26	2,48	2,67	1,46	1,69	1,92	2,11
	400	*15 3/4*	100	300	2,02	2,26	2,48	2,67	1,46	1,69	1,92	2,11
	120	*4 3/4*	60	60	2,27	2,73	3,18	3,57	1,52	1,72	1,92	2,07
	140	*5 1/2*	60	80	2,53	3,03	3,45	3,79	1,52	1,72	1,92	2,07
	160	*6 1/4*	80	80	2,80	3,25	3,59	3,87	1,78	2,02	2,26	2,45
10	180	*7 1/8*	80	100	2,91	3,26	3,59	3,87	1,78	2,02	2,26	2,45
0.40	200	*8*	100	100	2,91	3,26	3,59	3,87	2,02	2,32	2,60	2,83
	220	*8 5/8*	100	120	2,91	3,26	3,59	3,87	2,02	2,32	2,60	2,83
	240	*9 1/2*	100	140	2,91	3,26	3,59	3,87	2,02	2,32	2,60	2,83
	280	*11*	100	180	2,91	3,26	3,59	3,87	2,02	2,32	2,60	2,83

α = screw-to-grain angle

NOTES and **GENERAL PRINCIPLES** on page 10.

STRUCTURAL VALUES

GENERAL PRINCIPLES

- The reference factored lateral resistance for self-tapping screws has been determined following the guidelines in Clause 12.12 of the CSA O86:24 including the withdrawal restraint effect. Listed values are based on standard long term load duration factor (K_D = 1.0), dry service condition factor (K_{SF} = 1.0), and treatment factor (K_T = 1.0).
- The reference lateral design values are calculated for screws inserted without pre-drilling as per CSA O86:24 Clause 12.12.10.5.3. The direction of the bearing-to-grain angle does not influence lateral resistance. In the case of screws inserted with pre-drilling, greater resistance values can be obtained.
- Specified head pull-through capacities are taken from the ELC-4645 report. The withdrawal and head pull-through values provided in this datasheet are also applicable to CLT connections.
- Connection design requires comparing head pull-through resistance to both screw tensile capacity and thread withdrawal - the minimum of the three governs.
- Not all screw lengths satisfy the required embedment depth in either the side member ($4d_1$) or the main member ($8d_1$). Engineering discretion and judgment should be applied to evaluate the potential impact of reduced penetration on the connection's load-carrying capacity.
- TBS screws must be positioned in accordance with the minimum distances.
- G is the mean relative density according to CSA O86:24 Table A12. Most common wood species are assumed such as Northern species (G = 0.35), Spruce-Pine-Fir (G = 0.42), Douglas Fir (G = 0.49), and Southern Pine (G = 0.55).
- The tabulated lateral design values are based on both wood members having the same specific gravity G.
- As part of the connection design, the designer must size and verify both the structural wood members and the steel plates separately.
- Combined shear and tensile stresses shall comply with the interaction criteria outlined in CSA O86:24 Clause 12.12.11.

NOTES

(1) Factored withdrawal resistances were calculated with the entire threaded portion of the screw, b (in millimeters), minus the tip length, L_{tip}. The length of the tip is equal to the nominal diameter of the respective fasteners, d_1, as specified in the ELC-4645 report. Factor for fastener axis-to-grain angle, J_α, and the factor for dowel bearing effect for laterally loaded connections, J_w, varies according to connection geometry. The factored tensile resistance of the connector (P_{rt}) is governed by the lower value between the withdrawal resistance (P_{rw}), head pull-through resistance (P_{pt}) and the steel strength (T_{rs}).

(2) The angle between the fastener axis and the grain direction of the wood member, α, is taken as zero for the end grain calculations. Self-tapping screws installed perpendicular to the panel edge of CLT are assumed to be installed in the end grain of member.

(3) TBS screws installed in the end grain may not meet the minimum penetration requirement for withdrawal ($20d_1$) specified in CSA O86:24 Clause 12.12.6.1. Discretion and engineering judgment must be exercised to evaluate the impact of reduced penetration on the connection's capacity.

(4) Lateral resistances are factored and according to CSA O86:24 Clause 12.12.10. Values apply to dry service conditions and are representative of a single screw.

(5) The CLT-to-CLT boundary conditions are equally applicable to half-lap connections. Use the nearest connection geometry to determine the appropriate values.