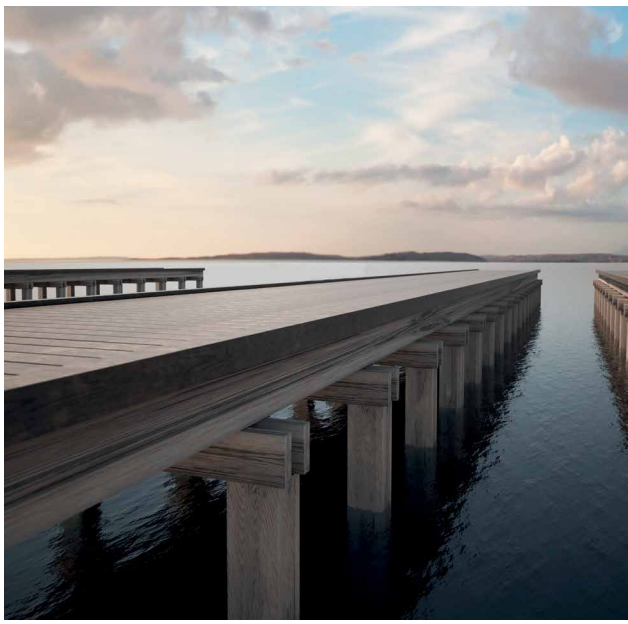
SCI A4 | AISI316

COUNTERSUNK SCREW



SUPERIOR STRENGTH

Special asymmetrical umbrella thread, elongated reamer cutter and under-head cutting ribs provide the screw with higher torsional strength and safer screwing.

A4 | AISI316

A4 | AISI316 austenitic stainless steel for high corrosion resistance. Ideal for environments adjacent to the sea in corrosivity class C5 and for insertion on the most aggressive timbers in class T5.

T5 TIMBER CORROSIVITY

Suitable for use in applications on agressive woods with an acidity (pH) level below 4 such as oak, Douglas fir and chestnut, and in wood moisture conditions above 20%.

NORTH AMERICAN TESTED

Tested in accordance with ASTM F1575 for bending yield strength and ASTM D1761-20 for withdrawal strength. Tensile testing was conducted in accordance with AISI S904-17.

CANADIAN DESIGN VALUES

USA, EU and more design values available online.

BIT INCLUDED

DIAMETER [mm]

3,5 — **5** — 8

LENGTH [mm]

20 — **50** **100** — 320

SERVICE CONDITION

WET

ATMOSPHERIC CORROSIVITY

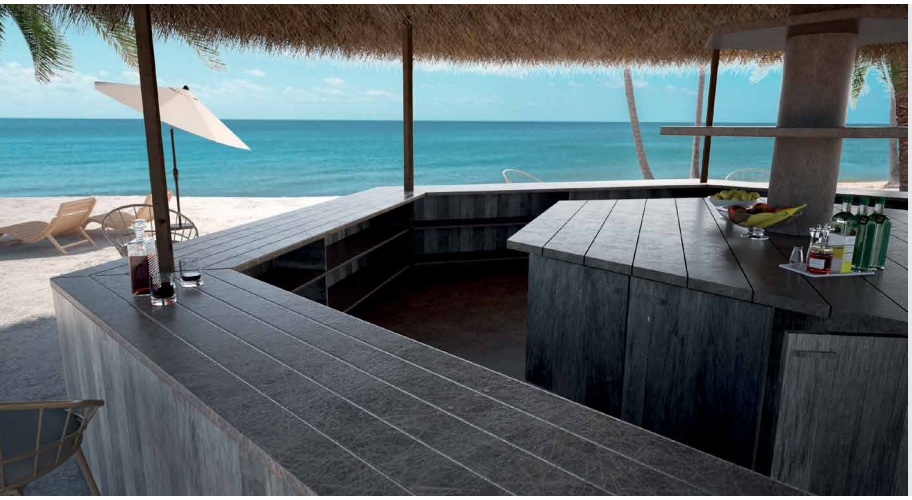
C1 C2 C3 C4 C5

WOOD CORROSIVITY

T1 T2 T3 T4 T5

MATERIAL

A4 AISI 316 — A4 | AISI316 austenitic stainless steel (CRC III)



FIELDS OF USE

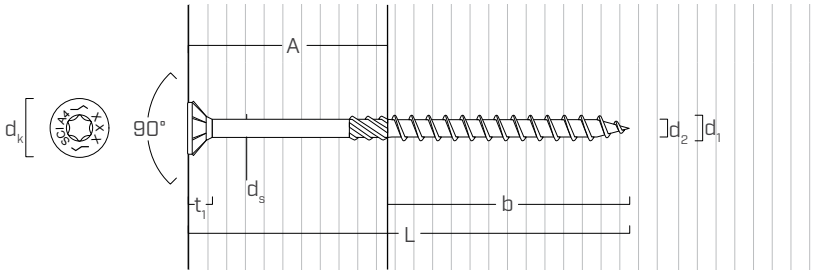
Outdoor use in highly aggressive environments. Wooden boards with density of < 470 kg/m³ (without pre-drill) and < 620 kg/m³ (with pre-drill).

CODES AND DIMENSIONS

SCI A4 | AISI316

d_1 [mm]	CODE	L [mm]	b [mm]	A [mm]	pcs
5 TX 25	**SCI5050A4**	50	24	26	200
	SCI5060A4	60	30	30	200
	SCI5070A4	70	35	35	100
	SCI5080A4	80	40	40	100
	SCI5090A4	90	45	45	100
	SCI50100A4	100	50	50	100

GEOMETRY AND MECHANICAL CHARACTERISTICS



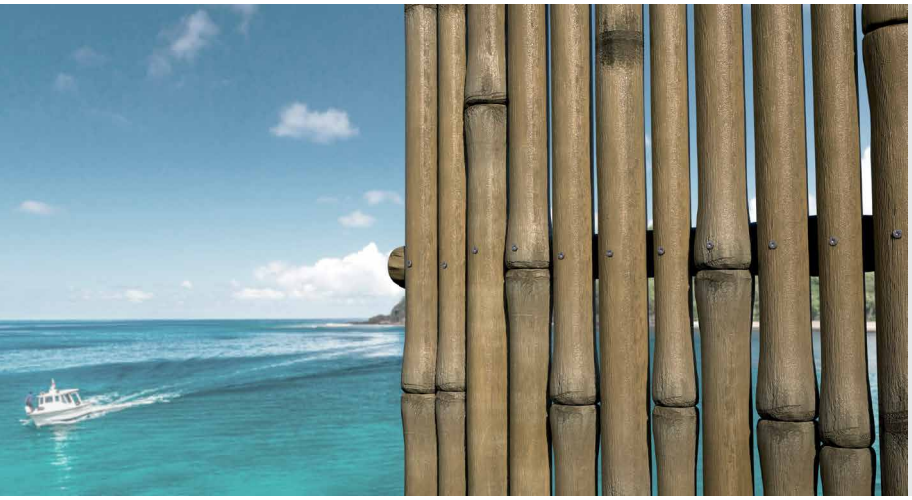
GEOMETRY

Nominal diameter	d_1	[mm]	5
Head diameter	d_K	[mm]	10,00
Root diameter	d_2	[mm]	3,40
Shank diameter	d_S	[mm]	3,65
Head thickness	t_1	[mm]	4,65
Pre-drilling hole diameter(1)	d_V	[mm]	3,0

(1) For high density materials, pre-drilled holes are recommended based on the wood specie.

MECHANICAL PROPERTIES

Nominal diameter	d_1	[mm]		5
Factored tensile strength	Φf_u	[kN]		3,31
Bending yield strength	F_{yb}	[MPa]		515
Factored shear strength of the screw	Φv_s	[kN]		1,96
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
Specified head pull-through resistance per screw	F_{pt}	[kN]	G=0.35	0,66
			G=0.42	0,80
			G=0.49	0,93
			G=0.55	1,04

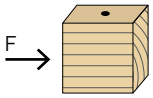


MARINE ENVIRONMENTS

Can be used in aggressive environments and in areas near the sea thanks to the A4 | AISI316 stainless steel.

MINIMUM DISTANCES FOR SHEAR LOADS | TIMBER

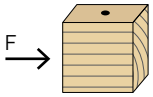
screws inserted **WITHOUT pre-drilled hole** — **G ≤ 0.44**



d_1		5 [mm]	*0.20* *[in]*
S_P	12·d‡	60	*2 3/8*
S_Q	5·d	25	*1*
a_L	15·d‡	75	*2 15/16*
a	10·d‡	50	*1 15/16*
e_Q	10·d	50	*1 15/16*
e_P	5·d	25	*1*

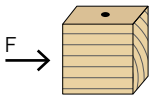
‡ For Western Red Cedar, this minimum spacing shall be increased by 50%.

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



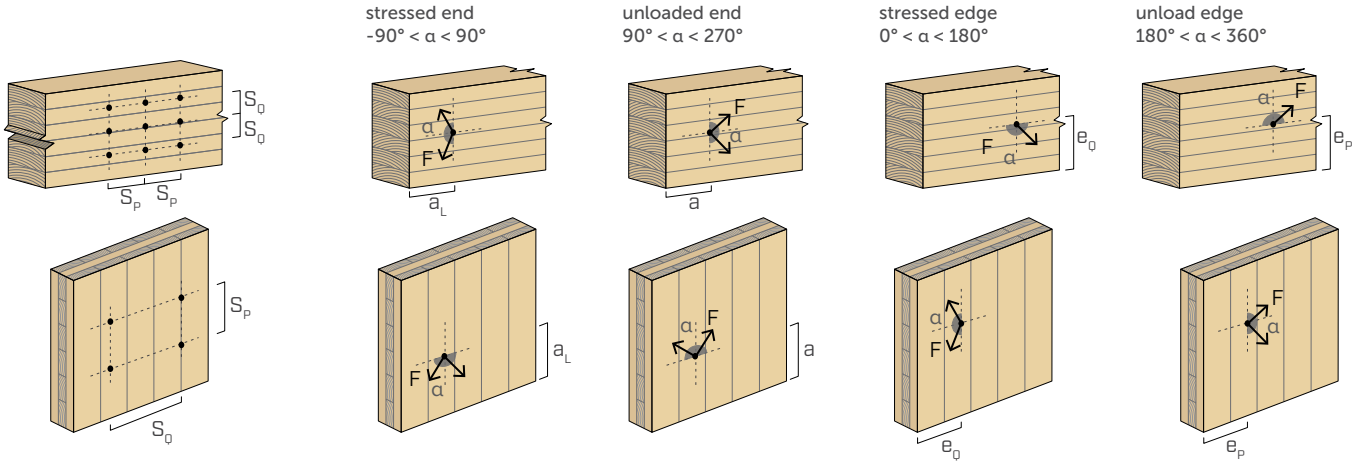
d_1		5 [mm]	*0.20* *[in]*
S_P	18·d	90	*3 1/2*
S_Q	7·d	35	*1 3/8*
a_L	22·d	110	*4 3/8*
a	15·d	75	*2 15/16*
e_Q	12·d	*60*	*2 3/8*
e_P	7·d	35	*1 3/8*

screws inserted **WITH pre-drilled hole**



d_1		5 [mm]	*0.20* *[in]*
S_P	5·d†	25	*1*
S_Q	4·d	20	*13/16*
a_L	12·d†	60	*2 3/8*
a	7·d†	35	*1 3/8*
e_Q	7·d	35	*1 3/8*
e_P	3·d	15	*9/16*

† 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

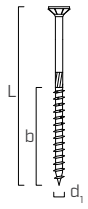
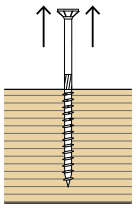
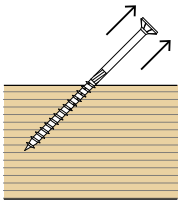
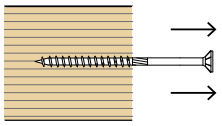
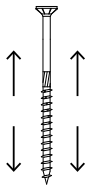


NOTES

- 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.

STRUCTURAL VALUES | AXIAL TENSION

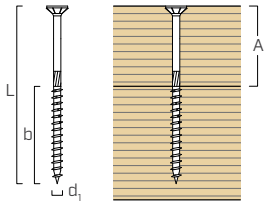
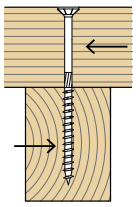
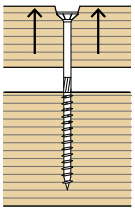
STRENGTH VALUES
CSA 086:24

geometry				TENSION[1]											
				thread withdrawal											steel tension
				α = 90°				α = 45°				end grain α = 0°			
															
				factored withdrawal resistance P_{rw}				factored withdrawal resistance P_{rw}				factored withdrawal resistance P_{rw}[2][3]			factored tension resistance T_{rs}
				G				G				G			
d_1	L		b	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*	50	*1 15/16*	24	0,70	0,80	0,91	1,00	0,63	0,73	0,83	0,91	0,35	0,40	0,46	0,50	3,31
	60	*2 3/8*	30	0,92	1,06	1,20	1,31	0,83	0,96	1,09	1,19	0,46	0,53	0,60	0,66	
	70	*2 3/4*	35	1,10	1,27	1,44	1,58	1,00	1,16	1,31	1,43	0,55	0,64	0,72	0,79	
	80	*3 1/8*	40	1,28	1,48	1,68	1,84	1,16	1,35	1,52	1,67	0,64	0,74	0,84	0,92	
	90	*3 1/2*	45	1,46	1,69	1,92	2,10	1,33	1,54	1,74	1,91	0,73	0,85	0,96	1,05	
	100	*4*	50	1,65	1,91	2,16	2,36	1,50	1,73	1,96	2,15	0,82	0,95	1,08	1,18	

α = screw-to-grain angle

STRUCTURAL VALUES | LATERAL RESISTANCE

STRENGTH VALUES
CSA 086:24

geometry					SHEAR[4]				TENSION			
					timber-to-timber α = 90°				head pull-through			
												
					factored lateral resistance N_r				factored head pull-through resistance P_{pt}			
					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]
5 *0.20*	50	*1 15/16*	24	26	0,55	0,65	0,73	0,79	0,47	0,56	0,65	0,73
	60	*2 3/8*	30	30	0,60	0,67	0,73	0,79	0,47	0,56	0,65	0,73
	70	*2 3/4*	35	35	0,60	0,67	0,73	0,79	0,47	0,56	0,65	0,73
	80	*3 1/8*	40	40	0,60	0,67	0,73	0,79	0,47	0,56	0,65	0,73
	90	*3 1/2*	45	45	0,60	0,67	0,73	0,79	0,47	0,56	0,65	0,73
	100	*4*	50	50	0,60	0,67	0,73	0,79	0,47	0,56	0,65	0,73

α = screw-to-grain angle

NOTES and GENERAL PRINCIPLES on page 6.

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.
- Head pull-through values have been determined in accordance with CSA O86:24, Clause A.12.12.8.3. Withdrawal and head pull-through values given in this datasheet are likewise 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 ($4d_F$) or the main member ($8d_F$). Engineering discretion and judgment should be applied to evaluate the potential impact of reduced penetration on the connection's load-carrying capacity.
- SCI A4 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) SCI A4 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.