



ICC-ES Evaluation Report ESR-3942

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES

Section: 06 05 23—Wood, Plastic, and Composite Fastenings

REPORT HOLDER:

EUROTEC GmbH

EVALUATION SUBJECT:

EUROTEC STRUCTURAL WOOD SCREWS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015 and 2012 *International Building Code*® (IBC)
- 2021, 2018, 2015 and 2012 *International Residential Code*® (IRC)

Property evaluated:

Structural

2.0 USES

EuroTec Structural Wood Screws are used for wood-to-wood connections that are designed in accordance with the IBC. For structures regulated under the IRC, the screws may be used where an engineered design is submitted in accordance with IRC Section R301.1.3.

3.0 DESCRIPTION

3.1 Notation and Symbols:

- a = Connection geometry parameter (See Table 7 and Figures 8 through 10.)
- D = Outside thread diameter
- D_H = Diameter of screw head or integral washer
- D_n = Neck diameter (See Figure 5)

- D_{nom} = Screw size designation
- D_r = Minor thread (root) diameter
- D_s = Unthreaded shank diameter
- $F_{yb,spec}$ = Minimum specified bending yield strength, determined in accordance with ASTM F1575 using D_r .
- L = Overall screw length (See Figures 1 through 7.)
- $L_{eff,m}$ = Effective embedded thread length in the wood main member (See Section 4.1.3.)
- $L_{eff,s}$ = Effective embedded thread length in the wood side member (See Section 4.1.3.)
- $L_{emb,l}$ = Minimum required embedded thread length in holding member, including tip, applicable to tabulated lateral design values
- $L_{emb,w}$ = Minimum required embedded thread length in holding member, including tip, applicable to tabulated withdrawal design values
- L_m = Dowel bearing length in the main member
- L_{thread} = Length of thread
- L_{tip} = Length of tip
- L_{un} = Length of unthreaded portion of the screw, measured from the head of the screw to the start of the threads (See Section 4.1.3.)
- R_α = Reduction factor for withdrawal resistance of inclined fasteners (See Section 4.1.4.)

SG_{NDS}	=	Assigned specific gravity (See Section 3.3.)
$t_{s,w}$	=	Thickness of wood side member
W	=	Reference unit withdrawal design value for screws installed perpendicular to face of the wood
W_H	=	Reference head pull-through design value
Z_{\parallel}	=	Reference lateral design value for screws loaded parallel to the wood grain
Z_{\perp}	=	Reference lateral design value for screws loaded perpendicular to the wood grain
α	=	Angle between the axis of the screw and the grain of the applicable wood member, degrees

3.2 EuroTec Structural Wood Screws:

The EuroTec Structural Wood Screws are dowel-type threaded fasteners designed to be installed in wood without drilling a lead hole. The screws are manufactured from carbon steel wire and are hardened and galvanized in accordance with the manufacturer’s specifications, which are included in the approved quality documentation. The screws are available in packages of loose fasteners.

3.2.1 Paneltwistec Screws: The Paneltwistec screws are typically partial thread screws, with very short screws being fully-threaded. See Table 1 for applicable thread lengths. The screws have either a countersunk head with ribs (designated SK) or a washer head (designated TK), which both have a star shaped driving recess. The partial thread screws have a reamer knurl between the smooth shank and the threads and a sharp point. Two tip designs are available, designated AG and DAG. The AG tip has a short double thread. For the DAG tip, there is a secondary thread which runs at a sharp angle to the primary thread for a length equal to roughly 5 times the thread pitch. See Figures 1 through 4 for images of these screws. See Table 1 for screw dimensions.

3.2.2 SawTec Screws: The SawTec screws are partially threaded screws, which have a stepped, flat head, with teeth under the head, and a star shaped driving recess. The screws have a reamer knurl between the smooth shank and the threads and a DAG tip design, described in Section 3.2.1. See Figure 5 for an image of these screws. See Table 1 for screw dimensions.

3.2.3 KonstruX ST Screws: The KonstruX ST screws are fully threaded screws, which have a cylindrical head or a ribbed countersunk head. Both head styles have a star shaped driving recess. The screws have a self drilling tip with a secondary thread which runs at a sharp angle to the primary thread for a short length near the tip. See Figures 6 and 7 for images of these screws. See Table 2 for screw dimensions.

3.3 Wood Members:

Wood members may be sawn lumber or structural glued laminated timber (glulam). Screws may also be used in the face of cross-laminated timber (CLT) panels. Use of the screws in engineered wood products (EWP) other than those addressed above is outside the scope of this report.

For purposes of connection design, sawn lumber, glulam and CLT must have SG_{NDS} as indicated in the tables in this report, and the moisture content must be less than or equal to 19 percent at the time of screw installation and while in service. SG_{NDS} for sawn lumber is the assigned specific gravity for the applicable grade mark, which must be determined in accordance with Table 12.3.3A of the ANSI/AWC National Design Specification for Wood Construction® (NDS) (Table 11.3.3A of the NDS for the 2012 IBC) or the latest NDS Supplement. SG_{NDS} for glulam members is the Specific Gravity for Fastener Design addressed in Tables 5A through 5D of the NDS Supplement. When designing connections with screws installed into CLT panels, all of the laminations must have a minimum SG_{NDS} as indicated in the tables in this report.

For wood-to-wood connections, the tabulated side member thickness is an absolute value (not a minimum or maximum value). The thickness of the wood main member must be sufficient to ensure that the tip of the screw is fully embedded in the wood.

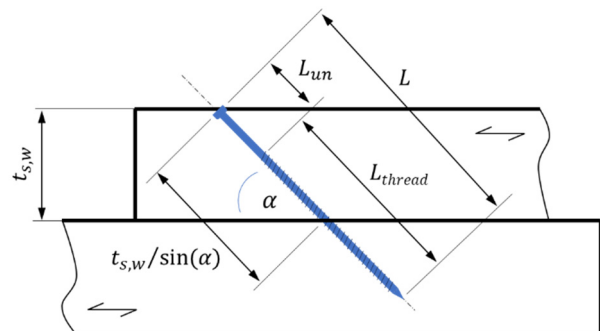
4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: The design values in this report are intended to aid the designer in meeting the requirements of IBC Section 1604.2. For connections not completely described in this report, determination of the suitability of the EuroTec Structural Wood Screws for the specific application is the responsibility of the designer and is outside the scope of this report. The designer is responsible for determining the available strengths for the connection, considering all applicable limit states, and for considering serviceability issues. The designer is responsible for determining the required spacing, edge distance and end distance for the screws, based on the characteristics of the connected building materials.

4.1.2 Screw Strength: Allowable screw shear and tension strengths (ASD) and design screw shear and tension strengths (LRFD), and minimum specified bending yield strengths for the screws are shown in Table 3.

4.1.3 Effective Embedded Thread Length: The effective embedded thread length is the length of fastener thread in a wood member that is completely surrounded by the wood. For example, for a wood-to-wood connection the effective lengths in the side and main members are determined as follows:



$$L_{eff,s} = \left(\frac{t_{s,w}}{\sin(\alpha)} \right) - L_{un} \tag{Eq. 4.1.3-1}$$

$$L_{eff,m} = \left(L - \left(\frac{t_{s,w}}{\sin(\alpha)} \right) - L_{tip} \right) \leq L_{thread} \tag{Eq. 4.1.3-2}$$

4.1.4 Reference Withdrawal Design Values: Reference withdrawal (W) design values in pounds per inch of thread penetration, for screws installed perpendicular to the face of the wood member are shown in Table 4. For inclined fastening with KonstruX screws, the applicable reduction

factor from the table below must be applied. Applicable reduction factors for Paneltwistec and SawTec screws are outside the scope of this report.

α	R_{α}
90	1.00
85	1.00
80	0.99
75	0.99
70	0.98
65	0.97
60	0.95
55	0.94
50	0.92
45	0.91
40	0.89
35	0.84
30	0.77

4.1.5 Reference Pull-through Design Values: Reference head pull-through values (W_H) for partially threaded screws are shown in Table 5 for installation with $90^{\circ} \geq \alpha \geq 30^{\circ}$. Lesser angles of installation are outside the scope of this report. For fully threaded screws, the reference pull-through design value is the greater of the tabulated value and the reference withdrawal design value in the side member determined in accordance with Sections 4.1.3 and 4.1.4.

4.1.6 Lateral Connections Designed in Accordance with the NDS: Reference lateral design values determined in accordance with the NDS for representative wood-to-wood connections are shown in Table 6, for screws installed perpendicular to the faces of the wood members. For other connection configurations, the reference lateral design strengths may be determined in accordance with the NDS, subject to the following conditions:

1. $F_{yb,spec}$ from Table 3 must be used for design.
2. D_r must be used where 'D' is referenced in Tables 12.3.1A, 12.3.1B and 12.3.3 of the NDS (Tables 11.3.1A, 11.3.1B and 11.3.3 of the 2012 NDS for the 2012 IBC). For partially-threaded screws, when determining if Footnote 1 to Table 12.3.1 applies, D_s must be considered the nominal diameter.
3. Wood species combinations must have SG_{NDS} of 0.55 or less.
4. $t_{s,w}$ must be a minimum of 1 inch (25.4 mm) for 6 mm screws, and 1.5 inches (38 mm) for larger screws.
5. Fastener penetration into the main member must be a minimum of $6D$.
6. Dowel bearing length shall be determined in accordance with Section 12.3.5.3 of the NDS (Section 11.3.5.2 of the 2012 NDS for the 2012 IBC), using 2^*D as the tip length for the Paneltwistec and SawTec screws and L_{tip} given in Table 2 for the KonstruX screws, as applicable.
7. Spacing, edge and end distance must be in accordance with Table 7, and as needed to prevent splitting of the wood.

4.1.7 Adjustments to Reference Design Values: The reference design values must be adjusted in accordance with the NDS provisions for dowel-type fasteners to determine allowable loads for use with ASD and/or design loads for use with LRFD.

4.1.8 Connections with Multiple Screws: See Sections 11.1.2, 11.2.2 and 12.6 of the NDS (Sections 10.1.2, 10.2.2 and 11.6 of the NDS for the 2012 IBC) regarding multiple

fastener connections and consideration of local stresses in the wood members.

4.1.9 Combined Loading: Where the screws are subjected to combined lateral and withdrawal loads, connections must be designed in accordance with Section 12.4.1 of the NDS (Section 11.4.1 of the NDS for the 2012 IBC), as applicable.

4.2 Installation:

4.2.1 General: The Eurotec Structural Wood Screws must be installed in accordance with the report holder's published installation instructions and this report. In the case of a conflict between this report and the report holder's instructions, the more restrictive requirements govern. The screws must be installed at the angle required by the construction documents, with the minimum spacing, end distances, and edge distances needed to prevent splitting of the wood or as noted in Table 7, whichever is more restrictive. For the Paneltwistec TK and SawTec screws, the underside of the integral washer or flat head must bear against the surface of the wood side member. For the Paneltwistec SK and KonstruX screws, the top of the screw head must be flush with the surface of the wood side member. Screws must not be overdriven. The screws must be installed by turning with a power driver (drill or impact driver), not by driving with a hammer.

4.2.2 Predrilling: Eurotec screws may be installed without predrilling. To reduce splitting, the use of predrilled holes is recommended by the report holder for certain situations, including the following conditions:

1. For species which are prone to splitting, including Douglas fir.
2. For exclusively axially loaded screws installed in lumber with a thickness $\leq 10D$ and/or a width of less than $8D$ or $2\frac{3}{8}$ inches (60 mm), whichever is greater.

See the report holder's published installation instructions. Predrilled holes must not exceed 0.90^*D_r .

5.0 CONDITIONS OF USE

The Eurotec Structural Wood Screws described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Calculations and details demonstrating compliance with this report must be submitted to the code official. The calculations and details must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.2 Connection geometry for inclined fastening must be justified to the satisfaction of the code official, including the minimum required wood thickness between crossing fasteners.
- 5.3 The screws have only been evaluated for use in dry service applications. Use in wet service conditions is outside the scope of this report.
- 5.4 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this evaluation report.
- 5.5 Use of the screws in contact with preservative-treated or fire-retardant-treated wood is outside the scope of this report.
- 5.6 The screws are manufactured under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Dowel-type Threaded Fasteners Used in Wood (AC233), dated June 2023.

7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-3942) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.
- 7.2 In addition, the packaging for the screws is labeled with the fastener type (such as Paneltwistec); the tip type (AG or DAG) and head style, as applicable; the nominal

screw diameter and length, and an image of the screw. Except for the cylindrical head KonstruX screws, each screw head is marked with an oval and the screw length as shown in the figures in this report.

- 7.3 The report holder's contact information is the following:

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TABLE 1—PANELTWISTEC AND SAWTEC SCREW DIMENSIONS

D_{nom} , mm (Inch)	L, mm (Inches)	L_{thread} ³ , inches	D_H , inch (Drive Size)	D_s , inch	D_n , inch	D, inch
Paneltwistec AG with Countersunk Head w/ribs (SK)¹						
6 (0.24)	50 ($1^{15}/_{16}$)	1.18	0.472 (TX30)	0.169	0.157	0.236
	60 ($2^3/_8$)	1.42				
	70 ($2^3/_4$)	1.65				
	80 ($3^1/_8$)	1.89				
	90 ($3^9/_16$)	2.13				
	100 ($3^{15}/_{16}$)	2.36				
	110 to 300 ($4^5/_16$ to $11^{13}/_{16}$)	2.76				
8 (0.32)	80 ($3^1/_8$)	1.97	0.571 (TX40)	0.224	0.209	0.315
	100 ($3^{15}/_{16}$)	2.36				
	120 ($4^3/_4$)	2.76				
	140 ($5^1/_2$)	3.15				
	160 ($6^5/_16$)	3.54				
	180 to 600 ($5^1/_8$ to $23^5/_8$)	3.94				
10 (0.39)	80 ($3^1/_8$)	1.97	0.701 (TX50)	0.272	0.248	0.394
	100 ($3^{15}/_{16}$)	2.36				
	120 ($4^3/_4$)	2.76				
	140 ($5^1/_2$)	3.15				
	160 ($6^5/_16$)	3.54				
	180 to 400 ($5^1/_8$ to $15^3/_4$)	3.94				
Paneltwistec AG with Washer Head (TK)²						
6 ($1^1/_4$)	30 ($1^3/_16$)	Full	0.551 (TX30)	0.169	0.157	0.236
	40 ($1^9/_16$)	Full				
	50 ($1^{15}/_{16}$)	1.18				
	57 ($2^1/_4$), 60 ($2^3/_8$)	1.42				
	70 ($2^3/_4$)	1.65				
	80 ($3^1/_8$)	1.89				
	90 ($3^9/_16$)	2.13				
	100 ($3^{15}/_{16}$)	2.36				
	110 to 300 ($4^5/_16$ to $11^{13}/_{16}$)	2.76				
8 ($5^1/_16$)	60 ($2^3/_8$)	Full	0.866 (TX40)	0.224	0.209	0.315
	80 ($3^1/_8$)	1.97				
	100 ($3^{15}/_{16}$)	2.36				
	120 ($4^3/_4$)	2.76				
	140 ($5^1/_2$)	3.15				
	160 ($6^5/_16$)	3.54				
	180 to 400 ($7^1/_16$ to $15^3/_4$)	3.94				
10 ($3^1/_8$)	60 ($2^3/_8$)	Full	0.984 (TX50)	0.272	0.248	0.394
	80 ($3^1/_8$)	1.97				
	100 ($3^{15}/_{16}$)	2.36				
	120 ($4^3/_4$)	2.76				
	140 ($5^1/_2$)	3.15				
	160 ($6^5/_16$)	3.54				
	180 to 400 ($7^1/_16$ to $15^3/_4$)	3.94				

TABLE 1—PANELTWISTEC AND SAWTEC SCREW DIMENSIONS (cont.)

D_{nom} , mm (Inch)	L, mm (Inches)	L_{thread} , inches	D_H , inch (Drive Size)	D_s , inch	D_r , inch	D, inch
Paneltwistec DAG with Countersunk Head w/ribs (SK)¹						
6 (1/4)	50 (1 ¹⁵ / ₁₆)	1.18	0.472 (TX30)	0.169	0.157	0.236
	60 (2 ³ / ₈)	1.42				
	70 (2 ³ / ₄)	1.65				
	80 (3 ¹ / ₈)	1.89				
	90 (3 ⁹ / ₁₆)	2.13				
	100 (3 ¹⁵ / ₁₆)	2.36				
	110 (4 ⁵ / ₁₆)	2.60				
	120 (4 ³ / ₄) to 300 (to 11 ¹³ / ₁₆)	2.76				
8 (5/16)	80 (3 ¹ / ₈)	1.89	0.571 (TX40)	0.224	0.209	0.315
	90 (3 ⁹ / ₁₆)	2.13				
	100 (3 ¹⁵ / ₁₆)	2.36				
	110 (4 ⁵ / ₁₆), 120 (4 ³ / ₄)	2.60				
	130 to 500 (5 ¹ / ₈ to 19 ¹¹ / ₁₆)	3.74				
10 (3/8)	80 (3 ¹ / ₈)	1.89	0.701 (TX50)	0.272	0.248	0.394
	90 (3 ⁹ / ₁₆)	2.13				
	100 (3 ¹⁵ / ₁₆)	2.36				
	110 (4 ⁵ / ₁₆), 120 (4 ³ / ₄)	2.60				
	130 to 500 (5 ¹ / ₈ to 19 ¹¹ / ₁₆)	3.74				
Paneltwistec DAG with Washer Head (TK)²						
6 (1/4)	50 (1 ¹⁵ / ₁₆)	1.18	0.551 (TX30)	0.169	0.157	0.236
	60 (2 ³ / ₈)	1.42				
	70 (2 ³ / ₄)	1.65				
	80 (3 ¹ / ₈)	1.89				
	90 (3 ⁹ / ₁₆)	2.13				
	100 (3 ¹⁵ / ₁₆)	2.36				
	110 (4 ⁵ / ₁₆)	2.60				
	120 (4 ³ / ₄) to 300 (to 11 ¹³ / ₁₆)	2.76				
8 (5/16)	50 (1 ¹⁵ / ₁₆)	Full	0.866 (TX40)	0.224	0.209	0.315
	60 (2 ³ / ₈), 80 (3 ¹ / ₈)	1.89				
	90 (3 ⁹ / ₁₆)	2.13				
	100 (3 ¹⁵ / ₁₆)	2.36				
	110 (4 ⁵ / ₁₆), 120 (4 ³ / ₄)	2.60				
	130 to 400 (5 ¹ / ₈ to 15 ³ / ₄)	3.74				
10 (3/8)	80 (3 ¹ / ₈)	1.89	0.984 (TX50)	0.272	0.248	0.394
	90 (3 ⁹ / ₁₆)	2.13				
	100 (3 ¹⁵ / ₁₆)	2.36				
	110 (4 ⁵ / ₁₆), 120 (4 ³ / ₄)	2.60				
	130 to 400 (5 ¹ / ₈ to 15 ³ / ₄)	3.74				

TABLE 1—PANELTWISTEC AND SAWTEC SCREW DIMENSIONS (cont.)

D_{nom} , mm (inch)	L, mm (inches)	L_{thread}^3 , inches	D_H , inch (Drive Size)	D_n , inch	D_s , inch	D_r , inch	D, inch
SawTec Flat Head¹							
6 (1/4)	50 (1 ⁵ / ₁₆)	1.18	0.512 (TX30)	0.256	0.169	0.157	0.236
	60 (2 ³ / ₈)	1.42					
	70 (2 ³ / ₄)	1.65					
	80 (3 ¹ / ₈)	1.89					
	90 (3 ⁹ / ₁₆)	2.13					
	100 (3 ¹⁵ / ₁₆) to 120 (4 ³ / ₄)	2.36					
	130 to 300 (5 ¹ / ₈ to 11 ¹³ / ₁₆)	2.76					
8 (5/16)	80 (3 ¹ / ₈)	1.89	0.709 (TX40)	0.404	0.224	0.209	0.315
	90 (3 ⁹ / ₁₆)	2.13					
	100 (3 ¹⁵ / ₁₆) to 120 (4 ³ / ₄)	2.36					
	130 to 600 (5 ¹ / ₈ to 23 ⁵ / ₈)	3.74					
10 (3/8)	80 (3 ¹ / ₈)	1.89	0.866 (TX50)	0.433	0.272	0.248	0.394
	90 (3 ⁹ / ₁₆)	2.13					
	100 (3 ¹⁵ / ₁₆) to 120 (4 ³ / ₄)	2.36					
	130 to 400 (5 ¹ / ₈ to 15 ³ / ₄)	3.74					

For **SI**: 1 inch = 25.4 mm.

¹Overall length is measured from the top of the head to the tip.

²Overall length is measured from the underside of the integral washer to the tip.

³Length of thread includes tip.

TABLE 2—KONSTRUX ST SCREW DIMENSIONS

HEAD STYLE	D_{nom} , mm (inch)	L, mm (inches)	D_H , inch (Drive Size)	D_n , inch	D, inch	L_{tip} , inch
Cylindric (ZK) ¹	6.5 (1/4)	80 to 195 (3 ¹ / ₈ to 7 ¹¹ / ₁₆)	0.315 (TX30)	0.177	0.256	0.157
	8 (5/16)	155 to 580 (6 ¹ / ₈ to 22 ⁷ / ₈)	0.394 (TX40)	0.205	0.315	0.197
	10 (3/8)	100 to 600 (3 ¹⁵ / ₁₆ to 23 ⁵ / ₈)	0.512 (TX50)	0.232	0.394	0.236
Countersunk w/ribs (SK) ¹	6.5 (1/4)	80 to 195 (3 ¹ / ₈ to 7 ¹¹ / ₁₆)	0.472 (TX30)	0.177	0.256	0.157
	8 (5/16)	95 to 545 (3 ³ / ₄ to 21 ⁷ / ₁₆)	0.571 (TX40)	0.205	0.315	0.197
	10 (3/8)	100 to 600 (3 ¹⁵ / ₁₆ to 23 ⁵ / ₈)	0.701 (TX50)	0.232	0.394	0.236

For **SI**: 1 inch = 25.4 mm, 1 psi = 6.89 kPa, 1 lbf = 4.45 N.

¹Overall length is measured from the top of the head to the tip.

TABLE 3—SCREW STEEL STRENGTHS

SCREW TYPE	D_{nom} , mm (inch)	$F_{yb,spec}$ ¹ (psi)	ALLOWABLE STEEL STRENGTHS (ASD)		DESIGN STEEL STRENGTHS (LRFD)	
			Tension (lbf)	Shear (lbf)	Tension (lbf)	Shear (lbf)
Paneltwistec and SawTec	6 (1/4)	152,000	1,160	833	1,740	1,250
	8 (5/16)	165,000	2,030	1,570	3,050	2,350
	10 (3/8)	177,000	2,350	1,780	3,530	2,680
KonstruX ST	6.5 (1/4)	229,000	1,840	1,200	2,760	1,800
	8 (5/16)	235,000	2,300	1,560	3,450	2,340
	10 (3/8)	203,000	2,880	1,910	4,310	2,870

For **SI**: 1 inch = 25.4 mm, 1 psi = 6.89 kPa, 1 lbf = 4.45 N.

¹Bending yield strength determined in accordance with ASTM F1575 using the minor thread (root) diameter, D_r .

TABLE 4—REFERENCE WITHDRAWAL DESIGN VALUES (W) FOR INSTALLATION INTO THE FACE OF THE WOOD MEMBER^{1,2}

SCREW TYPE	D_{nom} , mm (inch)	$L_{emb,w}$ (inches)	W FOR SELECTED SG_{NDS} VALUES (lbf/inch): ^{1,2}			
			0.35	0.42	0.50	0.55
Paneltwistec SawTec	6 (1/4)	7/8	–	75	–	–
		2 1/8 ⁽³⁾	103	119	137	147
	8 (5/16)	1 1/4	–	75	–	–
		2 7/8	125	145	167	180
	10 (3/8)	1 1/2	–	135	–	–
		3 1/2	134	156	179	193
KonstruX ST	6.5 (1/4)	7/8	–	80	–	–
		2 5/16	125	145	167	180
	8 (5/16)	1 1/4	–	88	–	92
		2 7/8	154	178	205	221
	10 (3/8)	1 1/2	–	92	–	115
		3 1/2	171	198	227	245

For **SI**: 1 inch = 25.4 mm, 1 lbf/in = 175N/m; 1 lbf = 4.45 N.

¹ Unless otherwise noted, tabulated values are applicable to screws installed perpendicular to the faces of the wood members.

² The tabulated reference withdrawal design value is in pounds-force per inch of effective thread embedment. See Section 4.1.3.

³ Tabulated values are applicable to screws installed with $90^\circ \geq \alpha \geq 45^\circ$.

TABLE 5—REFERENCE HEAD PULL THROUGH DESIGN VALUES (W_H)¹

SCREW TYPE	HEAD STYLE	D_{nom} , mm (inch)	$t_{s,w}$, inches	REFERENCE PULL-THROUGH DESIGN VALUE, W_H (lbf)	
				$SG_{NDS} \geq 0.42$	$SG_{NDS} \geq 0.55$
Paneltwistec	Countersunk w/ribs (SK)	6 (¹ / ₄)	1	111	168
		8 (⁵ / ₁₆)	1 ¹ / ₂	195	256
		10 (³ / ₈)	1 ¹ / ₂	286	315
	Washer Head (TK)	6 (¹ / ₄)	1	236	351
		8 (⁵ / ₁₆)	1 ¹ / ₂	436	853
		10 (³ / ₈)	1 ¹ / ₂	466	984
SawTec	Flat Head	6 (¹ / ₄)	1	202	226
		8 (⁵ / ₁₆)	1 ¹ / ₂	335	404
		10 (³ / ₈)	1 ¹ / ₂	444	511
Konstrux ST ²	Countersunk (SK)	6.5 (¹ / ₄)	1 ¹ / ₂	263	323
		8 (⁵ / ₁₆)	1 ¹ / ₂	263	323
		10 (³ / ₈)	1 ¹ / ₂	263	323

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

¹ Tabulated values are applicable to screws installed with $90^\circ \geq \alpha \geq 30^\circ$.

² For fully threaded screws, the reference pull-through design value is the greater of the tabulated value and the reference withdrawal design value in the side member determined in accordance with Sections 4.1.3 and 4.1.4.

TABLE 6—REFERENCE LATERAL DESIGN VALUES (Z) FOR SINGLE SHEAR (TWO-MEMBER) WOOD-TO-WOOD CONNECTIONS DESIGNED IN ACCORDANCE WITH THE NDS

FASTENER DESIGNATION	D_{nom} mm (inch)	L (in.)	$t_{s,w}$ (in.)	$L_{emb,l}$ (in.)	REFERENCE LATERAL DESIGN VALUE (Z) FOR SELECTED SG_{NDS} VALUES (lbf): ^{1,2,3}											
					0.36			0.42			0.50			0.55		
					$Z_{ }$	$Z_{\perp s}$	Z_{\perp}	$Z_{ }$	$Z_{\perp s}$	Z_{\perp}	$Z_{ }$	$Z_{\perp s}$	Z_{\perp}	$Z_{ }$	$Z_{\perp s}$	Z_{\perp}
Paneltwistec or SawTec	6 (0.24)	3.94	1.75	2.19	128	128	128	147	147	147	173	173	173	189	189	189
	8 (0.32)	5.51	2.50	3.01	199	159	159	229	183	183	269	215	215	293	235	235
	10 (0.39)	6.30	3.00	3.30	252	202	202	291	233	233	341	273	273	373	298	298
KonstruX ST	6.5 (¹ / ₄)	5.51	2.50	3.01	192	154	154	221	177	177	260	208	208	284	227	227
	8 (⁵ / ₁₆)	6.10	2.75	3.35	232	185	185	267	214	214	314	251	251	342	274	274
	10 (³ / ₈)	6.30	3.00	3.30	255	204	204	294	235	235	345	276	276	377	302	302

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

¹ Tabulated values are applicable to screws installed perpendicular to the faces of the wood members.

² The wood main member thickness must be equal to or greater than the screw length less the thickness of the wood side member so that the fastener is fully embedded in the wood.

³ The tabulated lateral design values are based on both wood members having the same specific gravity.

⁴ Other connection configurations may be designed in accordance with Section 4.1.6.

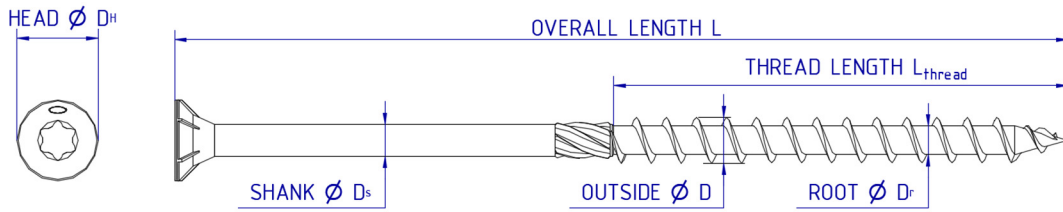


FIGURE 1 - PANELTWISTEC AG SK SCREW

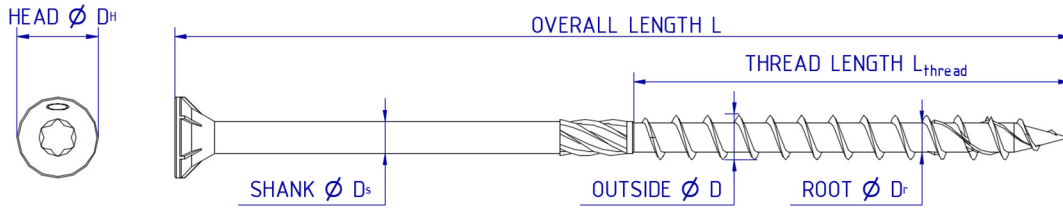


FIGURE 2 - PANELTWISTEC DAG SK SCREW

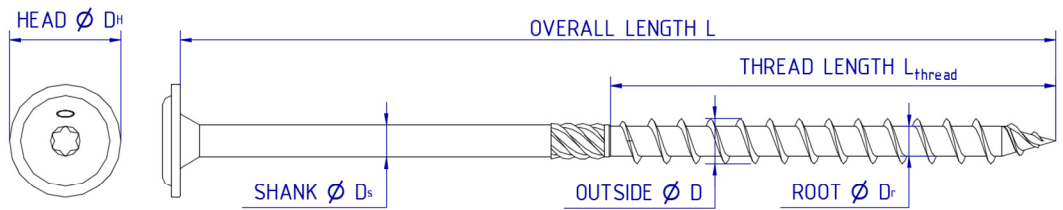


FIGURE 3 - PANELTWISTEC AG TK SCREW

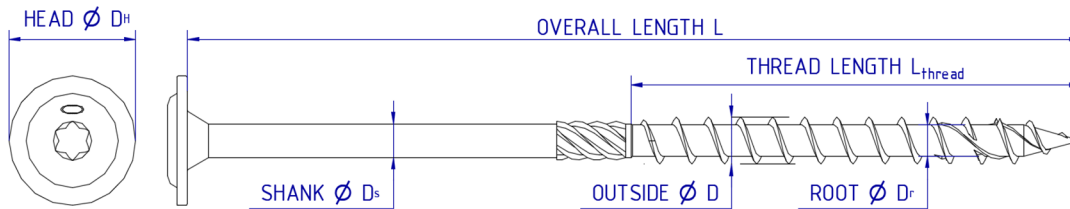


FIGURE 4 - PANELTWISTEC DAG TK SCREW

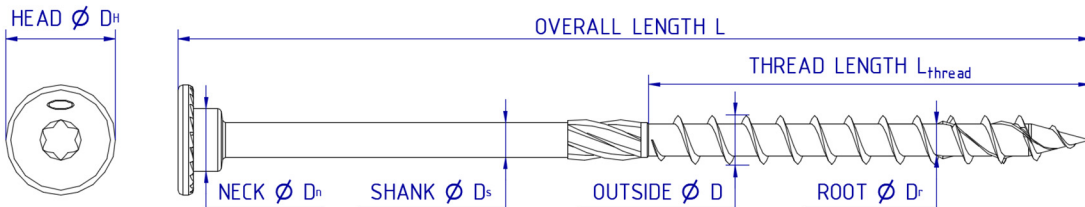


FIGURE 5 - SAWTEC SCREW

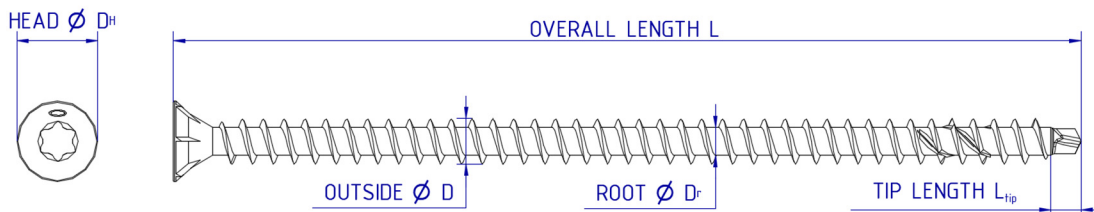


FIGURE 6 - KONSTRUX ST SK SCREW

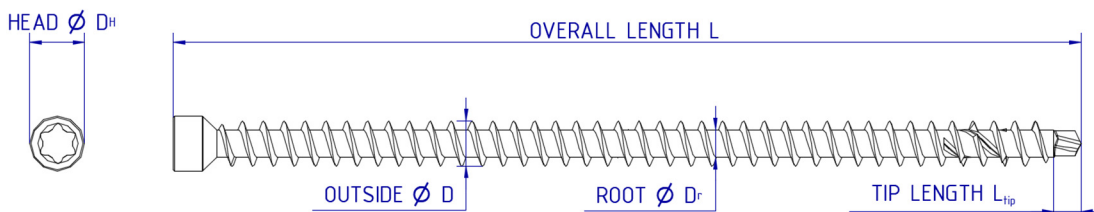


FIGURE 7 - KONSTRUX ST ZK SCREW

TABLE 7—CONNECTION GEOMETRY REQUIREMENTS FOR FASTENERS INSTALLED PERPENDICULAR TO THE FACE OF WOOD MEMBERS AND INCLINED FASTENERS^{1,2,3}

CONDITION ⁴		MINIMUM DISTANCE OR SPACING		
		Self-drilled		Predrilled Hole ⁵
		SG _{NDS} < 0.50	SG _{NDS} ≥ 0.50	
For Paneltwistec, SawTec and KonstruX Screws up to 8 mm				
End distance (see Figures 8 and 10)	Loading toward end, $a_{end,1}$	15D	20D	12D
	Loading perpendicular to grain or away from end, $a_{end,2}$	10D	15D	7D
	Axial loading, $a_{end,2}$	10D	10D	7D
	Inclined fastener, $a_{end,CG}$			
Edge distance (see Figures 8 and 10)	Loading toward edge, $a_{edge,1}$	10D	12D	7D
	Loading parallel to grain or away from edge, $a_{edge,2}$	5D	7D	3D
	Axial Loading, $a_{edge,2}$	4D	4D	3D
	Inclined fastener, $a_{edge,CG}$			
Spacing between fasteners, parallel to grain (see Figures 9 and 10)	Loading parallel to grain, a_1	15D	15D	10D
	Loading perpendicular to grain, a_1	10D	10D	5D
	Axial loading, a_1	7D	7D	7D
	Inclined fastener, a_1			
Spacing between fasteners, perpendicular to grain (see Figures 9 and 10)	Loading parallel to grain, a_2	5D	7D	4D
	Loading perpendicular to grain, a_2	5D	7D	4D
	Axial loading, a_2	4D	4D	3D
	Inclined fastener, a_2			
	Inclined fastener, crossed screws, $a_{2,cross}$	1.5D	1.5D	1.5D
For 10 mm Paneltwistec, SawTec and KonstruX Screws				
End distance (see Figures 8 and 10)	Loading toward end, $a_{end,1}$	15D	20D	7D
	Loading perpendicular to grain or away from end, $a_{end,2}$	10D	15D	4D
	Axial loading, $a_{end,2}$	10D	10D	4D
	Inclined fastener, $a_{end,CG}$			
Edge distance (see Figures 8 and 10)	Loading toward edge, $a_{edge,1}$	10D	12D	4D
	Loading parallel to grain or away from edge, $a_{edge,2}$	5D	7D	3D
	Axial Loading, $a_{edge,2}$	4D	4D	3D
	Inclined fastener, $a_{edge,CG}$			
Spacing between fasteners, parallel to grain (see Figures 9 and 10)	Loading parallel to grain, a_1	15D	15D	5D
	Loading perpendicular to grain, a_1	10D	10D	5D
	Axial loading, a_1	7D	7D	5D
	Inclined fastener, a_1			
Spacing between fasteners, perpendicular to grain (see Figures 9 and 10)	Loading parallel to grain, a_2	5D	7D	5D
	Loading perpendicular to grain, a_2	5D	7D	5D
	Axial loading, a_2	5D	5D	5D
	Axial loading for crossed screws $a_{2,cross}$	1.5D	1.5D	1.5D

For **SI**: 1 inch = 25.4 mm.

¹End distances, edge distances and fastener spacing must be sufficient to prevent splitting of the wood, or as required by this table, whichever is the more restrictive.

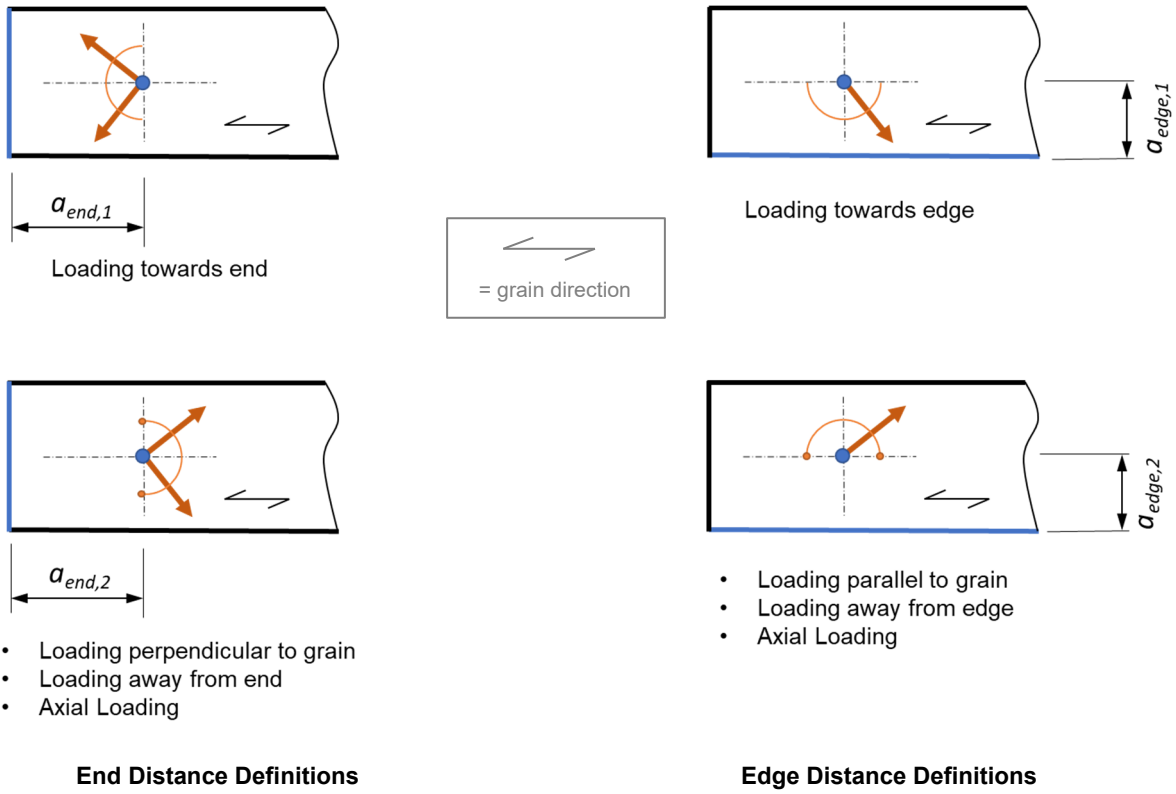
²Wood member stresses must be checked in accordance with Section 11.1.2 and Appendix E of the NDS, and end distances, edge distances and fastener spacing may need to be increased accordingly.

³Tabulated values are applicable to wood-to-wood connections.

⁴For CLT products, parallel and perpendicular-to-grain descriptions apply to the grain orientation at the shear plane for lateral loading and to the face grain orientation for withdrawal loading.

⁵Tabulated geometry is applicable to fasteners installed in predrilled holes that meet the following requirements:

- For installation in Douglas Fir and other species of similar or greater density, the hole must have a diameter between 0.60D_s and 0.75D_s.
- For installation in SPF and other species of similar density, the hole must have a diameter between 0.40D_s and 0.70D_s.
- The hole diameter must not exceed 0.9D_s.



End Distance Definitions

Edge Distance Definitions

FIGURE 8—END AND EDGE DISTANCE DEFINITIONS FOR SCREWS INSTALLED PERPENDICULAR TO GRAIN

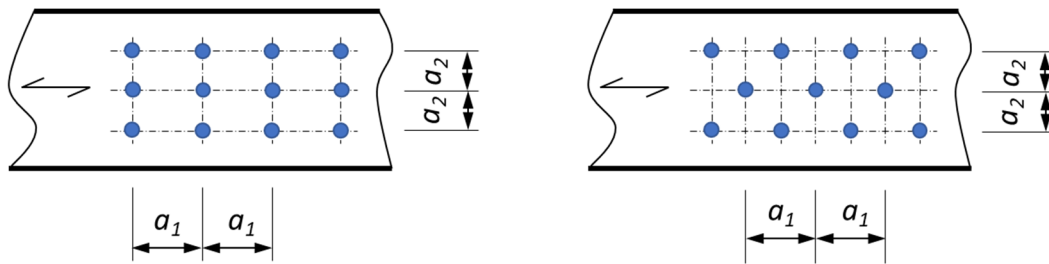


FIGURE 9—SPACING DEFINITIONS FOR SCREWS INSTALLED PERPENDICULAR TO GRAIN

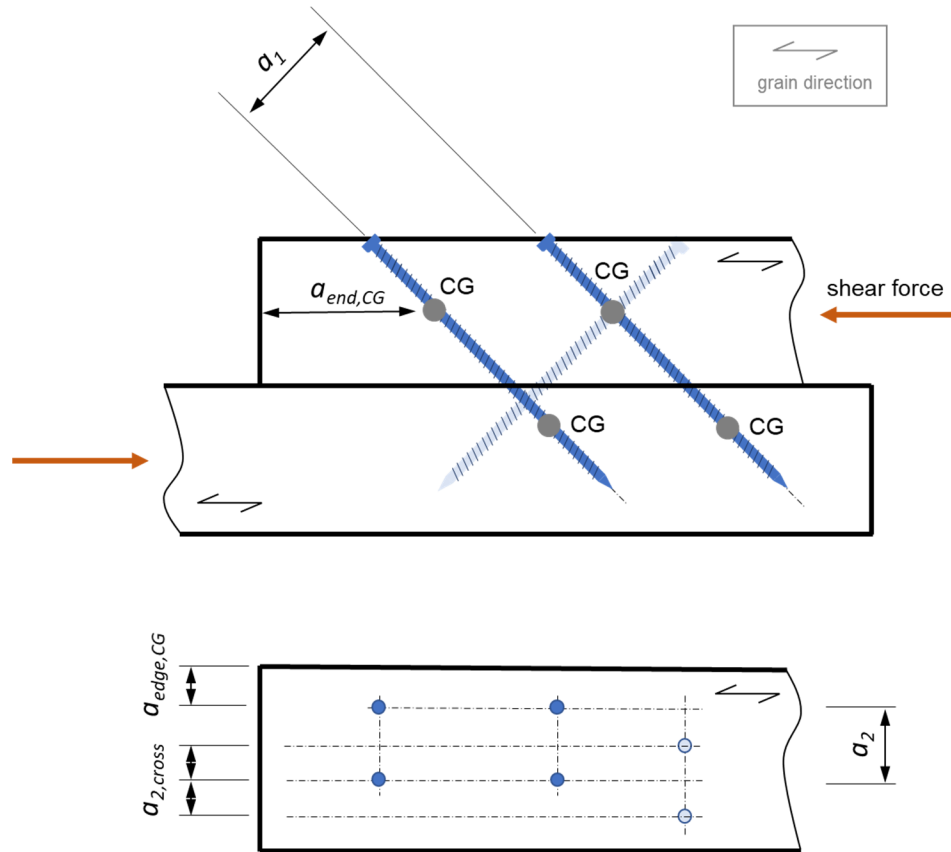


FIGURE 10—SPACING DEFINITIONS FOR INCLINED AND CROSSED SCREWS

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES**Section: 06 05 23—Wood, Plastic and Composite Fastenings****REPORT HOLDER:**

EUROTEC GmbH

EVALUATION SUBJECT:

EUROTEC STRUCTURAL WOOD SCREWS

1.0 REPORT PURPOSE AND SCOPE**Purpose:**

The purpose of this evaluation report supplement is to indicate that the EuroTec Structural Wood Screws, described in ICC-ES evaluation report ESR-3942, have also been evaluated for compliance with the code(s) noted below.

Applicable code edition(s):

- 2022 California Building Code (CBC)

For evaluation of applicable Chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2022 California Residential Code (CRC)

2.0 CONCLUSIONS**2.1 CBC:**

The EuroTec Structural Wood Screws, described in Sections 2.0 through 7.0 of the evaluation report ESR-3942, comply with CBC Chapter 23, provided the design and installation are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapters 16, 17 and 23, as applicable.

2.1.1 OSHPD:

The applicable OSHPD Sections and Chapters of the CBC are beyond the scope of this supplement.

2.1.2 DSA:

The applicable DSA Sections and Chapters of the CBC are beyond the scope of this supplement.

2.2 CRC:

The EuroTec Structural Wood Screws, described in Sections 2.0 through 7.0 of the evaluation report ESR-3942, comply with CRC Section R301, provided the design and installation are in accordance with the 2021 *International Residential Code*® (IRC) provisions noted in the evaluation report and the additional requirements of CRC Chapter R301, as applicable.

This supplement expires concurrently with the evaluation report, reissued February 2023 and revised September 2023.