ICC ES
ESR-3942

Eurotec Inc.
The specialist for fastening technology

USA DESIGN GUIDE
FOR STRUCTURAL WOOD SCREWS

PANELTWISTEC AG

SAWTEC

KONSTRUX ST

www.eurotec.us

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Disclaimer

NOTE TO THE DESIGNER

- Reference design values, minimum spacing distances, and recommendations herein presented are based on **ICC-ESR 3942** and **European Technical Approval ETA-11/0024**, unless noted otherwise, taking into account the National Design Standards (NDS) 2018 provisions. This guide must be used and interpreted by a qualified designer;

- All suggestions and details shown are to be treated as general cases and cannot be assumed to be valid for all construction situations and site conditions;

- Structural screws described in this guide may be used only in dry service conditions (C_M = 1), considering a moisture content of 19 % or less and 16 % or less for structural sawn lumber members and engineered wood products detailed in ICC-ESR 3942, respectively, as per NDS provisions;

- Conforming with ICC-ER's scope, use of the screws in connections with saltwater exposure or saltwater spray, as well as in contact with preservative/fire-retardant-treated wood, shall be made with the responsibility of the designer;

- In case splitting of wood member or engineered wood product is observed during or prior to fastener installation, a design professional must be contacted immediately and appropriated measures must be taken. The same applies in the event of fastener damage or breakage;

- When the capacity of a connection is controlled by the fastener's strength, the allowable connection strength must not be increased by the adjustment factors specified in the NDS;

- A load bearing connection shall consist of at least two (2) wood screws;

- For withdrawal design, minimum penetration depth of 4D is needed to use tabulated reference design values;

- Wood screws shall not be loaded in withdrawal from end grain of wood members or end grain of CLT laminations (C_{eg} = 0);

- Load duration factors $C_D \leq 1.6$ may be applied to fastener design, except when connection capacity is based on design of metal parts, according to Appendix B and clause 11.2.3 of the NDS;

- Installation of the screws must be performed without pre-drilling, and without hammering. It is suggested to use a power driver when installing slender screws, and an impact wrench when installing thicker screws;

- No reduction to the reference design values is anticipated if soap or other lubricant is used on the wood screw to or lead hole to facilitate installation and to prevent damage to the wood screw, according to clause 12.1.5.5 of the NDS;

- The allowable lateral load for a two-member single screw connection shall be the minimum of:
  → ($Z_{||}' = Z_{||}$·Applicable adjustment factors of NDS; allowable shear strength of screw)

- The allowable lateral load for a two-member single screw connection in which the screw is subject to tension, with L_e as the thread penetration length, shall be the minimum of:
  → ($W'·L_e = W·L_e$ ·Applicable adjustment factors of NDS ; $W_H' = W_H$·Applicable adjustment factors of NDS ; allowable screw tension strength)

- All reference design values must be multiplied by all applicable adjustment factors for wood screws in accordance with the NDS. Depending if the design approach chosen is the Allowable Stress Design (ASD) method or the Load and Resistance Factor Design (LRFD) method, values must be affected as follows:

For lateral loads:

$Z' = Z\ C_D\ C_M\ C_t\ C_g\ C_\Delta\ C_{eg}\ C_{di}\ C_{tn}$ (ASD)

$Z' = Z\ C_M\ C_t\ C_g\ C_\Delta\ C_{eg}\ C_{di}\ C_{tn}\ 3.32{\cdot}0.65\ \lambda$ (LRFD)

For wtihdrawal loads:

$W' = W\ C_D\ C_M\ C_t\ C_{eg}\ C_{tn}$ (ASD)

$W' = W\ C_D\ C_M\ C_t\ C_{eg}\ C_{tn}\ 3.32{\cdot}0.65\ \lambda$ (LRFD)

For pull-through loads:

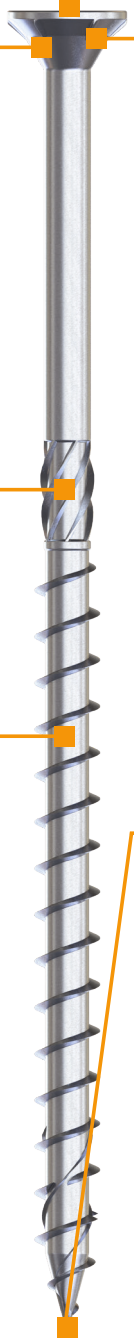
$W_H' = W_H\ C_D\ C_M\ C_t$ (ASD)

$W_H' = W_H\ C_M\ C_t\ 3.32{\cdot}0.65\ \lambda$ (LRFD)

1 SCREW BASICS

1.1 COMPONENTS OF AN EUROTEC FASTENER

From drive to tip



TX Drive

- Allows high torque transmission
- Prevents camout

Milling ribs

For easy countersinking in all types of wood

Shank cutter

Pre-mills the wood for the unthreaded shaft, reducing installation friction

Thread types

Fully threaded - For absorbing high tensile and compressive loads

Partially threaded - For a force-locked connection between wooden components

Head shapes

Countersunk head

- Prevents splitting of the wood
- Flush finish with the surface

Washer head

- The larger contact surface allows a higher pull-through resistance

Flat sawtoothed head

- Flush finish with the surface
- Pulling power of a washer head
- Reduced wood splitting

Cylindrical head

- Vanishes in the wood surface
- Ideal for tight spaces

Tip types

DAG

- Improves the installation „bite"
- Reduces the screwing torque
- Reduces wood splitting

AG

- Reduces the screwing torque
- Reduces wood splitting

Drilling tip

- No pre-drilling needed
- Allows reduction of minimum spacing requirements
- Reduces the screwing torque

1.2 MATERIALS AND COATINGS

Eurotec self-tapping wood construction screws have been extensively tested over the years and are used worldwide. They are offered in a wide variety of materials and coatings specially designed to offer the best possible fastening solution for each type of connection and construction project.

Overview of Materials and Coatings

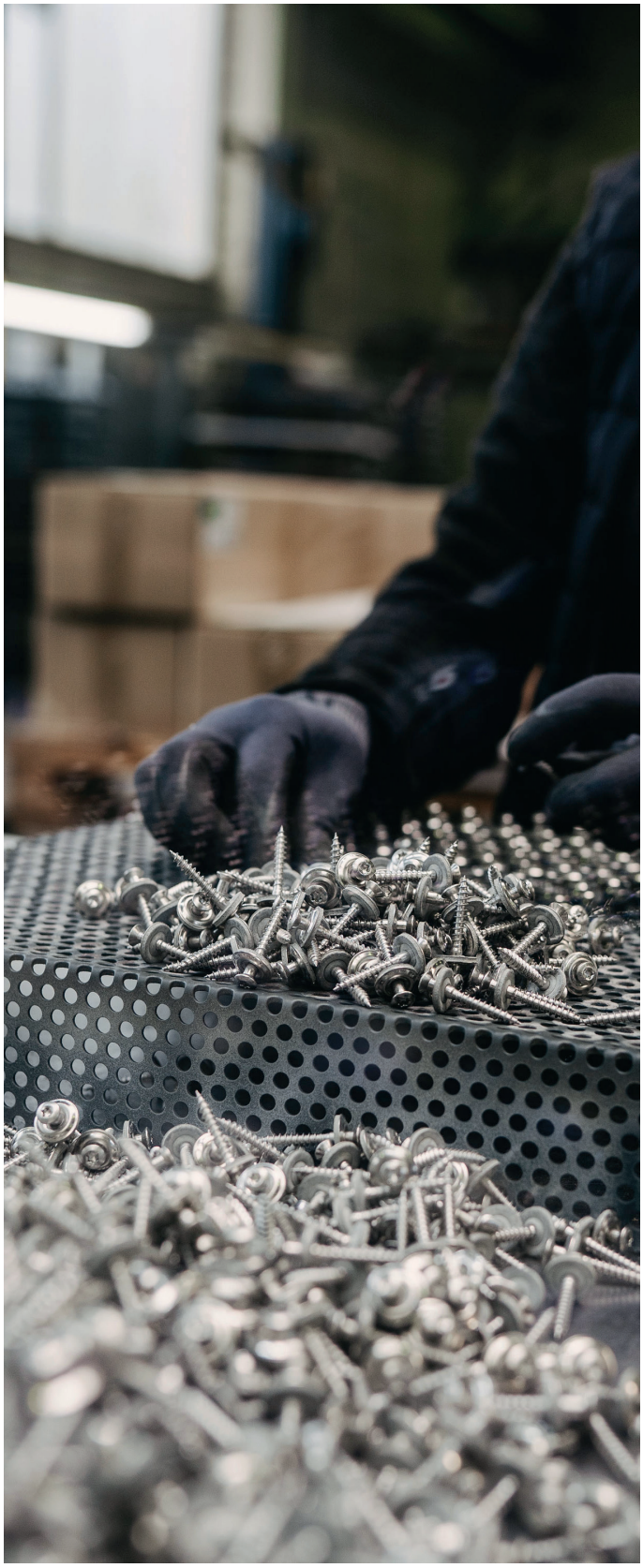
Hardened carbon steel + special „1000" coating
- Applicable in service classes 1 and 2 to DIN EN 1995 (Eurocode 5)
- Withstands up to 1,000 hours of salt spray testing according to DIN EN ISO 9227 NSS
- Corrosivity category C4 long/C5-M long according to DIN EN ISO 12944-6
- Good resistance to mechanical loading
- Not suitable for wood containing tanning agents

Hardened carbon steel + galvanised
- Corrosion resistant
- Applicable in service classes 1 and 2 to DIN EN 1995 (Eurocode 5)
- Good resistance to mechanical loading
- Not suitable for wood containing tanning agents

#410 hardened stainless steel
- Stainless steel in accordance with DIN 10088
- Limited resistance to acid
- 10 years experience without corrosion problems with suitable woods
- 50 % greater breaking torque than A2 and A4
- Magnetizable
- Applicable in service classes 1 to 3
- Not suitable for use with woods containing tanning agents such as cumarú, oak, merbau, robinia, etc.
- Not suitable for saline atmospheres
- Not suitable for atmospheres containing chlorine

#304 stainless steel
- Partially suitable for saline atmospheres
- Limited resistance to acid
- Not suitable for atmospheres containing chlorine
- Applicable in service classes 1 to 3
- Limited suitability for woods containing high amounts of tanning agents, such as cumaru, oak, merbau, robinia, etc.

#316 stainless steel
- Suitable for use with woods containing tanning agents such as cumarú, oak, merbau, robinia, etc.
- Suitable for saline atmospheres
- Limited resistance to acid
- Applicable in service classes 1 to 3
- Not suitable for use in chloric atmospheres atmospheres



NOTE: The stainless steel version of these screws is not covered by the ICC-ESR 3942. Please check them separately at our website www.eurotec.team/en

2 REFERENCE DESIGN VALUES AND STEEL STRENGTHS

2.1 SCREW STEEL STRENGTHS

Screw type	Nominal diameter (D)		Bending yield strength (F_{yb}) [psi]	Allowable steel strengths (ASD)		Design steel strengths (LRFD)	
	[in]	(mm)		Tension [lbf]	Shear [lbf]	Tension [lbf]	Shear [lbf]
Paneltwistec SawTec	1/4	(6)	152	1,160	833	1,740	1,250
	5/16	(8)	165	2,030	1,570	3,050	2,350
	3/8	(10)	177	2,350	1,780	3,530	2,680
KonstruX ST	1/4	(6)	229	1,840	1,200	2,760	1,800
	5/16	(8)	235	2,300	1,560	3,450	2,340
	3/8	(10)	203	2,880	1,910	4,310	2,870

2.2 WITHDRAWAL

Reference withdrawal design values (W)

Screw type	Nominal diameter (D)		Minimum thread penetration	Reference withdrawal design values (W) [lbf/in]	
	[in]	(mm)		0.42 ≤ G < 0.55	G ≥ 0.55
Paneltwistec SawTec	1/4	(6)	4D	75	-
	5/16	(8)		75	-
	3/8	(10)		135	-
KonstruX ST	1/4	(6)		80	-
	5/16	(8)		88	92
	3/8	(10)		92	115

NOTE:

- Tabulated W values apply to screws installed perpendicular to the grain of wood member (α = 90°). For screws installed at an angle with respect to the wood grain (30°≤ α < 90°), values shall be reduced by the correspondent angle to grain reduction factor (r_α) shown in the table below. Reduction factors were derived from the well-known Hankinson formula;
- Values must be multiplied by all applicable adjustment factors for dowel-type fasteners in accordance with the NDS, in order to determine allowable loads (ASD) and/or design loads (LRFD);
- Tabulated W values are in pounds-force per inch of thread penetration into de main member;
- Thickness of the main member (t_m) must be equal to or greater than the screw length (L) less the thickness of side member (t_s): $t_m \geq (L - t_s)$;
- Thread penetration length is equal to the portion of screw embedded in the main member, including the screw tip (L_{tip}).

Reduction factor for inclined screws in withdrawal (r_α)

tens	ones									
	_9°	_8°	_7°	_6°	_5°	_4°	_3°	_2°	_1°	_0°
8_°	1.000	1.000	0.999	0.998	0.997	0.996	0.995	0.994	0.992	0.990
7_°	0.988	0.986	0.983	0.981	0.978	0.975	0.972	0.969	0.966	0.962
6_°	0.959	0.955	0.952	0.948	0.944	0.940	0.936	0.932	0.927	0.923
5_°	0.919	0.914	0.910	0.906	0.901	0.897	0.892	0.888	0.883	0.879
4_°	0.875	0.870	0.866	0.861	0.857	0.853	0.849	0.845	0.840	0.836
3_°	0.832	0.829	0.825	0.821	0.817	0.814	0.810	0.807	0.803	0.800

2.3 PULL-THROUGH

Reference head pull-through design values (W_H)

Screw type	Nominal diameter (D)		Minimum side member thickness [in] (mm)	Reference pull-through design values (WH) [lbf]	
	[in]	(mm)		0.42 ≤ G < 0.55	G ≥ 0.55
Paneltwistec Countersunk (SK)	1/4	(6)	1-1/2 (38)	111	168
	5/16	(8)		195	256
	3/8	(10)		286	315
Paneltwistec Washer head (TK)	1/4	(6)		236	351
	5/16	(8)		436	853
	3/8	(10)		466	984
SawTec	1/4	(6)		202	226
	5/16	(8)		335	404
	3/8	(10)		444	511
KonstruX ST Countersunk (SK)	1/4	(6)		263	323
	5/16	(8)		263	323
	3/8	(10)		263	323

NOTE:

- Tabulated W_H values must be multiplied by all adjustment factors for dowel-type fasteners in accordance with NDS, in order to determine allowable loads (ASD) and/or design loads (LRFD);
- Tabulated values are applicable to screws installed perpendicular to the faces of wood members;
- Minimum side member thickness can be reduced to 1" for Paneltwistec and SawTec screws of D= 1/4";
- Thickness of the main member (t_m) must be equal to or greater than the screw length (L) less the thickness of wood side member (t_s): $t_m \geq (L - t_s)$.

2.4 LATERAL

Reference lateral design values (Z) for wood-wood connections

Screw type	Nominal diameter (D)		Minimum screw length (L)		Side member thickness (t_s) [in]	Minimum screw penetration into main member		Reference Lateral Design Values ($Z_{||}$) [lbf]	
	[in]	(mm)	[in]	(mm)		[in]	(mm)	0.42 ≤ G < 0.55	G ≥ 0.55
Paneltwistec	1/4	(6)	2-3/8	(60)	1	1-3/8	(35)	78	80
	5/16	(8)	3-1/8	(80)	1-1/2	1-5/8	(41)	144	169
	3/8	(10)						154	199
SawTec	1/4	(6)	2-3/8	(60)	1	1-3/8	(35)	78	80
	5/16	(8)	3-1/8	(80)	1-1/2	1-5/8	(41)	144	169
	3/8	(10)						154	199
KonstruX ST	1/4	(6)	4-3/4	(120)	2-1/4	2-1/2	(64)	101	123
	5/16	(8)	3-3/4	(95)	1-3/4	2	(51)	126	194
	3/8	(10)	4-7/8	(125)	2-1/4	2-1/2	(64)	207	254

NOTE:

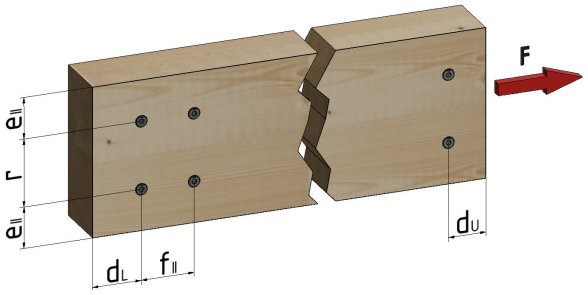
- Tabulated Z values must be multiplied by all adjustment factors for dowel-type fasteners in accordance with NDS, in order to determine allowable loads (ASD) and/or design loads (LRFD);
- Tabulated values are applicable to screws installed perpendicular to the faces of wood members;
- Thickness of the main member (t_m) must be equal to or greater than the screw length (L) less the thickness of wood side member (t_s): $t_m \geq (L - t_s)$;
- Side member thickness (t_s) is an absolute value (not a minimum or maximum value);
- Tabulated lateral design values are based on both wood members having the same specific gravity.

3 MINIMUM SPACING REQUIREMENTS

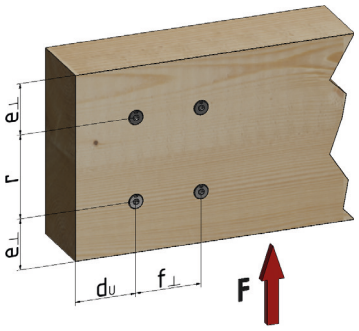
3.1 TIMBER AND GLULAM

Timber and glulam minimum spacing requirements

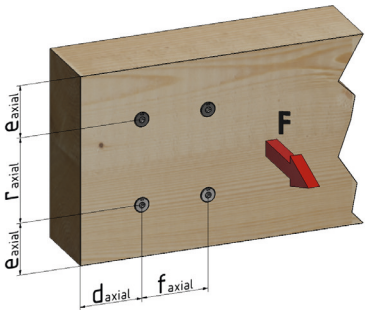
Lateral Loading Parallel to Grain:



Lateral Loading Perpendicular to Grain:



Axial Loading:



Specific gravity ranges	End distance			Edge distance			Spacing between fasteners in a row			Spacing between rows of fasteners	
	d_L	d_U	d_{axial}	$e_{\|\|}$	$e_{\perp}$	e_{axial}	$f_{\|\|}$	$f_{\perp}$	f_{axial}	r	r_{axial}
G < 0.50	15D	10D	10D	5D	10D	4D	15D	10D	7D	5D	4D
G ≥ 0.50	20D	15D	10D	7D	12D	4D	15D	10D	7D	7D	5D

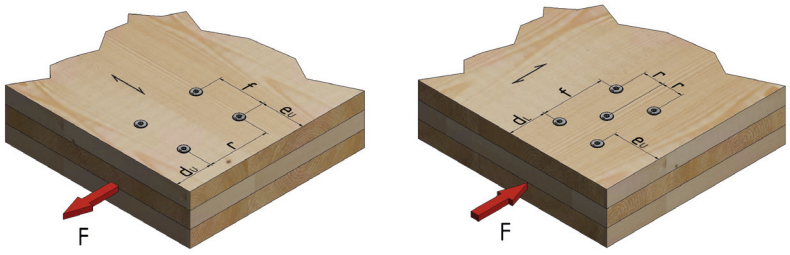
NOTE:

- Tabulated values apply to all head styles of Paneltwistec, SawTec, and KonstruX ST screws;
- Tabulated values must prevent wood from splitting. In case splitting is observed, a design professional must be consulted;
- Stresses in wood members must be checked in accordance with Section 11.1.2 and Appendix E of the NDS, and spacings may need to be increased accordingly;
- For laterally loaded screws up to 5/16" diameter, if rows are staggered, the minimum distance between them reduces from 5D to 2.5D for G < 0.50, and from 7D to 3D for G ≥ 0.50. See clause 11.3.6.2 of the NDS for staggered row requirements;
- End distances dL and dU refer, respectively, to loaded member end (fastener bearing toward end grain), and unloaded member end (fastener bearing away from end grain) including the case of perpendicular to grain loading;
- For this table, D refers to the major thread diameter of the screw.

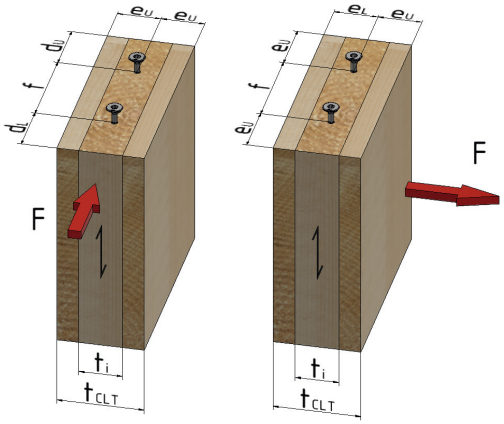
3.2 CROSS-LAMINATED TIMBER

CLT Minimum spacing requirements

Fasteners in Plane Surface:



Fasteners in Narrow Edge:



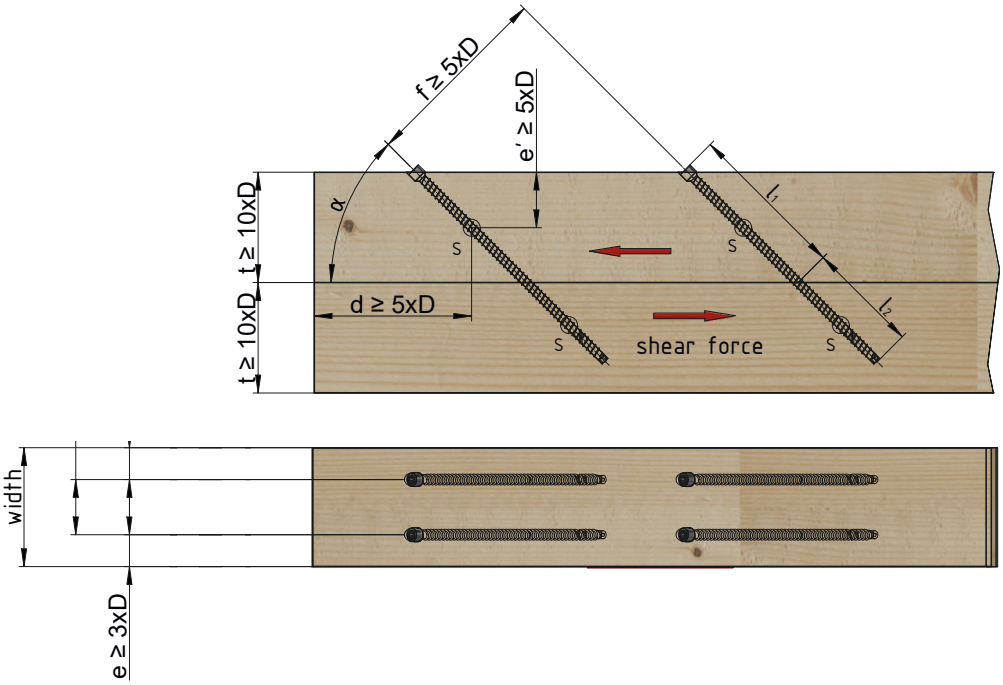
Fastener Installation on CLT	End distance		Edge distance		Spacing between fasteners in a row	Spacing between rows of fasteners
	d_L	d_U	e_L	e_U	f	r
Plane	6D	6D	6D	2.5D	4D	2.5D
Edge	12D	7D	6D	3D	10D	4D

NOTE:

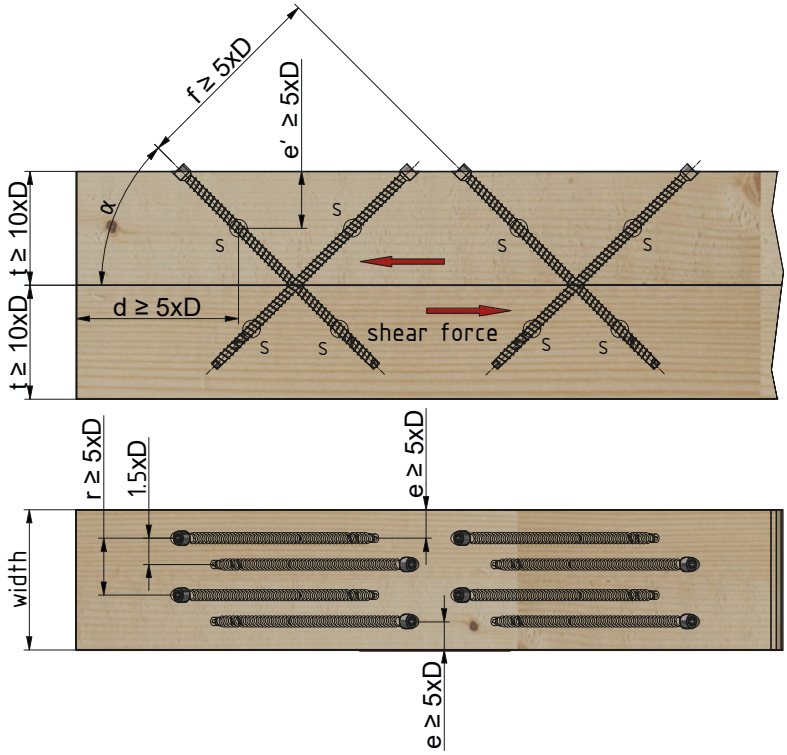
- Minimum distancing requirements were derived according to the methods described in the European Technical Approval ETA-11/0024 for self-tapping wood screws;
- Tabulated values apply to CLT panels with a minimum thickness of 10D;
- Minimum penetration depth of the screw into the edge of CLT panels is 10D;
- For this table, D refers to the major thread diameter of the screw.

3.3 SPECIAL CONSIDERATIONS

Inclined axially loaded screws

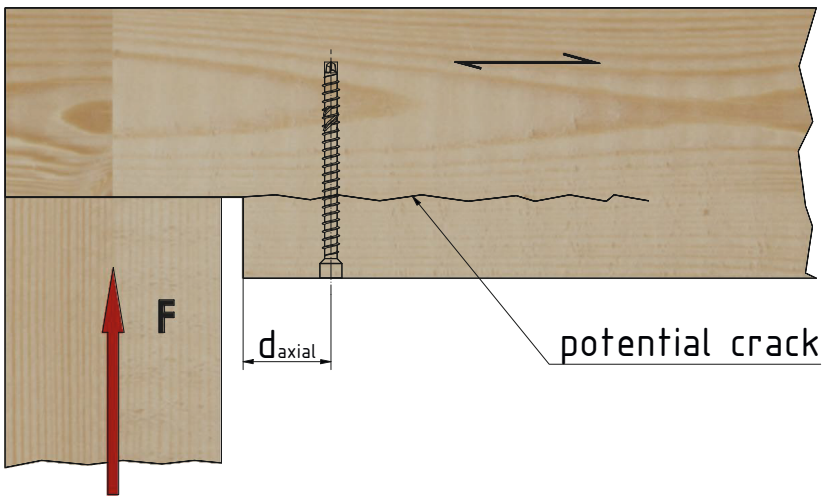


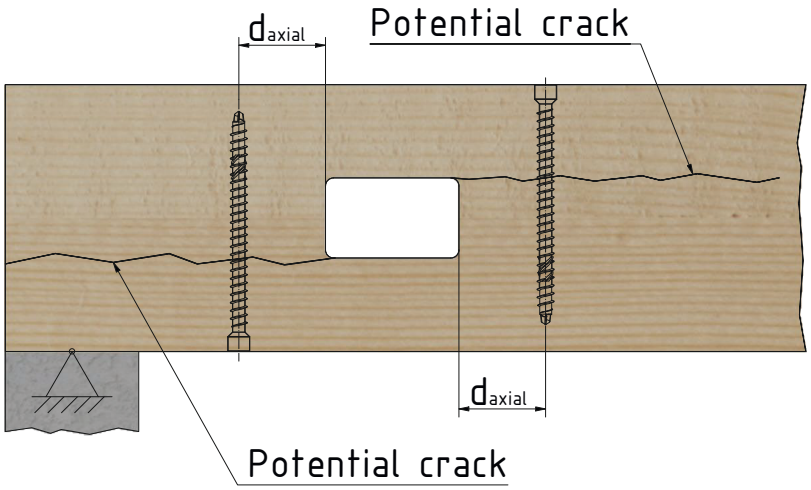
Inclined axially loaded screws in crosswise configuration

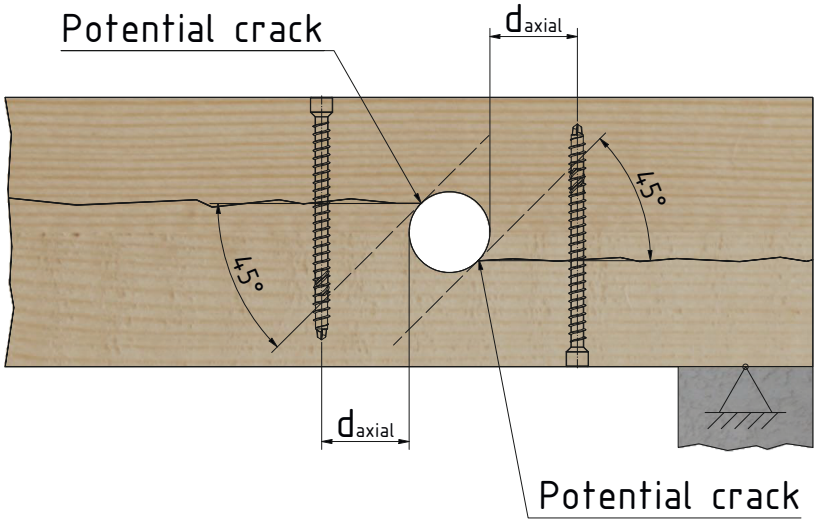


S: centroid of the part of the screw in the timber member
Minimum width of timber member = max {8D ; 2-3/8" (60 mm)}
Minimum distances considering KonstruX screws with drilling tip type in non-predrilled holes.
Minimum distances r and e' can be reduced from 5D to 2.5D, if their respective conditioning is fulfilled: $(f \cdot r) \geq 25D^2$; $(f \cdot e') \geq 25D^2$.
For a crossed screw couple, the minimum spacing between the crossing screws is 1.5D.

Reinforcing screws near notches and holes

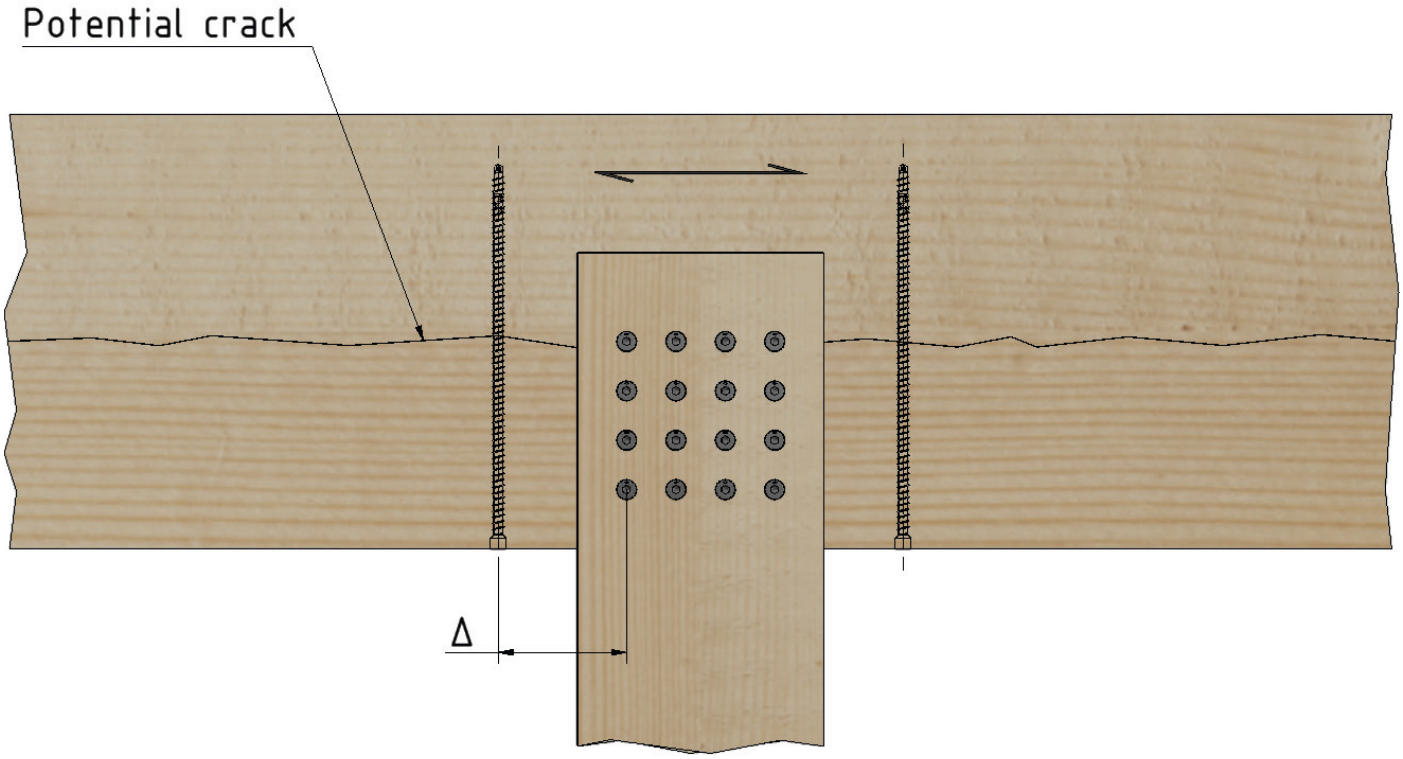






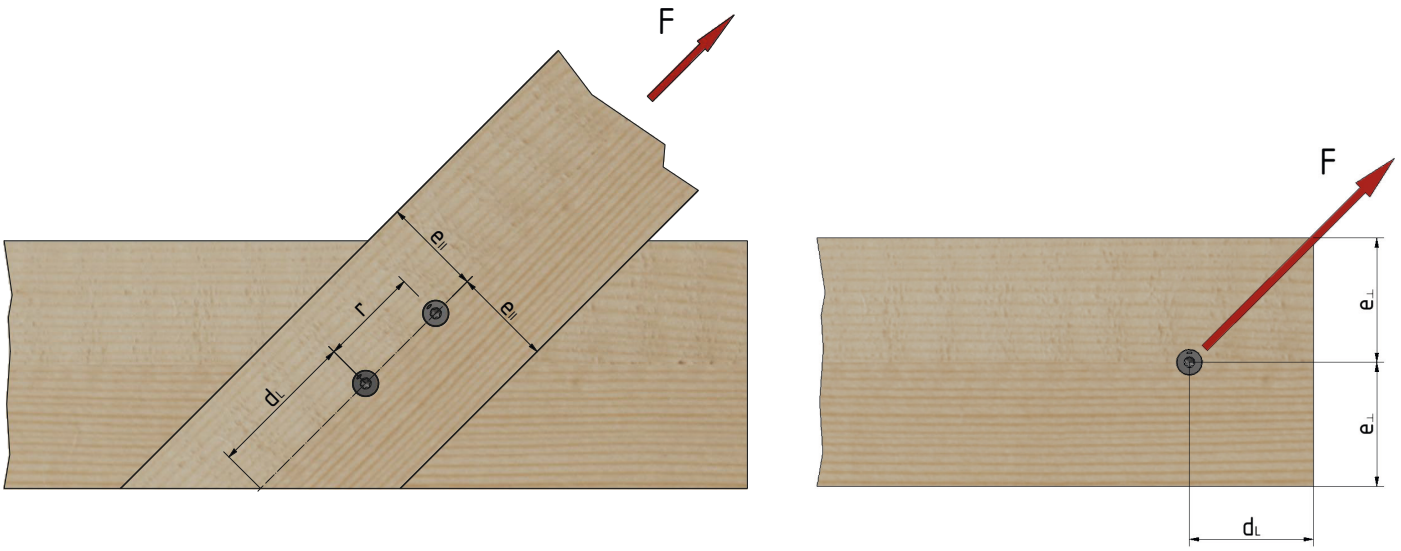
Screws should always be installed as close as possible to the where the potential crack is expected to start. Nevertheless, minimum end and edge distancing still must be fulfilled.

Reinforcing screws near notches and holes



Although no minimum distance is required between reinforcing screws and bolts, it's essential that they are installed perpendicular to each other.

Wood members and forces at an angle



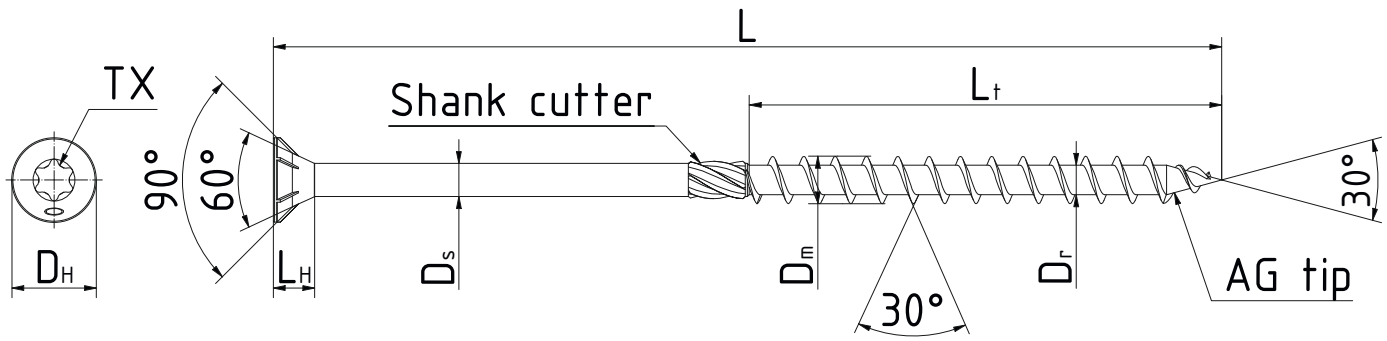
Where fasteners are installed in members with miter cuts, end and edge distances must be considered as the image shows.

If screws are subjected predominantly to an angled force with respect to wood grain direction, loaded and unloaded distancing must be considered accordingly.

4 EUROTEC STRUCTURAL FASTENERS DIMENSIONS

4.1 PARTIALLY-THREADED FASTENERS

4.1.1 Paneltwistec AG Ribbed Countersunk Head



Paneltwistec AG Ribbed Countersunk Head Dimensions

Item #	Units per box	D	L		Lt		LH	DH	Dm	Ds	Dr	Bit
			[in]	(mm)	[in]	(mm)						
945583	200	1/4 (6)	2-3/8	(60)	1.42	(36)	0.222 (5.7)	0.463 (11.8)	0.234 (6)	0.173 (4.4)	0.157 (4)	TX30
945584	200		2-3/4	(70)	1.65	(42)						
945632	200		3-1/8	(80)	1.89	(48)						
945633	100		3-9/16	(90)	2.13	(54)						
945634	100		3-15/16	(100)	2.36	(60)						
945635	100		4-5/16	(110)	2.76	(70)						
945636	100		4-3/4	(120)								
945637	100		5-1/8	(130)								
945638	100		5-1/2	(140)								
945639	100		5-7/8	(150)								
945640	100		6-1/4	(160)								
945641	100		7-1/8	(180)								
945642	100		7-7/8	(200)								
945643	100		8-5/8	(220)								
945644	100		9-1/2	(240)								
945645	100		10-1/4	(260)								
945646	100		11	(280)								
945647	100		11-13/16	(300)								

Note: inches (mm)

Paneltwistec AG ribbed countersunk head dimensions (cont.)

Item #	Units per box	D	L		L_t		L_H	D_H	D_m	D_s	D_r	Bit
			[in]	(mm)	[in]	(mm)						
944715	50	5/16 (8)	3-1/8	(80)	1.89	(48)	0.275 (7)	0.571 (14.5)	0.311 (7.9)	0.228 (5.8)	0.209 (5.3)	TX40
944716	50		3-15/16	(100)	2.36	(60)						
944717	50		4-3/4	(120)	2.60	(66)						
944718	50		5-1/2	(140)	3.74	(95)						
944719	50		6-1/4	(160)								
944720	50		7-1/8	(180)								
944721	50		7-7/8	(200)								
944722	50		8-5/8	(220)								
944723	50		9-1/2	(240)								
944724	50		10-1/4	(260)								
944725	50		11	(280)								
944726	50		11-13/16	(300)								
944727	50		12-5/8	(320)								
944728	50		13-3/8	(340)								
944729	50		14-1/4	(360)								
944730	50		15	(380)								
944731	50		15-3/4	(400)								
944732	25		16-1/2	(420)								
944733	25		17-1/4	(440)								
944734	25		18-1/8	(460)								
944735	25		19	(480)								
944736	25		19-11/16	(500)								
944737	25		21-5/8	(550)								
944739	25		23-5/8	(600)								

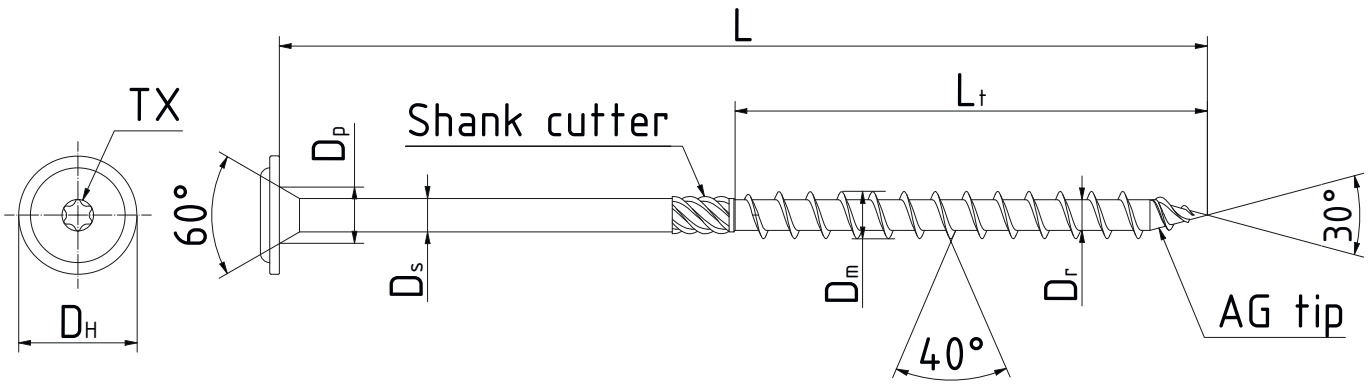
Note: inches (mm)

Paneltwistec AG ribbed countersunk head dimensions (cont.)

Item #	Units per box	D	L		L_t		L_H	D_H	D_m	D_s	D_r	Bit
			[in]	(mm)	[in]	(mm)						
945687	50	3/8 (10)	3-15/16	(100)	2.36	(60)	0.343 (8.7)	0.701 (17.8)	0.394 (10)	0.276 (7)	0.246 (6.2)	TX50
945688	50		4-3/4	(120)	2.76	(70)						
945689	50		5-1/2	(140)	3.15	(80)						
945690	50		6-1/4	(160)	3.54	(90)						
945691	50		7-1/8	(180)	3.94	(100)						
945692	50		7-7/8	(200)								
945693	50		8-5/8	(220)								
945694	50		9-1/2	(240)								
945695	50		10-1/4	(260)								
945696	50		11	(280)								
945697	50		11-13/16	(300)								
945698	50		12-5/8	(320)								
945699	50		13-3/8	(340)								
945703	50		14-1/4	(360)								
945709	50		15	(380)								
945711	50		15-3/4	(400)								

Note: inches (mm)

4.1.2 Paneltwistec AG Washer Head



Paneltwistec AG washer head dimensions

Item #	Units per box	D	L		Lt		D_H	D_P	D_m	D_s	D_r	Bit
			[in]	(mm)	[in]	(mm)						
945947	100		1-3/16	(30)	Fully threaded							
945948	100		1-9/16	(40)	Fully threaded							
945712	100		1-15/16	(50)	1.18	(30)						
945713	100		2-3/8	(60)	1.42	(36)						
945716	100		2-3/4	(70)	1.65	(42)						
945717	100		3-1/8	(80)	1.89	(48)						
945718	100		3-9/16	(90)	2.13	(54)						
945719	100		3-15/16	(100)	2.36	(60)						
945720	100		4-5/16	(110)								
945721	100		4-3/4	(120)								
945722	100	1/4 (6)	5-1/8	(130)								
945723	100		5-1/2	(140)								
945724	100		5-7/8	(150)								
945725	100		6-1/4	(160)								
945726	100		7-1/8	(180)	2.76	(70)	0.551 (14)	0.264 (6.7)	0.234 (6)	0.169 (4.3)	0.161 (4)	TX30
945727	100		7-7/8	(200)								
945728	100		8-5/8	(220)								
945729	100		9-1/2	(240)								
945730	100		10-1/4	(260)								
945731	100		11	(280)								
945732	100		11-13/16	(300)								

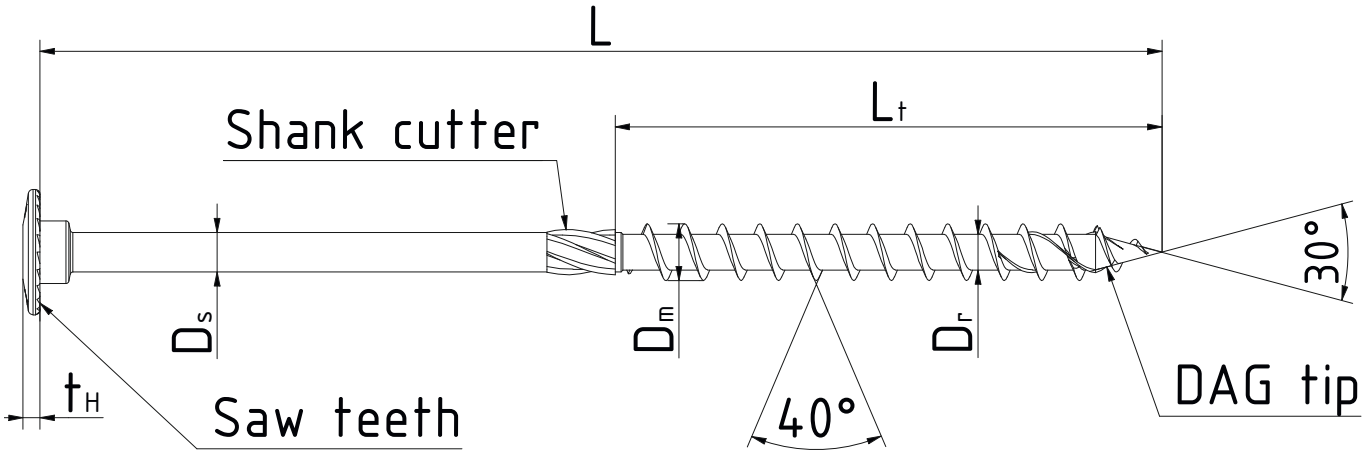
Note: inches (mm)

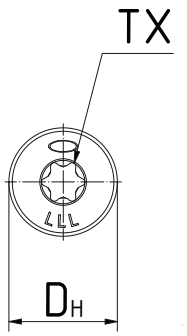
Paneltwistec AG washer head dimensions (cont.)

Item #	Units per box	D	L		L_t		D_H	D_p	D_m	D_s	D_r	Bit
			[in]	(mm)	[in]	(mm)						
945806	50	5/16 (8)	2-3/8	(60)	1.89	(48)	0.866 (22)	0.394 (10)	0.315 (8)	0.228 (5.8)	0.228 (5.8)	TX40
944588	50		3-1/8	(80)								
944589	50		3-15/16	(100)	2.36	(60)						
944590	50		4-3/4	(120)	2.60	(66)						
944591	50		5-1/2	(140)	3.74	(95)						
944592	50		6-1/4	(160)								
944593	50		7-1/8	(180)								
944594	50		7-7/8	(200)								
944595	50		8-5/8	(220)								
944596	50		9-1/2	(240)								
944597	50		10-1/4	(260)								
944598	50		11	(280)								
944599	50		11-13/16	(300)								
944600	50		12-5/8	(320)								
944601	50		13-3/8	(340)								
944602	50		14-1/4	(360)								
944603	50		15	(380)								
944604	50		15-3/4	(400)								
945750	50	3/8 (10)	3-1/8	(80)	1.97	(50)	0.984 (25)	0.457 (11.6)	0.394 (10)	0.276 (7)	0.246 (6.2)	TX50
945751	50		3-15/16	(100)	2.36	(60)						
945752	50		4-3/4	(120)	2.76	(70)						
945753	50		5-1/2	(140)	3.15	(80)						
945754	50		6-1/4	(160)	3.54	(90)						
945755	50		7-1/8	(180)	3.94	(100)						
945756	50		7-7/8	(200)								
945757	50		8-5/8	(220)								
945758	50		9-1/2	(240)								
945759	50		10-1/4	(260)								
945760	50		11	(280)								
945761	50		11-13/16	(300)								
945762	50		12-5/8	(320)								
945763	50		13-3/8	(340)								
945764	25		14-1/4	(360)								
945765	25		15	(380)								
945766	25		15-3/4	(400)								
100019	25		16-1/2	(420)								
100020	25		17-3/8	(440)								
100021	25		18-1/8	(460)								
100022	25		18-7/8	(480)								
100023	25		19-5/8	(500)								
100024	25		21-5/8	(550)								
100025	25		23-5/8	(600)								

Note: inches (mm)

4.1.3 SawTec





SawTec dimensions

Item #	Units per box	D	L		Lt		tH	DH	Dm	Ds	Dr	Bit
			[in]	(mm)	[in]	(mm)						
954128	100	1/4 (6)	2-3/8	(60)	1.42	(36)	0.094 (2.4)	0.512 (13)	0.236 (6)	0.169 (4.3)	0.157 (4)	TX30
954129	100		2-3/4	(70)	1.65	(42)						
954130	100		3-1/8	(80)	1.89	(48)						
954131	100		3-15/16	(100)	2.36	(60)						
954133	100		4-3/4	(120)								
954135	100		5-1/2	(140)	2.76	(70)						
954137	100		6-1/4	(160)								
954138	100		7-1/8	(180)								

Note: inches (mm)

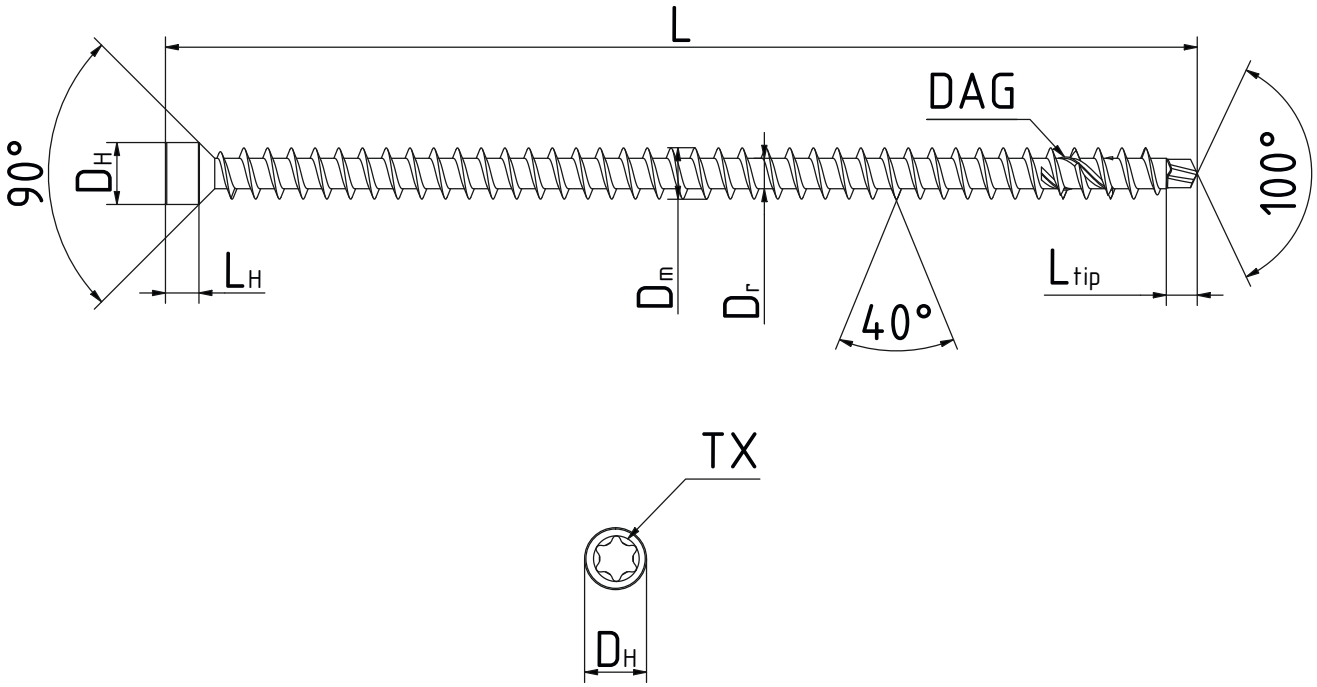
SawTec dimensions (cont.)

Item #	Units per box	D	L		L_t		t_H	D_H	D_m	D_s	D_r	Bit
			[in]	(mm)	[in]	(mm)						
954145	50	5/16 (8)	3-1/8	(80)	1.89	(48)	0.102 (2.6)	0.709 (18)	0.315 (8)	0.222 (5.6)	0.209 (5.3)	TX40
954146	50		3-15/16	(100)	2.36	(60)						
954147	50		4-3/4	(120)								
954148	50		5-1/2	(140)	3.74	(95)						
954149	50		6-1/4	(160)								
954150	50		7-1/8	(180)								
954151	50		7-7/8	(200)								
954152	50		8-5/8	(220)								
954153	50		9-1/2	(240)								
954154	50		10-1/4	(260)								
954155	50		11	(280)								
954156	50		11-13/16	(300)								
954157	50		12-5/8	(320)								
954158	50		13-3/8	(340)								
954159	50		14-1/4	(360)								
954160	50		15	(380)								
954161	50		15-3/4	(400)								
954181	50		16-1/2	(420)								
954182	50		17-1/4	(440)								
954183	50		18-1/8	(460)								
954184	50		19	(480)								
954185	50		19-11/16	(500)								
954186	50		21-5/8	(550)								
954187	50		23-5/8	(600)								
954162	100	3/8 (10)	3-15/16	(100)	2.36	(60)	0.122 (3.1)	0.866 (22)	0.394 (10)	0.272 (6.9)	0.246 (6.2)	TX40
954163	100		4-3/4	(120)								
954164	100		5-1/2	(140)	3.74	(95)						
954165	100		6-1/4	(160)								
954166	100		7-1/8	(180)								
954167	100		7-7/8	(200)								
954168	100		8-5/8	(220)								
954169	100		9-1/2	(240)								
954170	100		10-1/4	(260)								
954171	100		11	(280)								
954172	100		11-13/16	(300)								
954173	100		12-5/8	(320)								
954174	100		13-3/8	(340)								
954175	100		14-1/4	(360)								
954176	100		15	(380)								
954177	100		15-3/4	(400)								

Note: inches (mm)

4.2 FULLY-THREADED FASTENERS

4.2.1 KonstruX ST Cylindric Head



KonstruX ST cylindric head dimensions

Item #	Units per box	D	L		L_H	L_{tip}	D_H	D_m	D_r	Bit
			[in]	(mm)						
904808	100	1/4 (6.5)	3-1/8	(80)	0.217 (5.5)	0.197 (5)	0.315 (8)	0.256 (6.5)	0.177 (4.5)	TX30
904809	100		4	(100)						
904810	100		4-3/4	(120)						
904811	100		5-1/2	(140)						
904812	100		6-1/4	(160)						
904813	100		7-11/16	(195)						
100063	100		7-7/8	(200)						
100064	100		8-5/8	(220)						
100065	100		9-1/2	(240)						
100066	100		10-1/4	(260)						

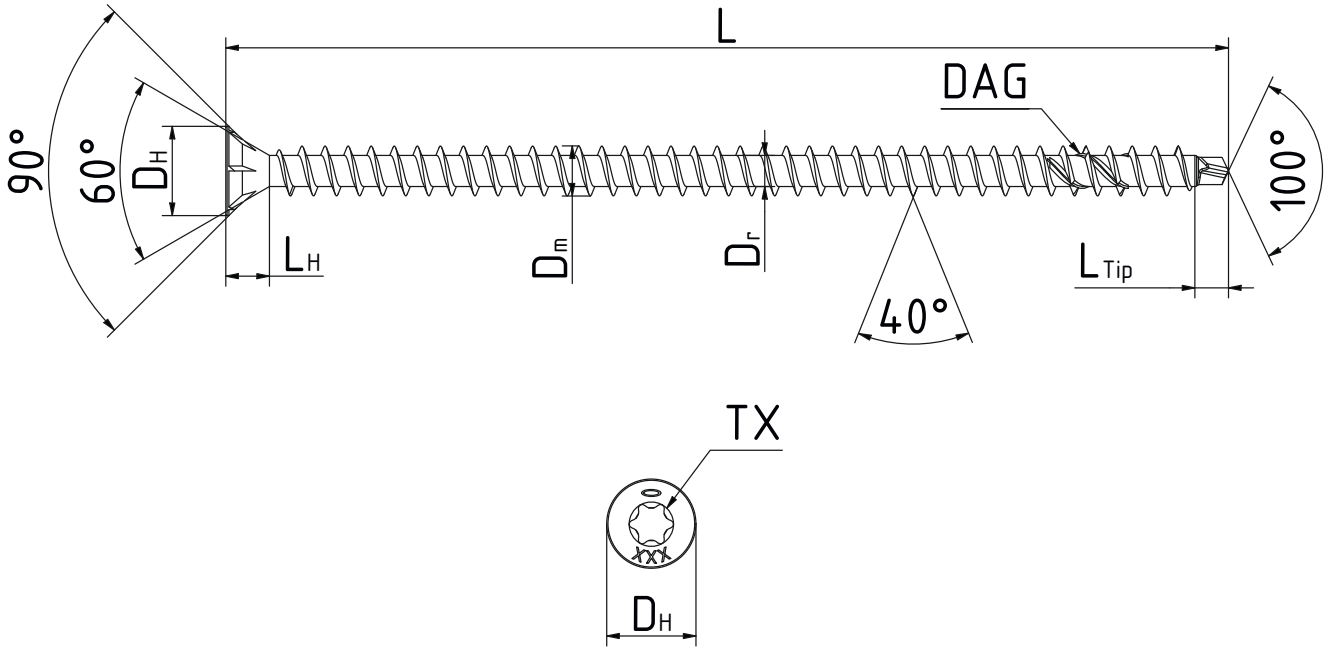
Note: inches (mm)

KonstruX ST cylindric head dimensions (cont.)

Item #	Units per box	D	L		L_H	L_{tip}	D_H	D_m	D_r	Bit
			[in]	(mm)						
904825	50	5/16 (8)	6-1/8	(155)	0.256 (6.5)	0.236 (6)	0.394 (10)	0.315 (8)	0.205 (5.2)	TX40
904826	50		7-5/8	(195)						
904827	50		8-5/8	(220)						
904828	50		9-5/8	(245)						
904834	100		10-5/8	(270)						
904829	50		11-5/8	(295)						
904830	50		13	(330)						
904831	50		14-3/4	(375)						
904832	50		15-3/4	(400)						
944804	50		17	(430)						
944805	50		19	(480)						
944806	50		20-7/8	(530)						
944807	50		22-7/8	(580)						
904815	25	3/8 (10)	11-13/16	(300)	0.256 (6.5)	0.315 (8)	0.512 (13)	0.394 (10)	0.232 (5.9)	TX50
904816	25		13	(330)						
904817	25		14-1/4	(360)						
904818	25		15-3/4	(400)						
904819	25		17-11/16	(450)						
904820	25		19-11/16	(500)						
904821	25		21-5/8	(550)						
904822	25		23-5/8	(600)						
100080	25		25-5/8	(650)						
100081	25		27-1/2	(700)						
100082	25		29-1/2	(750)						
100083	25		31-1/2	(800)						

Note: inches (mm)

4.2.2 KonstruX ST ribbed countersunk head



KonstruX ST ribbed countersunk head dimensions

Item #	Units per box	D	L		L_H	L_{tip}	D_H	D_m	D_r	Bit
			[in]	(mm)						
904857	100	1/4 (6.5)	3-1/8	(80)	0.222 (5.5)	0.197 (5)	0.453 (11.5)	0.256 (6.5)	0.177 (4.5)	TX30
904858	100		4	(100)						
904859	100		4-3/4	(120)						
904860	100		5-1/2	(140)						
904790	50	5/16 (8)	3-3/4	(95)	0.256 (6.5)	0.236 (6)	0.571 (14.5)	0.315 (8)	0.205 (5.2)	TX40
904791	50		4-15/16	(125)						
904792	50		6-1/8	(155)						
904793	50		7-11/16	(195)						
904794	50		8-5/8	(220)						
904795	50		9-5/8	(245)						
904796	50		10-5/8	(270)						
904797	50		11-5/8	(295)						
904798	50		13	(330)						
904799	50		14-3/4	(375)						
904800	50		15-3/4	(400)						
904801	50		17	(430)						
904802	50		19	(480)						
904803	50		20-7/8	(545)						

Note: inches (mm)

KonstruX ST ribbed countersunk head dimensions (cont.)

Item #	Units per box	D	L		L_H	L_{tip}	D_H	D_m	D_r	Bit
			[in]	(mm)						
904770	25	3/8 (10)	4-15/16	(125)	0.256 (6.5)	0.315 (8)	0.701 (17.8)	0.394 (10)	0.232 (5.9)	TX50
904771	25		6-1/8	(155)						
904772	25		7-11/16	(195)						
904773	25		8-5/8	(220)						
904774	25		9-5/8	(245)						
904775	25		10-5/8	(270)						
904776	25		11-13/16	(300)						
904777	25		13	(330)						
904778	25		14-1/4	(360)						
904779	25		15-3/4	(400)						
904780	25		17-11/16	(450)						
904781	25		19-11/16	(500)						
904782	25		21-5/8	(550)						
904783	25		23-5/8	(600)						
100090	25		25-5/8	(650)						
100091	25		27-1/2	(700)						
100092	25		29-1/2	(750)						
100093	25		31-1/2	(800)						

Note: inches (mm)

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