

LBS HARDWOOD EVO

ROUND HEAD SCREW FOR PLATES ON HARDWOODS

C4 EVO COATING

The atmospheric corrosion strength class (C4) of the C4 EVO coating was tested by the Research Institutes of Sweden - RISE. Coating suitable for use in applications on wood with an acidity level (pH) greater than 4, such as spruce, larch and pine (see the "TIMBER SCREWS AND DECK FASTENING" catalogue at www.rothoblaas.com)

HARDWOOD CERTIFICATION

Special tip with embossed slit elements. Canadian certified according to ELC-4645 allows for use with high density timber without any pre-drill. Approved for structural applications subject to stresses in any direction vs the grain.

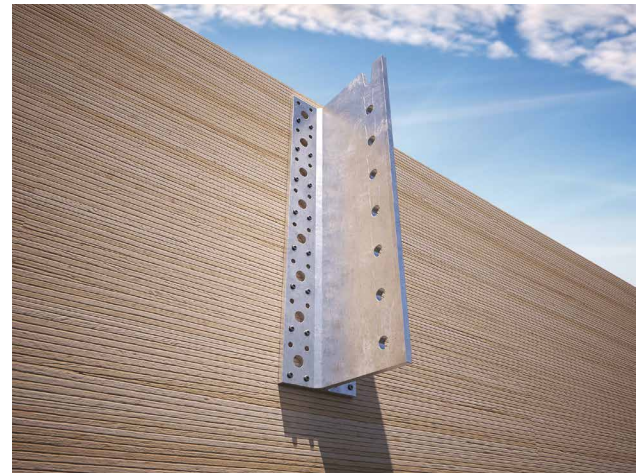
ROBUSTNESS

The inner core diameter of the screw has been enlarged compared to the LBS version to ensure screwing in higher density woods. The cylindrical under head is designed for fastening mechanical elements and producing an interlocking effect with the plate hole that provides excellent static performances.

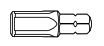


CANADIAN DESIGN VALUES

USA, EU and more design values available online.



MANUALS



BIT INCLUDED

DIAMETER [mm]

3,5 ☒ 5 ☒ 7 ☐ 12

LENGTH [mm]

25 ☐ 60 ☒ 200 ☐ 200

SERVICE CONDITION



ATMOSPHERIC CORROSIVITY



WOOD CORROSIVITY



MATERIAL



carbon steel with C4 EVO coating

CORE HARDNESS



as required in CSA 086:24⁽¹⁾

FIELDS OF USE

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

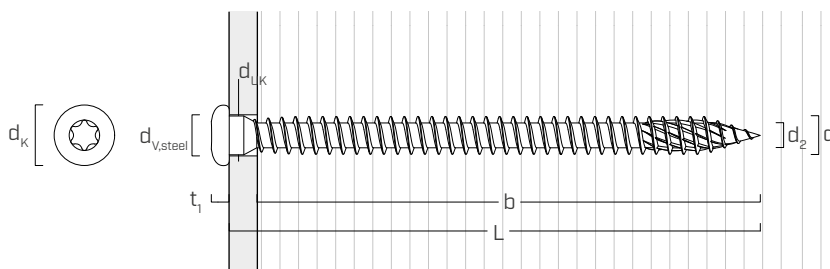
⁽¹⁾ Core hardness < 390 HV guaranteed for structural timber screws diameter 6 mm and above.

CODES AND DIMENSIONS

d_1 [mm]	CODE	L [mm]	b [mm]	pcs
5 TX 20	LBSHEVO580	80	76	200
	LBSHEVO5100	100	96	200
	LBSHEVO5120	120	116	200

d_1 [mm]	CODE	L [mm]	b [mm]	pcs
7 TX 30	LBSHEVO760	60	55	100
	LBSHEVO780	80	75	100
	LBSHEVO7100	100	95	100
	LBSHEVO7120	120	115	100
	LBSHEVO7160	160	155	100
	LBSHEVO7200	200	195	100

GEOMETRY AND MECHANICAL CHARACTERISTICS



Nominal diameter	d_1	[mm]	5	7
Head diameter	d_K	[mm]	7,80	11,00
Root diameter	d_2	[mm]	3,48	4,85
Underhead diameter	d_{UK}	[mm]	4,90	7,00
Head thickness	t_1	[mm]	2,45	3,50
Hole diameter on steel plate	$d_{V,steel}$	[mm]	5,0 - 5,5	7,5 - 8,0
Pre-drilling hole diameter ⁽¹⁾	$d_{V,S}$	[mm]	3,0	4,0
Pre-drilling hole diameter ⁽²⁾	$d_{V,H}$	[mm]	3,5	5,0
Characteristic tensile strength	$f_{tens,k}$	[kN]	11,5	21,5
Characteristic yield moment	$M_{y,k}$	[Nm]	9,0	21,5

⁽¹⁾ Pre-drilling valid for softwood.

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

MECHANICAL PROPERTIES

Nominal diameter	d_1	[mm]	5	7
Factored tensile strength	Φf_u	[kN]	7,09	14,83
Bending yield strength	F_{yb}	[MPa]	1122	1186
Factored shear strength of the screw	Φv_s	[kN]	3,65	7,09
Specified withdrawal resistance per millimeter of threaded shank (tip included)	Y_w	[N/mm]	G=0.35	52,29
			G=0.42	60,50
			G=0.49	68,44
			G=0.55	75,07
				105,09



HYBRID STEEL-TIMBER STRUCTURES

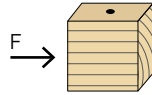
The LBSHEVO Ø7 mm screws are suitable for custom-designed connections, which are characteristic of steel structures. Maximum performance in hardwoods combined with the strengths of steel plates.

T3 TIMBER CORROSIVITY

Coating suitable for use in applications on wood with an acidity level (pH) greater than 4, such as spruce, larch, pine, ash and birch.

MINIMUM DISTANCES FOR SHEAR LOADS | TIMBER

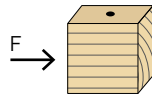
screws inserted **WITHOUT** pre-drilled hole $G \leq 0.44$



d_1	5 [mm]	0.20 [in]	7 [mm]	0.28 [in]
S_p 12·d [†]	60	2 3/8	84	3 5/16
S_Q 5·d	25	1	35	1 3/8
a_L 15·d [†]	75	2 15/16	105	4 1/8
a 10·d [†]	50	1 15/16	70	2 3/4
e_Q 10·d	50	1 15/16	70	2 3/4
e_p 5·d	25	1	35	1 3/8

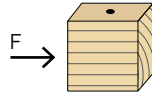
[†] For Western Red Cedar, this minimum spacing shall be increased by 50%.

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



d_1	5 [mm]	0.20 [in]	7 [mm]	0.28 [in]
S_p 18·d	90	3 1/2	126	4 15/16
S_Q 7·d	35	1 3/8	49	1 15/16
a_L 22·d	110	4 3/8	154	6 1/16
a 15·d	75	2 15/16	105	4 1/8
e_Q 12·d	60	2 3/8	84	3 5/16
e_p 7·d	35	1 3/8	89	1 15/16

screws inserted **WITH** pre-drilled hole

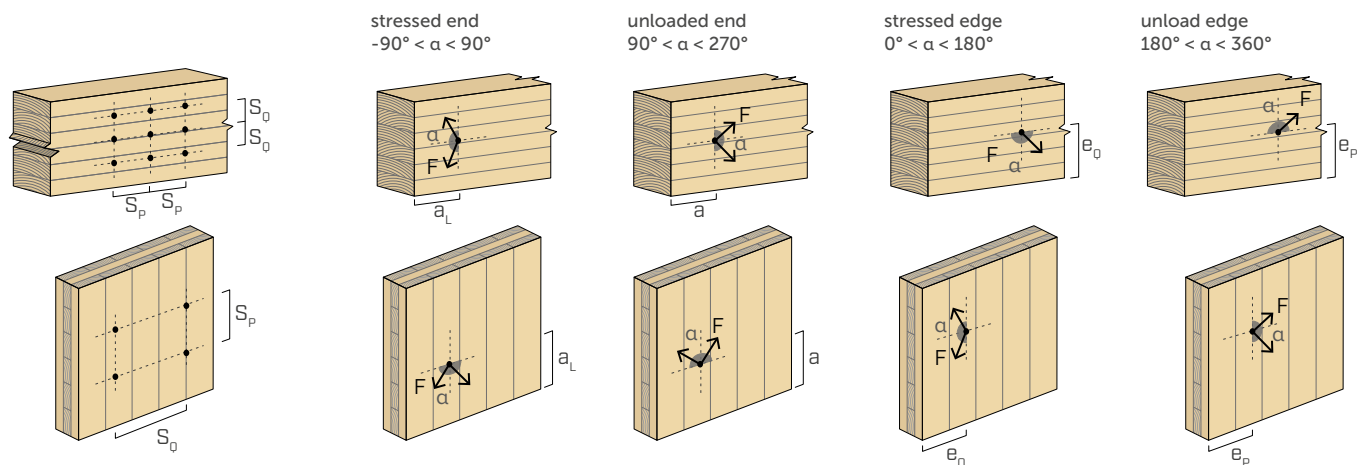


d_1	5 [mm]	0.20 [in]	7 [mm]	0.28 [in]
S_p 5·d [†]	25	1	35	1 3/8
S_Q 4·d	20	13/16	28	1 1/8
a_L 12·d [†]	60	2 3/8	84	3 5/16
a 7·d [†]	35	1 3/8	49	1 15/16
e_Q 7·d	35	1 3/8	49	1 15/16
e_p 3·d	15	9/16	21	13/16

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

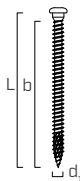
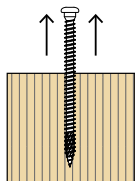
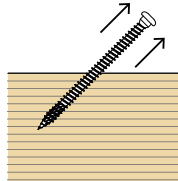
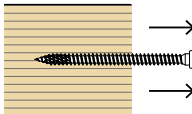
$d = d_1$ = nominal diameter of the screw

α = load-to-grain angle



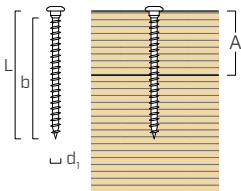
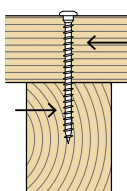
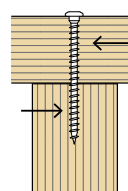
NOTES

- 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.

geometry		TENSION ^[1]												steel tension		
		thread withdrawal				end grain $\alpha = 0^\circ$				steel tension						
		$\alpha = 90^\circ$	$\alpha = 45^\circ$													
																
		factored withdrawal resistance P_{rw}				factored withdrawal resistance P_{rw}				factored withdrawal resistance $P_{rw}^{(2)}$				factored tension resistance T_{rs}		
d_1	L	b	G				G				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]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	
5 0.20	80	3 1/8	76	0,59	0,68	0,77	0,84	0,53	0,62	0,70	0,76	0,29	0,34	0,38	0,42	7,09
	100	4	96	1,13	1,31	1,49	1,63	1,03	1,19	1,35	1,48	0,57	0,66	0,74	0,81	
	120	4 3/4	116	1,50	1,74	1,96	2,15	1,36	1,58	1,79	1,96	0,75	0,87	0,98	1,08	
7 0.28	60	2 3/8	55	2,46	2,85	3,22	3,53	2,24	2,59	2,93	3,21	1,23	1,42	1,61	1,77	14,83
	80	3 1/8	75	3,48	4,03	4,56	5,00	3,17	3,67	4,15	4,55	1,74	2,02	2,28	2,50	
	100	4	95	4,51	5,22	5,90	6,47	4,10	4,74	5,37	5,89	2,25	2,61	2,95	3,24	
	120	4 3/4	115	2,72	3,14	3,55	3,90	2,47	2,86	3,23	3,54	1,36	1,57	1,78	1,95	
	160	6 1/4	155	3,48	4,03	4,56	5,00	3,17	3,67	4,15	4,55	1,74	2,02	2,28	2,50	
	200	8	195	3,48	4,03	4,56	5,00	3,17	3,67	4,15	4,55	1,74	2,02	2,28	2,50	

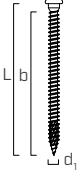
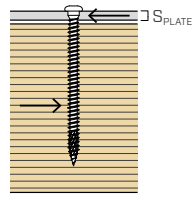
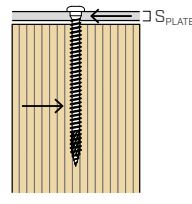
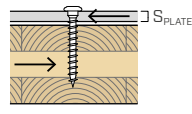
α = screw-to-grain angle

■ STRUCTURAL VALUES | LATERAL RESISTANCE

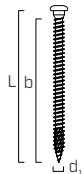
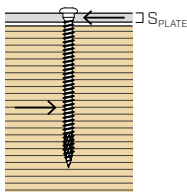
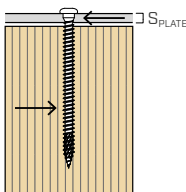
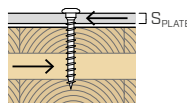
SHEAR ^[3]												
geometry					timber-to-timber $\alpha = 90^\circ$				timber-to-timber $\alpha = 0^\circ$			
												
					factored lateral resistance N_r				factored lateral resistance $N_r^{(2)}$			
					G				G			
d_1	L	b	$A^{(4)}$		0.35	0.42	0.49	0.55	0.35	0.42	0.49	0.55
[mm] [in]	[mm] [in]	[mm] [in]	[mm] [in]	[mm] [in]	[kN] [kN]	[kN] [kN]	[kN] [kN]	[kN] [kN]	[kN] [kN]	[kN] [kN]	[kN] [kN]	[kN] [kN]
5 0.20	80	3 1/8	76	35	0,96	1,10	1,23	1,33	0,62	0,70	0,79	0,86
	100	4	96	45	1,11	1,24	1,36	1,46	0,70	0,80	0,90	0,98
	120	4 3/4	116	55	1,20	1,35	1,48	1,60	0,78	0,89	1,00	1,09
7 0.28	60	2 3/8	55	25	0,91	1,08	1,25	1,40	0,61	0,72	0,83	0,93
	80	3 1/8	75	35	1,26	1,49	1,73	1,93	0,82	0,98	1,13	1,26
	100	4	95	45	1,61	1,90	2,19	2,39	1,04	1,23	1,37	1,48
	120	4 3/4	115	5	0,27	0,33	0,38	0,43	0,27	0,33	0,38	0,43
	160	6 1/4	155	5	0,27	0,33	0,38	0,43	0,27	0,33	0,38	0,43
	200	8	195	5	0,27	0,33	0,38	0,43	0,27	0,33	0,38	0,43

α = screw-to-grain angle

NOTES and GENERAL PRINCIPLES on page 7.

geometry				SHEAR ^[3]											
				steel-to-timber $\alpha = 90^\circ$				steel-to-timber $\alpha = 0^\circ$				steel-to-timber $\alpha = 90^\circ$			
															
				factored lateral resistance N_r				factored lateral resistance $N_r^{(2)}$				factored lateral resistance N_r			
d_1 [mm] [in]	L [mm] [in]		s_{PLATE} [mm] [in]	G				G				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
5 0.20	80	3 1/8	1,6 1/16	1,69	1,89	2,08	2,23	0,93	1,06	1,19	1,29	1,64	1,83	2,02	2,17
	100	4		1,87	2,10	2,32	2,49	1,08	1,20	1,32	1,42	1,82	2,04	2,25	2,43
	120	4 3/4		2,05	2,27	2,45	2,60	1,17	1,31	1,44	1,55	1,97	2,16	2,33	2,47
	80	3 1/8	3,2 1/8	1,69	1,89	2,08	2,23	0,92	1,06	1,19	1,29	1,64	1,83	2,02	2,17
	100	4		1,87	2,10	2,32	2,49	1,08	1,20	1,32	1,42	1,82	2,04	2,25	2,43
	120	4 3/4		2,05	2,27	2,45	2,60	1,17	1,31	1,44	1,55	1,97	2,16	2,33	2,47
	80	3 1/8	6,4 1/4	1,67	1,86	2,05	2,20	0,90	1,03	1,16	1,26	1,61	1,81	1,99	2,14
	100	4		1,85	2,08	2,29	2,46	1,06	1,19	1,31	1,41	1,80	2,02	2,23	2,40
	120	4 3/4		2,03	2,27	2,45	2,60	1,16	1,30	1,43	1,54	1,97	2,16	2,33	2,47
	80	3 1/8	9,5 3/8	1,64	1,83	2,01	2,16	0,87	1,00	1,12	1,23	1,59	1,77	1,95	2,09
	100	4		1,82	2,04	2,25	2,42	1,03	1,17	1,29	1,39	1,77	1,98	2,19	2,36
	120	4 3/4		2,00	2,25	2,45	2,60	1,14	1,28	1,41	1,52	1,95	2,16	2,33	2,47
	80	3 1/8	12,7 1/2	1,61	1,80	1,97	2,12	0,85	0,97	1,09	1,19	1,56	1,74	1,91	2,05
	100	4		1,79	2,01	2,21	2,38	1,01	1,16	1,27	1,37	1,74	1,95	2,15	2,31
	120	4 3/4		1,98	2,22	2,45	2,60	1,13	1,26	1,39	1,50	1,92	2,16	2,33	2,47
	80	3 1/8	15,9 5/8	1,58	1,76	1,94	2,08	0,82	0,94	1,05	1,15	1,53	1,71	1,87	2,01
	100	4		1,76	1,97	2,17	2,34	0,98	1,13	1,25	1,34	1,71	1,92	2,11	2,27
	120	4 3/4		1,95	2,19	2,41	2,60	1,11	1,25	1,37	1,48	1,89	2,13	2,33	2,47
	80	3 1/8	19,1 3/4	1,55	1,73	1,90	2,03	0,80	0,91	1,02	1,11	1,48	1,67	1,84	1,97
	100	4		1,73	1,94	2,14	2,30	0,96	1,10	1,23	1,32	1,68	1,88	2,07	2,23
	120	4 3/4		1,92	2,15	2,38	2,56	1,10	1,23	1,35	1,46	1,86	2,10	2,31	2,47

α = screw-to-grain angle

geometry				SHEAR ^[3]											
				steel-to-timber α = 90°				steel-to-timber α = 0°				steel-to-timber α = 90°			
															
				factored lateral resistance N _r				factored lateral resistance N _r ⁽²⁾				factored lateral resistance N _r			
d ₁ [mm] [in]	L		S _{PLATE} [mm] [in]	G				G				G			
	[mm]	[in]		0.35	0.42	0.49	0.55	0.35	0.42	0.49	0.55	0.35	0.42	0.49	0.55
7 0.28	60	2 3/8	1,6 1/16	2,24	2,56	2,87	3,12	1,19	1,35	1,50	1,63	2,13	2,43	2,72	2,96
	80	3 1/8		2,72	3,12	3,48	3,72	1,41	1,60	1,79	1,95	2,58	2,96	3,33	3,60
	100	4		3,11	3,47	3,81	4,09	1,62	1,86	2,08	2,27	3,00	3,36	3,69	3,97
	120	4 3/4		3,36	3,77	4,15	4,46	1,84	2,11	2,37	2,56	3,26	3,66	4,03	4,33
	160	6 1/4		3,87	4,33	4,67	4,95	2,20	2,47	2,72	2,93	3,75	4,11	4,44	4,70
	200	8		3,96	4,33	4,67	4,95	2,46	2,75	2,97	3,14	3,75	4,11	4,44	4,70
	60	2 3/8	3,2 1/8	2,23	2,54	2,84	3,10	1,18	1,34	1,49	1,62	2,11	2,41	2,70	2,94
	80	3 1/8		2,70	3,10	3,48	3,72	1,40	1,59	1,78	1,94	2,57	2,94	3,31	3,60
	100	4		3,11	3,47	3,81	4,09	1,61	1,85	2,07	2,26	3,00	3,36	3,69	3,97
	120	4 3/4		3,36	3,77	4,15	4,46	1,83	2,10	2,36	2,56	3,26	3,66	4,03	4,33
	160	6 1/4		3,87	4,33	4,67	4,95	2,20	2,47	2,72	2,93	3,75	4,11	4,44	4,70
	200	8		3,96	4,33	4,67	4,95	2,46	2,75	2,97	3,14	3,75	4,11	4,44	4,70
	60	2 3/8	6,4 1/4	2,17	2,48	2,77	3,02	1,16	1,31	1,46	1,58	2,06	2,35	2,63	2,86
	80	3 1/8		2,65	3,04	3,41	3,70	1,38	1,57	1,75	1,90	2,52	2,89	3,24	3,54
	100	4		3,09	3,45	3,79	4,07	1,59	1,82	2,04	2,23	2,97	3,34	3,67	3,94
	120	4 3/4		3,34	3,75	4,13	4,44	1,81	2,07	2,33	2,55	3,24	3,64	4,01	4,31
	160	6 1/4		3,86	4,33	4,67	4,95	2,19	2,46	2,71	2,92	3,75	4,11	4,44	4,70
	200	8		3,96	4,33	4,67	4,95	2,45	2,75	2,97	3,14	3,75	4,11	4,44	4,70
	60	2 3/8	9,5 3/8	2,10	2,39	2,67	2,90	1,10	1,27	1,41	1,53	1,99	2,27	2,53	2,75
	80	3 1/8		2,57	2,95	3,31	3,62	1,34	1,53	1,71	1,85	2,45	2,80	3,14	3,43
	100	4		3,05	3,40	3,74	4,01	1,56	1,78	2,00	2,17	2,90	3,29	3,62	3,88
	120	4 3/4		3,30	3,70	4,07	4,38	1,77	2,03	2,29	2,50	3,20	3,59	3,95	4,25
	160	6 1/4		3,82	4,29	4,67	4,95	2,17	2,44	2,69	2,89	3,72	4,11	4,44	4,70
	200	8		3,96	4,33	4,67	4,95	2,43	2,73	2,97	3,14	3,75	4,11	4,44	4,70
	60	2 3/8	12,7 1/2	2,02	2,30	2,57	2,79	1,03	1,23	1,37	1,48	1,92	2,18	2,44	2,65
	80	3 1/8		2,50	2,86	3,21	3,50	1,31	1,49	1,66	1,80	2,37	2,72	3,05	3,32
	100	4		2,97	3,36	3,68	3,95	1,52	1,74	1,95	2,12	2,83	3,25	3,56	3,83
	120	4 3/4		3,26	3,65	4,02	4,32	1,74	1,99	2,24	2,44	3,16	3,54	3,90	4,19
	160	6 1/4		3,78	4,24	4,67	4,95	2,15	2,41	2,66	2,86	3,67	4,11	4,44	4,70
	200	8		3,96	4,33	4,67	4,95	2,41	2,71	2,97	3,14	3,75	4,11	4,44	4,70
	60	2 3/8	15,9 5/8	1,95	2,21	2,47	2,68	0,96	1,16	1,32	1,43	1,85	2,10	2,34	2,54
	80	3 1/8		2,42	2,77	3,11	3,39	1,27	1,45	1,61	1,75	2,30	2,63	2,95	3,22
	100	4		2,90	3,31	3,63	3,89	1,49	1,70	1,90	2,07	2,75	3,16	3,51	3,77
	120	4 3/4		3,22	3,60	3,97	4,26	1,70	1,95	2,19	2,39	3,12	3,49	3,85	4,13
	160	6 1/4		3,73	4,20	4,64	4,95	2,13	2,39	2,63	2,83	3,63	4,09	4,44	4,70
	200	8		3,96	4,33	4,67	4,95	2,39	2,69	2,97	3,14	3,75	4,11	4,44	4,70
	60	2 3/8	19,1 3/4	1,87	2,12	2,36	2,56	0,90	1,07	1,25	1,38	1,78	2,01	2,24	2,43
	80	3 1/8		2,35	2,68	3,01	3,28	1,24	1,41	1,57	1,70	2,23	2,55	2,85	3,11
	100	4		2,82	3,24	3,58	3,83	1,45	1,66	1,86	2,02	2,68	3,08	3,46	3,71
	120	4 3/4		3,18	3,56	3,91	4,20	1,67	1,91	2,15	2,34	3,08	3,45	3,79	4,08
	160	6 1/4		3,69	4,15	4,58	4,94	2,10	2,37	2,61	2,80	3,59	4,04	4,44	4,70
	200	8		3,96	4,33	4,67	4,95	2,37	2,66	2,94	3,14	3,75	4,11	4,44	4,70

α = screw-to-grain angle

NOTES and GENERAL PRINCIPLES on page 7.

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 steel plate is assumed to be ASTM A36 with a minimum ultimate tensile strength, f_u , equal to 58 ksi (400 MPa).
- 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.
- LBS hardwood EVO screws must be positioned in accordance with the minimum distances.
- As part of the connection design, the designer must size and verify both the structural wood members and the steel plates separately.
- In the case of combined shear and tensile stress, the interaction between shear and tension must be satisfied.
- Not all screw lengths satisfy the required embedment depth in either the side member ($4d_p$) or the main member ($8d_p$). LBS hardwood 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.
- G is the mean relative density according to CSA-O86 2024 Table A.12. 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 ($G = 0.55$).

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.
- (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) Lateral resistances are factored and according to CSA-O86 2024 Clause 12.12.10. Values apply to dry service conditions and are representative of a single screw.
- (4) The fixable thickness (A) is considered as half the length of the screw ($L/2$) - 5 mm.
- (5) The resistance for CLT includes the application of the $J_x = 0.9$ factor.