

VGS EVO



FULLY THREADED SCREW WITH COUNTERSUNK OR HEXAGONAL HEAD

C4 EVO COATING

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 wet service outdoor applications and under class C4 atmospheric corrosion conditions.

STRUCTURAL APPLICATIONS

Approved for structural applications subject to stresses in any direction vs the grain (0° - 90°). Safety certified by numerous tests carried out for any direction of insertion. Cyclical SEISMIC-REV tests according to EN 12512. Countersunk head up to L = 600 mm, ideal for use on plates or for concealed reinforcements.

AUTOCLAVE-TREATED TIMBER

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

3 THORNS TIP

Thanks to the 3 THORNS tip, minimum installation distances are reduced. More screws can be used in less space and larger screws in smaller elements.



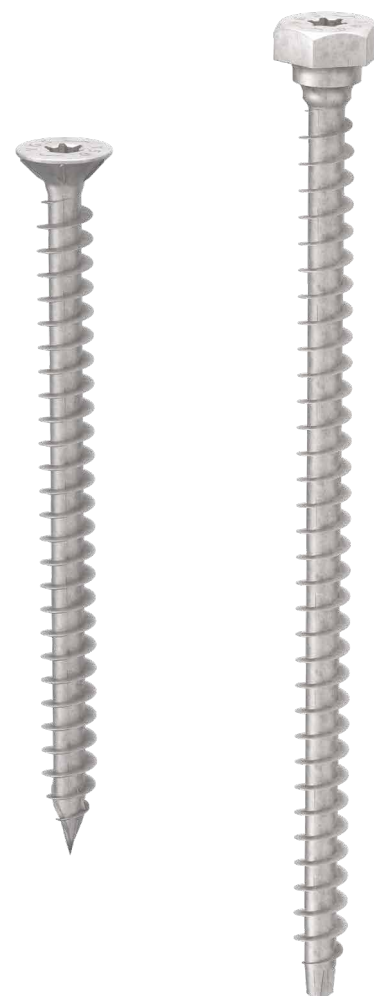
CANADIAN DESIGN VALUES

USA, EU and more design values available online.



BIT INCLUDED

DIAMETER [mm]	9 9 13 13
LENGTH [mm]	80 100 800 1500
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



METAL-to-TIMBER recommended use:



FIELDS OF USE

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



OUTDOOR STRUCTURAL PERFORMANCE

Ideal for fastening timber framed panels and trusses (Rafter, Truss). Values also tested, certified and calculated for high density woods. Ideal for fastening timber-framed panels and lattice beams (Rafter, Truss).

CLT & LVL

Values also tested, certified and calculated for CLT and high density woods such as laminated veneer lumber (LVL).

CODES AND DIMENSIONS

d ₁ [mm]	CODE	L [mm]	b [mm]	pcs
9 TX 40	VGSEVO9120	120	110	25
	VGSEVO9160	160	150	25
	VGSEVO9200	200	190	25
	VGSEVO9240	240	230	25
	VGSEVO9280	280	270	25
	VGSEVO9320	320	310	25
	VGSEVO9360	360	350	25
11 TX 50	VGSEVO11100	100	90	25
	VGSEVO11150	150	140	25
	VGSEVO11200	200	190	25
	VGSEVO11250	250	240	25
	VGSEVO11300	300	290	25
	VGSEVO11350	350	340	25
	VGSEVO11400	400	390	25
	VGSEVO11500	500	490	25
	VGSEVO11600	600	590	25

d ₁ [mm]	CODE	L [mm]	b [mm]	pcs
13 TX 50	VGSEVO13200	200	190	25
	VGSEVO13300	300	280	25
	VGSEVO13400	400	380	25
	VGSEVO13500	500	480	25
	VGSEVO13600	600	580	25
13 SW 19 TX 50	VGSEVO13700	700	680	25
	VGSEVO13800	800	780	25

RELATED PRODUCTS

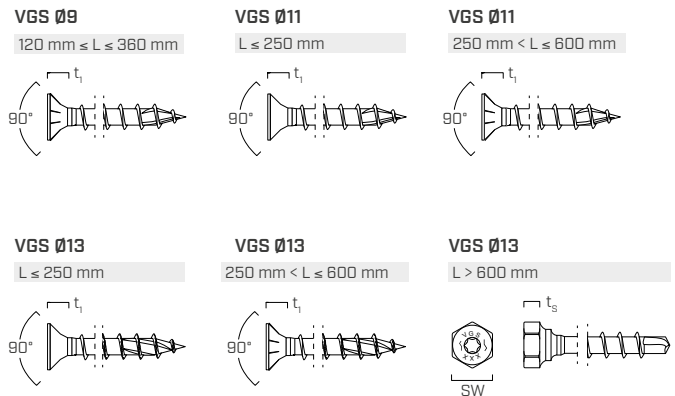
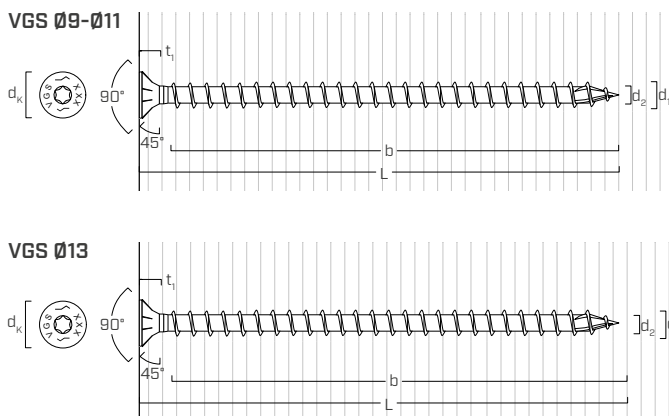


VGU EVO



TORQUE LIMITER

GEOMETRY AND MECHANICAL CHARACTERISTICS



GEOMETRY

Nominal diameter	d ₁	[mm]	9	11	13	13
Length	L	[mm]	-	-	≤ 600 mm	> 600 mm
Countersunk head diameter	d _K	[mm]	16,00	19,30	22,00	-
Countersunk head thickness	t ₁	[mm]	6,50	8,20	9,40	-
Wrench size	SW	-	-	-	-	SW 19
Hexagonal head thickness	t _s	[mm]	-	-	-	7,50
Thread diameter	d ₂	[mm]	5,90	6,60	8,00	8,00
Pre-drilling hole diameter ⁽¹⁾	d _{V,S}	[mm]	5,0	6,0	8,0	8,0
Pre-drilling hole diameter ⁽²⁾	d _{V,H}	[mm]	6,0	7,0	9,0	9,0

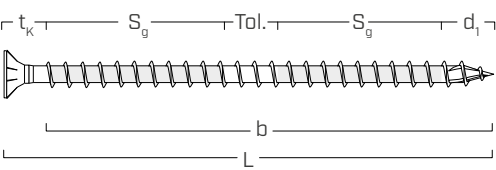
⁽¹⁾ Pre-drilling valid for softwood.

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

MECHANICAL PARAMETERS

Nominal diameter	d ₁	[mm]	9	11	13
Factored tensile strength	Φ _{f,u}	[kN]	17,84	23,17	31,96
Bending yield strength	F _{yb}	[MPa]	1069	1026	960
Specified withdrawal resistance per millimeter of threaded shank (tip included)	Y _w	[N/mm]	G=0.35	78,56	96,02
			G=0.42	90,9	111,1
			G=0.49	102,8	125,7
			G=0.55	112,8	137,9

EFFECTIVE THREAD USED IN CALCULATION



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

represents the entire length of the threaded part (see table above)

$$S_g = (b - d_1 - Tol.)/2$$

represents the partial length of the threaded part net of a laying tolerance (Tol.) of 10 mm

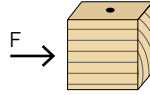
t_K = 10 mm or 20mm depending on head type and diameter

NOTES

- The length of the tip is equal to the nominal diameter of the respective fasteners, d₁, as specified in Table 2C of the ELC-4645 report.

MINIMUM DISTANCES FOR SHEAR LOADS

screws inserted **WITHOUT** pre-drilled hole $G \leq 0.44$

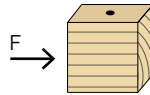


d_1		9 [mm]	0.36 [in]	11 [mm]	0.44 [in]	13 [mm]	0.52 [in]
S_P	12-d [†]	108	4 1/4	132	5 3/16	156	6 1/8
S_Q	5-d	45	1 3/4	55	2 3/16	65	2 9/16
a_L	15-d [†]	135	5 5/16	165	6 1/2	195	7 11/16
a	10-d [†]	90	3 1/2	110	4 3/8	130	5 1/8
e_Q	10-d	90	3 1/2	110	4 3/8	130	5 1/8
e_P	5-d	45	1 3/4	55	2 3/16	65	2 9/16

[†] For Douglas Fir–Larch and Western Red Cedar, this minimum spacing shall be increased by 50%.

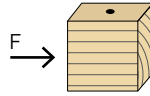
[‡] For Western Red Cedar, this minimum spacing shall be increased by 50%.

screws inserted **WITHOUT** pre-drilled hole $0.44 < G \leq 0.50$



d_1		9 [mm]	0.36 [in]	11 [mm]	0.44 [in]	13 [mm]	0.52 [in]
S_P	18-d	162	6 3/8	198	7 13/16	234	9 1/4
S_Q	7-d	63	2 1/2	77	3 1/16	91	3 9/16
a_L	22-d	198	7 13/16	242	9 1/2	286	11 1/4
a	15-d	135	5 5/16	165	6 1/2	195	7 11/16
e_Q	12-d	108	4 1/4	132	5 3/16	156	6 1/8
e_P	7-d	63	2 1/2	77	3 1/16	91	3 9/16

screws inserted **WITH** pre-drilled hole



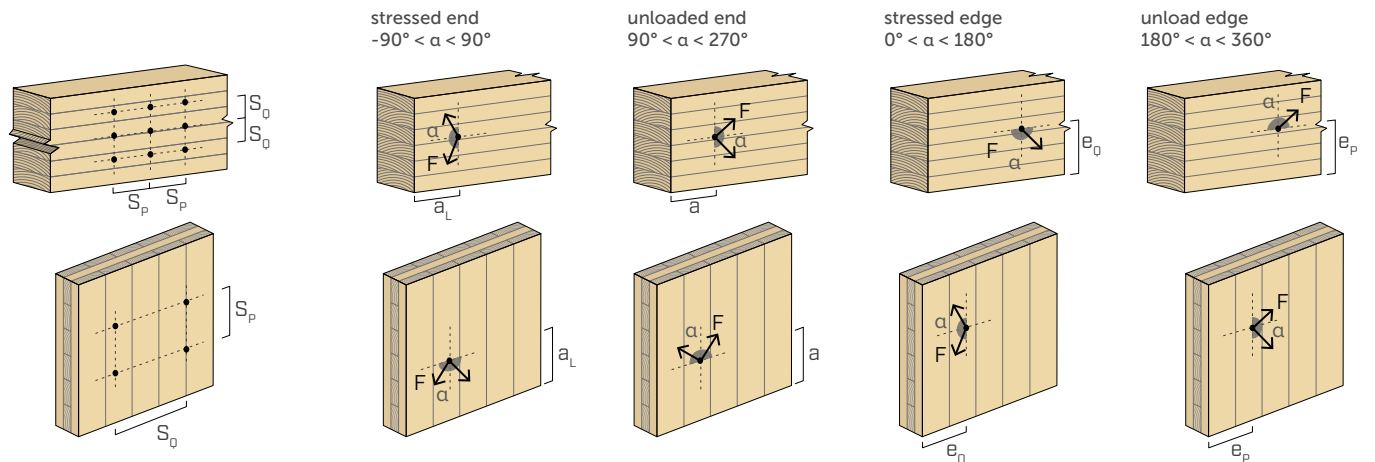
d_1		9 [mm]	0.36 [in]	11 [mm]	0.44 [in]	13 [mm]	0.52 [in]
S_P	5-d [†]	45	1 3/4	55	2 3/16	65	2 9/16
S_Q	4-d	36	1 7/16	44	1 3/4	52	2 1/16
a_L	12-d [†]	108	4 1/4	132	5 3/16	156	6 1/8
a	7-d [†]	63	2 1/2	77	3 1/16	91	3 9/16
e_Q	7-d	63	2 1/2	77	3 1/16	91	3 9/16
e_P	3-d	27	1 1/16	33	1 5/16	39	1 9/16

[†] For Douglas Fir–Larch and Western Red Cedar, this minimum spacing shall be increased by 50%.

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

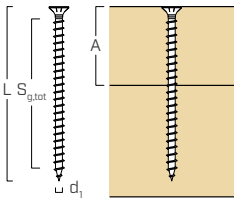
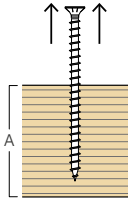
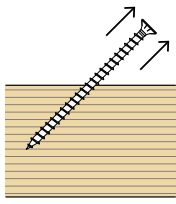
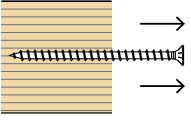
α = load-to-grain angle

d = d_1 = nominal screw diameter



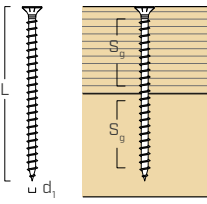
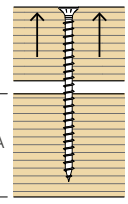
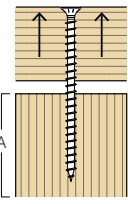
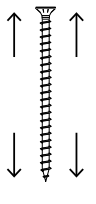
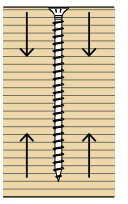
NOTES

- 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.

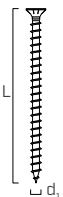
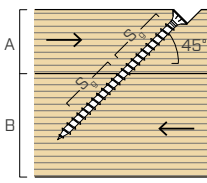
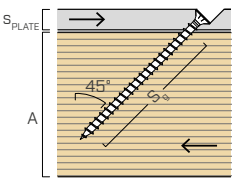
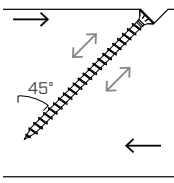
geometry					TENSION/COMPRESSION ⁽¹⁾											
					$\alpha = 90^\circ$				total thread withdrawal $\alpha = 45^\circ$				end grain $\alpha = 0^\circ$			
																
					factored withdrawal resistance P_{rw}				factored withdrawal resistance P_{rw}				factored withdrawal resistance $P_{rw}^{(2)}$			
					G				G				G			
d_1	L	$S_{g,tot}$	A_{min}		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] [in]	[mm] [in]		[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
9 0.36	120	4 3/4	101	130	5,55	6,43	7,27	7,97	5,05	5,84	6,61	7,25	2,78	3,21	3,63	3,99
	160	6 1/4	141	170	7,75	8,97	10,15	11,13	7,05	8,16	9,22	10,12	3,88	4,49	5,07	5,57
	200	8	181	210	9,95	11,52	13,02	14,29	9,05	10,47	11,84	12,99	4,98	5,76	6,51	7,15
	240	9 1/2	221	250	12,15	14,06	15,90	17,45	11,05	12,78	14,46	15,86	6,08	7,03	7,95	8,73
	280	11	261	290	14,35	16,61	18,78	20,61	13,05	15,10	17,07	18,74	7,18	8,30	9,39	10,30
	320	12 5/8	301	330	16,55	19,15	21,66	23,77	15,05	17,41	19,69	21,61	8,28	9,58	10,83	11,88
	360	14 1/4	341	370	18,75	21,70	24,54	26,93	17,05	19,73	22,31	24,48	9,38	10,85	12,27	13,46
11 0.44	100	4	79	110	5,31	6,14	6,95	7,63	4,83	5,59	6,32	6,93	2,65	3,07	3,48	3,81
	150	6	129	160	8,67	10,03	11,35	12,45	7,88	9,12	10,32	11,32	4,34	5,02	5,68	6,23
	200	8	179	210	12,03	13,92	15,75	17,28	10,94	12,66	14,32	15,71	6,02	6,96	7,88	8,64
	250	10	229	260	15,39	17,81	20,15	22,11	13,99	16,19	18,32	20,10	7,70	8,90	10,07	11,05
	300	11 3/4	279	310	18,75	21,70	24,55	26,93	17,05	19,73	22,32	24,48	9,38	10,85	12,27	13,47
	350	13 3/4	329	360	22,11	25,59	28,95	31,76	20,10	23,26	26,32	28,87	11,06	12,79	14,47	15,88
	400	15 3/4	379	410	25,47	29,47	33,35	36,58	23,16	26,80	30,32	33,26	12,74	14,74	16,67	18,29
	500	19 3/4	479	510	32,20	37,25	42,15	46,24	29,27	33,87	38,32	42,03	16,10	18,63	21,07	23,12
	600	23 5/8	579	610	38,92	45,03	50,95	55,89	35,38	40,94	46,31	50,81	19,46	22,51	25,47	27,95
13 0.52	200	8	177	210	14,06	16,29	18,40	20,18	12,78	14,81	16,73	18,35	7,03	8,15	9,20	10,09
	300	11 3/4	267	310	21,21	24,58	27,75	30,45	19,28	22,34	25,23	27,68	10,61	12,29	13,88	15,22
	400	15 3/4	367	410	29,16	33,78	38,15	41,85	26,51	30,71	34,68	38,04	14,58	16,89	19,07	20,92
	500	19 3/4	467	510	37,10	42,99	48,54	53,25	33,73	39,08	44,13	48,41	18,55	21,49	24,27	26,63
	600	23 5/8	567	610	45,05	52,19	58,94	64,66	40,95	47,45	53,58	58,78	22,52	26,10	29,47	32,33
	700	27 1/2	667	710	52,99	61,40	69,33	76,06	48,18	55,82	63,03	69,14	26,50	30,70	34,67	38,03
	800	31 1/2	767	810	60,94	70,60	79,73	87,46	55,40	64,18	72,48	79,51	30,47	35,30	39,86	43,73

α = screw-to-grain angle

NOTES and GENERAL PRINCIPLES on page 17.

					TENSION/COMPRESSION ⁽¹⁾									
geometry					partial thread withdrawal $\alpha = 90^\circ$				end grain $\alpha = 0^\circ$				steel tension	buckling $\alpha = 90^\circ$
														
					factored withdrawal resistance P_{rw}				factored withdrawal resistance $P_{rw}^{(2)}$				factored tension resistance T_{rs}	factored buckling resistance P_{rb}
d_1 [mm] [in]	L		S_g [mm]	A_{min} [mm]	G				G				[kN]	[kN]
	[mm]	[in]			0.35	0.42	0.49	0.55	0.35	0.42	0.49	0.55		
9 0.36	120	4 3/4	45	65	2,47	2,86	3,24	3,55	1,24	1,43	1,62	1,78	17,84	16,37
	160	6 1/4	65	85	3,57	4,14	4,68	5,13	1,79	2,07	2,34	2,57		
	200	8	85	105	4,67	5,41	6,12	6,71	2,34	2,70	3,06	3,36		
	240	9 1/2	105	125	5,77	6,68	7,56	8,29	2,89	3,34	3,78	4,15		
	280	11	125	145	6,87	7,95	9,00	9,87	3,44	3,98	4,50	4,94		
	320	12 5/8	145	165	7,97	9,23	10,43	11,45	3,99	4,61	5,22	5,72		
	360	14 1/4	165	185	9,07	10,50	11,87	13,03	4,54	5,25	5,94	6,51		
11 0.44	100	4	35	55	2,35	2,72	3,08	3,38	1,18	1,36	1,54	1,69	23,17	19,66
	150	6	60	80	4,03	4,67	5,28	5,79	2,02	2,33	2,64	2,90		
	200	8	85	105	5,71	6,61	7,48	8,21	2,86	3,31	3,74	4,10		
	250	10	110	130	7,39	8,55	9,68	10,62	3,70	4,28	4,84	5,31		
	300	11 3/4	135	155	9,07	10,50	11,88	13,03	4,54	5,25	5,94	6,52		
	350	13 3/4	160	180	10,75	12,44	14,08	15,44	5,38	6,22	7,04	7,72		
	400	15 3/4	185	205	12,43	14,39	16,28	17,86	6,22	7,19	8,14	8,93		
	500	19 3/4	235	255	15,80	18,28	20,68	22,68	7,90	9,14	10,34	11,34		
	600	23 5/8	285	305	19,16	22,16	25,08	27,51	9,58	11,08	12,54	13,76		
13 0.52	200	8	85	105	6,75	7,82	8,84	9,69	3,38	3,91	4,42	4,85	31,96	27,02
	300	11 3/4	130	155	10,33	11,97	13,51	14,82	5,16	5,98	6,76	7,41		
	400	15 3/4	180	205	14,30	16,57	18,71	20,53	7,15	8,28	9,36	10,26		
	500	19 3/4	230	255	18,27	21,17	23,91	26,23	9,14	10,59	11,95	13,11		
	600	23 5/8	280	305	22,25	25,77	29,11	31,93	11,12	12,89	14,55	15,96		
	700	27 1/2	330	355	26,22	30,38	34,30	37,63	13,11	15,19	17,15	18,81		
	800	31 1/2	380	405	30,19	34,98	39,50	43,33	15,10	17,49	19,75	21,67		

α = screw-to-grain angle

		SLIDING ⁽³⁾															
geometry		timber-to-timber								steel-to-timber						steel tension	
																	
d ₁	L		S _g	A	B _{min}	factored lateral resistance N _r ⁽⁴⁾				S _{PLATE} ⁽⁵⁾	S _g	A _{min}	factored lateral resistance N _r ⁽⁴⁾				factored tension resistance T _{rs}
						G							G				
[mm] [in]	[mm]	[in]	[mm]	[mm]	[mm]	0.35	0.42	0.49	0.55	[mm] [in]	[mm]	[mm]	0.35	0.42	0.49	0.55	[kN]
9 0.36	120	4 3/4	45	45	60	1,91	2,21	2,50	2,74	15,9 5/8	90	85	3,82	4,42	5,00	5,48	12,61
	160	6 1/4	65	60	75	2,76	3,19	3,61	3,96		130	115	5,51	6,38	7,22	7,92	
	200	8	85	75	90	3,61	4,17	4,72	5,18		170	140	7,21	8,34	9,44	10,35	
	240	9 1/2	105	90	105	4,45	5,15	5,83	6,40		210	170	8,91	10,31	11,66	12,79	
	280	11	125	105	120	5,30	6,14	6,94	7,61		250	200	10,61	12,27	13,88	15,23	
	320	12 5/8	145	115	130	6,15	7,12	8,05	8,83		290	225	12,30	14,23	16,10	17,66	
	360	14 1/4	165	130	145	7,00	8,10	9,16	10,05		330	255	14,00	16,20	18,32	20,10	
11 0.44	100	4	35	40	55	1,81	2,10	2,38	2,61	19,1 3/4	60	65	3,11	3,60	4,07	4,47	16,38
	150	6	60	60	75	3,11	3,60	4,07	4,47		110	100	5,70	6,60	7,47	8,19	
	200	8	85	75	90	4,41	5,10	5,77	6,33		160	135	8,30	9,60	10,86	11,91	
	250	10	110	95	110	5,70	6,60	7,47	8,19		210	170	10,89	12,60	14,25	15,64	
	300	11 3/4	135	110	125	7,00	8,10	9,16	10,05		260	205	13,48	15,60	17,65	19,36	
	350	13 3/4	160	130	145	8,30	9,60	10,86	11,91		310	240	16,07	18,60	21,04	23,08	
	400	15 3/4	185	145	160	9,59	11,10	12,56	13,78		360	275	18,67	21,60	24,43	26,81	
	500	19 3/4	235	180	195	12,18	14,10	15,95	17,50		460	350	23,85	27,60	31,22	34,25	
	600	23 5/8	285	220	235	14,78	17,10	19,34	21,22		560	420	29,03	33,59	38,01	41,70	
13 0.52	200	8	85	80	95	5,21	6,04	6,82	7,48	22,2 7/8	155	135	9,50	11,01	12,43	13,63	22,60
	300	11 3/4	130	110	125	7,97	9,23	10,42	11,43		255	205	15,63	18,11	20,45	22,43	
	400	15 3/4	180	145	160	11,03	12,78	14,43	15,83		355	275	21,76	25,21	28,47	31,23	
	500	19 3/4	230	180	195	14,10	16,33	18,44	20,23		455	345	27,89	32,31	36,48	40,02	
	600	23 5/8	280	215	230	17,16	19,88	22,45	24,63		555	415	34,01	39,41	44,50	48,82	
	700	27 1/2	330	250	265	20,22	23,43	26,46	29,03		-	-	-	-	-	-	
	800	31 1/2	380	285	300	23,29	26,98	30,47	33,43		-	-	-	-	-	-	

NOTES and GENERAL PRINCIPLES on page 17.

geometry					SHEAR ^[6]							
					timber-to-timber							
					$\alpha = 90^\circ$				$\alpha = 0^\circ$			
					factored lateral resistance N_r				factored lateral resistance $N_r^{(2)}$			
d_1	L		S_g	$A^{(7)}$	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]
9 0.36	120	4 3/4	45	60	2,18	2,59	3,00	3,34	1,37	1,55	1,73	1,87
	160	6 1/4	65	80	2,85	3,17	3,48	3,73	1,61	1,83	2,05	2,23
	200	8	85	100	3,12	3,49	3,84	4,13	1,85	2,12	2,38	2,59
	240	9 1/2	105	120	3,40	3,81	4,20	4,52	2,09	2,40	2,70	2,90
	280	11	125	140	3,67	4,13	4,56	4,90	2,33	2,62	2,88	3,09
	320	12 5/8	145	160	3,91	4,28	4,62	4,90	2,48	2,78	3,06	3,29
	360	14 1/4	165	180	3,91	4,28	4,62	4,90	2,62	2,94	3,24	3,49
11 0.44	100	4	35	50	2,07	2,46	2,85	3,18	1,34	1,59	1,84	2,03
	150	6	60	75	3,24	3,81	4,17	4,47	1,86	2,12	2,37	2,57
	200	8	85	100	3,84	4,29	4,72	5,07	2,22	2,54	2,85	3,11
	250	10	110	125	4,26	4,78	5,27	5,68	2,58	2,97	3,34	3,62
	300	11 3/4	135	150	4,68	5,27	5,75	6,09	2,94	3,31	3,65	3,92
	350	13 3/4	160	175	4,86	5,32	5,75	6,09	3,17	3,56	3,92	4,22
	400	15 3/4	185	200	4,86	5,32	5,75	6,09	3,38	3,80	4,20	4,52
	500	19 3/4	235	250	4,86	5,32	5,75	6,09	3,67	4,02	4,35	4,60
	600	23 5/8	285	300	4,86	5,32	5,75	6,09	3,67	4,02	4,35	4,60
13 0.52	200	8	80	100	4,95	5,53	6,06	6,50	2,75	3,13	3,50	3,80
	300	11 3/4	125	150	5,81	6,52	7,18	7,73	3,58	4,11	4,62	5,03
	400	15 3/4	175	200	6,65	7,28	7,87	8,33	4,32	4,85	5,34	5,74
	500	19 3/4	225	250	6,65	7,28	7,87	8,33	4,82	5,42	5,95	6,30
	600	23 5/8	275	300	6,65	7,28	7,87	8,33	5,03	5,51	5,95	6,30
	700	27 1/2	325	350	6,65	7,28	7,87	8,33	5,03	5,51	5,95	6,30
	800	31 1/2	375	400	6,65	7,28	7,87	8,33	5,03	5,51	5,95	6,30

α = screw-to-grain angle.

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 factored thread withdrawal resistance were evaluated considering a penetration length of $S_{g, tot}$ or S_g , as shown in the table. For intermediate values of S_g it is possible to linearly interpolate.
- The reference lateral design values are calculated for screws inserted without pre-drilling hole 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 hole, greater resistance values can be obtained.
- The steel plate is assumed to be ASTM A36 with a minimum ultimate tensile strength, f_u , equal to 58 ksi (400 MPa).
- VGS EVO 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 Table 2C of 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.
- (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.
- (3) For fully threaded screws, the head pull-through resistance is not relevant to the connection capacity, instead, thread withdrawal governs. These values must be compared to the tensile resistance of the screw, with the lower value determining the governing resistance.
- (4) The 45° inclined screw is intended to work in withdrawal and the resulting resistance of the connection is given by the projection of the withdrawal resistance (along screw axis) onto the shear plane.
- (5) The plate thickness (S_{PLATE}) are understood to be the minimum values to allow the countersunk head of the screw to be accommodated.
- (6) 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.
- (7) The fixable thickness (A) is considered as half the length of the screw ($L/2$).