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ESR-3294

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Reissued 04/2018
This report is subject to renewal 04/2019.

DIVISION: 05 00 00—METALS

SECTION: 05 05 23—METAL FASTENINGS

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES

SECTION: 06 05 23—WOOD, PLASTIC AND COMPOSITE FASTENINGS

REPORT HOLDER:

ELCO CONSTRUCTION PRODUCTS

**1302 KERR DRIVE
DECORAH, IOWA 52101**

EVALUATION SUBJECT:

ELCO SELF-DRILLING STRUCTURAL SCREW FASTENERS



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DIVISION: 05 00 00—METALS

Section: 05 05 23—Metal Fastenings

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES

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

REPORT HOLDER:

ELCO CONSTRUCTION PRODUCTS

1302 KERR DRIVE

DECORAH, IOWA 52101

(800) 435-7213

www.elcoconstruction.com

EVALUATION SUBJECT:

ELCO SELF-DRILLING STRUCTURAL SCREW FASTENERS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2015, 2012, 2009 and 2006 *International Building Code*® (IBC)
- 2015, 2012 and 2009 *International Residential Code*® (IRC)

Property evaluated:

Structural

2.0 USES

Elco Self-drilling Structural Screw Fasteners are used to connect cold-formed steel members together, to connect cold-formed steel to hot-rolled steel plates, to connect sheet steel to cold-formed steel and to connect wood structural panel sheathing to cold-formed steel. The screws are used to resist shear and tension loads in engineered connections and are used in connections prescribed by the code for steel-to-steel and wood-to-steel connections.

3.0 DESCRIPTION

3.1 General:

The Elco Self-drilling Structural Screw Fasteners are self-drilling tapping screws formed from carbon steel wire conforming to ASTM F2282, Grade 1018 - 1022, and case-hardened to 50 to 56 HRC. The screws are coated with a proprietary corrosion-resistant coating identified as Stalgard®. Table 1 provides screw descriptions including type, size, threads per inch (tpi), nominal diameter, head

style, head diameter, point type, length, drilling capacity, length of load bearing area, and coating information.

3.2 Standard Drill Screws:

3.2.1 EDC450 (Type 1): The EDC450 screw has coarse threads and an indented high hex washer head with an undercut. This screw complies with the thread design, material specifications and performance requirements of ASTM C1513.

3.2.2 EDB401, EDB426, EDB446, EDB486, EDB541, EDB571 (Type 2): These screws have coarse threads and an indented high hex washer head. These screws comply with ASTM C1513.

3.2.3 EDC745 (Type 3): The EDC745 screw has coarse threads and an indented hex washer head. This screw complies with ASTM C1513.

3.2.4 EDB741, EDB761, EDB782, EDB801, EDB821, EDB830, EDB840, EDB845 (Type 4) and EDA790 (Type 4A): These screws have coarse threads and an indented hex washer head. The screws comply with ASTM C1513.

3.2.5 EDC930 (Type 5): The EDC930 screw has coarse threads and an indented hex washer head which is smaller than that required by ASME B18.6.4. The screw complies with the thread design, material specifications and performance requirements of ASTM C1513.

3.2.6 EDB936, EDB946, EDB956, EDB961, EDB971, EDB976, EDB981, EDB983 (Type 6): These screws have coarse threads and an indented hex washer head. These screws comply with ASTM C1513.

3.3 Extended Drilling Capacity Screws:

3.3.1 EDC801, EDC816 (Type 7): These screws have fine threads and an indented hex washer head. The spacing of the lead threads is greater than the spacing of the remainder of the threads. These screws comply with ASTM C1513.

3.3.2 ECC720, ECC740, ECC750 (Type 8): These screws have fine threads and an indented hex washer head. The threads nearest the drilling point are slightly deformed and the manufacturer describes the thread design as Round Body Taptite®. These screws comply with the material specifications and performance requirements of ASTM C1513.

3.4 Architectural Roof Clip Fasteners [EDO450, EDO460, EDO470 (Type 9)]:

The fasteners are coarse thread screws with pancake-style heads. These screws comply with ASTM C1513.

3.5 Drilit® Drill Screws:

3.5.1 EDT602 (Type 10) and EDT720 (Type 11): The EDT602 and EDT720 screws have fine threads and a phillips wafer head. Between the threads and the drill point, the screws have a portion of smooth shank with two projecting wings. The EDT602 and EDT720 screws comply with the thread design, material specifications and performance requirements of ASTM C1513.

3.5.2 EDT267, EDT282 (Type 12): These screws have fine threads and a phillips flat head. Between the threads and the drill point, these screws have a portion of smooth shank with two projecting wings. These screws comply with the thread design, material specifications and performance requirements of ASTM C1513.

3.5.3 EDT442, EDT470 (Type 13): The EDT442 and EDT470 screws have fine threads and a phillips flat head. Between the threads and the drill point, the screws have a portion of smooth shank with two projecting wings. The EDT442 and EDT470 screws comply with the thread design, material specifications and performance requirements of ASTM C1513.

3.6 Cold-formed Steel:

Connected steel must comply with one of the specifications listed in Section A2.1.1 of AISI S100-12 and must have the minimum base-metal thickness and tensile strength shown in the tables in this report.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: Screw thread length and point style must be selected on the basis of thickness of the fastened material and thickness of the supporting steel, respectively, based on the length of load bearing area (see Figure 13) and drilling capacity given in Table 1.

When tested for corrosion resistance in accordance with ASTM B117, the screws met the minimum requirement listed in ASTM F1941, as required by ASTM C1513, with no white corrosion after three hours and no red rust after 12 hours.

4.1.2 Prescriptive Design: The #10, #12 and 1/4-inch Elco Standard Drill Screws (Types 1 through 6) are recognized for use where ASTM C1513 screws of the same size and head style/dimension are prescribed in the IRC and in the AISI Standards referenced in 2015 and 2012 IBC Section 2211 (2009 and 2006 IBC Section 2210). The Elco Drilit® Drill screws (Types 10 through 13) may be used to attach wood structural panel sheathing to cold-formed steel as prescribed in 2015 IRC Sections R505.2.5, R603.2.5 and R804.2.5, (2012 and 2009 IRC Sections R505.2.4, R603.2.4 and R804.2.4) and as prescribed in Section C2.2.2 of AISI S213, which is referenced from 2015 and 2012 IBC Section 2211.6 (Section C2.2.2 of AISI Lateral, which is referenced in 2009 IBC Section 2210.6 and 2006 IBC Section 2210.5).

4.1.3 Engineered Steel-to-steel Connection Design: The Elco Standard Drill Screws, Extended Drilling Capacity Screws and Architectural Roof Clip Fasteners (Types 1 through 9) are recognized for use in engineered steel-to-steel connections. Design of cold-formed steel connections and connections of cold-formed steel to hot rolled steel must comply with Section E4 of AISI S100 (AISI-NAS for the 2006 IBC), using the nominal and allowable fastener tension and shear strengths for the screws as shown in Table 2. Alternatively, available connection shear strengths may be determined using Tables 3A and 3B, available pull-out connection strengths may be determined using Tables

4A and 4B, and available pull-over connection strengths may be determined using Tables 5A and 5B. The available connection shear strengths are for connections where the connected steel elements are in direct contact with one another. Design provisions for tapping screw connections subjected to combined shear and tension loading are outside the scope of this report.

For screws used in framing connections, in order for the screws to be considered fully effective, the minimum spacing between the fasteners and the minimum edge distance must be three times the nominal diameter of the screws, except when the edge is parallel to the direction of the applied force, the minimum edge distance must be 1.5 times the nominal screw diameter. When the spacing between screws is two times the fastener diameter, the connection shear strength values in Tables 3A and 3B must be reduced by 20 percent (Refer to Section D1.5 of AISI S200).

For screws used in applications other than framing connections, the minimum spacing between the fasteners must be three times the nominal screw diameter and the minimum edge and end distance must be 1.5 times the nominal screw diameter. Additionally, under the 2009 and 2006 IBC, when the direction to the end of the connected part is parallel to the line of the applied force, the allowable connection shear strength determined in accordance with Section E4.3.2 of Appendix A of AISI S100-07 must be considered.

Connected members must be checked for rupture in accordance with Section E6 of AISI S100-12 for the 2015 IBC (Section E5 of AISI S100-07/S2-10 under the 2012; Section E5 of AISI S100-07 under the 2009 IBC).

4.2 Installation:

Installation of Elco Self-drilling Structural Screw Fasteners must be in accordance with the manufacturer's published installation instructions and this report. The manufacturer's published installation instructions must be available at the jobsite at all times during installation.

The screws must be installed perpendicular to the work surface using a screw driving tool with a maximum speed of 2,500 rpm. The screw must penetrate through the supporting metal with a minimum of three threads protruding past the back side of the supporting metal.

5.0 CONDITIONS OF USE

The Elco 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** The fasteners must be installed in accordance with the manufacturer's published installation instructions and this report. If there is a conflict between the manufacturer's published installation instructions and this report, this report governs.
- 5.2** The allowable connection capacities specified in Section 4.1 are not to be increased when the fasteners are used to resist wind or seismic forces.
- 5.3** The use of the screws in engineered steel deck diaphragms has not been evaluated and is outside the scope of this evaluation report. Wood structural panel diaphragms constructed using the screws must comply with AISI S213 (AISI—Lateral) or must be recognized in a current ICC-ES evaluation report.
- 5.4** Drawings and calculations verifying compliance with this report and the applicable code must be submitted

to the code official for approval. The drawings and calculations are to be prepared by a registered design professional when required by the statutes of the jurisdiction in which the project is to be constructed.

- 5.5** The Elco 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 Tapping Screw Fasteners (AC118), dated February 2016.

7.0 IDENTIFICATION


The heads of the Elco screws are marked with “” as shown in Figures 1 through 12. Each box of the fasteners has a label bearing the report holder name, product name, part number, size, lot number and the evaluation report number (ESR-3294).

TABLE 1—ELCO SELF-DRILLING STRUCTURAL SCREW FASTENERS

	SCREW TYPE / FIGURE NO.	SIZE	TPI	BASIC/ NOMINAL SCREW DIAMETER (inch)	HEAD STYLE ¹	ACROSS FLATS (inch)	NOMINAL HEAD DIAMETER (inch)	POINT TYPE	COATING ²	PRODUCT NUMBER	NOMINAL FASTENER SCREW LENGTH (inch)	DRILLING CAPACITY ³ (inch)		LENGTH OF LOAD BEARING AREA ⁴ (inch)
												Min.	Max.	
Standard Drill Screws	1	10	16	0.190	IHHWH		0.399	#1	SS	EDC450	3/4	0.095	0.095	0.158
	2	10	16	0.190	IHHWH	5/16	0.399	#3	SS	EDB401	1/2	0.11	0.175	0.063
										EDB426	5/8			0.188
										EDB446	3/4			0.348
										EDB486	1			0.483
										EDB541	1 1/2			0.983
										EDB571	2			1.483
	3	12	14	0.216	IHWH	5/16	0.415	#1	SS	EDC745	3/4	0.095	0.095	0.156
	4	12	14	0.216	IHWH	5/16	0.415	#3	SS	EDB741	3/4	0.11	0.210	0.234
										EDB761	1			0.436
										EDB782	1 1/4			0.686
										EDB801	1 1/2			0.936
										EDB821	2			1.436
										EDB830	2 1/2			1.936
										EDB840	3			2.436
										EDB845	4			3.436
	4A	12	14	0.216	IHWH	5/16	0.415	#2/3	SS	EDA790	1 1/4	0.11	0.210	0.556
	5	1/4	14	0.250	IHWH	3/8	0.415	#1	SS	EDC930	7/8	0.095	0.095	0.336
	6	1/4	14	0.250	IHWH	3/8	0.500	#3	SS	EDB936	3/4	0.11	0.210	0.146
EDB946										1	0.376			
EDB956										1 1/4	0.626			
EDB961										1 1/2	0.876			
EDB971										2	1.376			
EDB976										2 1/2	1.886			
EDB981										3	2.376			
EDB983										4	3.376			
Extended Drilling Capacity Screws	7	12	24	0.216	IHWH	5/16	0.415	#4	SS	EDC801	7/8	0.11	0.312	0.356
										EDC816	1 1/4			0.656
	8	12	24	0.216	IHWH	5/16	0.415	#5	SS	ECC720	1 1/4	0.11	0.500	0.330
										ECC740	1 1/2			0.595
ECC750	2	1.095												
Arch. Roof Clip Fasteners	9	10	16	0.190	Pancake	n/a	0.437	#3	SS	EDO450	1	0.11	0.175	0.533
										EDO460	1 1/2			1.035
										EDO470	2			1.532
Drillit Drill Screws	10	10	24	0.190	PWH	n/a	0.470	#3 w/wings	GS	EDT602	1 7/16	0.036	0.187	0.816
	11	12	24	0.216	PWH	n/a	0.480	#4 w/wings	GS	EDT720	1 7/16	0.060	0.312	0.827
	12	12	24	0.216	PFH	n/a	0.480	#4 w/wings	GS	EDT267	2 1/4	0.06	0.312	1.361
										EDT282	2 3/4			1.861
	13	1/4	20	0.250	PFH	n/a	0.487	#4 w/wings	GS	EDT442	3	0.06	0.312	2.025
										EDT470 ⁵	4			3.025

For SI: 1 inch = 25.4 mm.

¹Head styles: IHWH = Indented Hex Washer Head; IHHWH = Indented High Hex Washer Head; PPH = Phillips Pancake Head; PWH = Phillips Wafer Head; PFH = Phillips Flat Head

²SS = Silver Stalgard®, GS = Gray Stalgard®

³The drilling capacity of a fastener refers to the minimum and maximum thickness of the steel that the fastener is designed to drill through.

⁴The length of load bearing area is the nominal screw length minus the length of the point to the third full thread. See Figure 13.

⁵This screw is partially threaded for attachment of wood sheathing with a minimum thickness of 1 1/4 inches.

TABLE 2—ELCO SELF-DRILLING SCREWS SHEAR AND TENSION FASTENER STRENGTH (lbf)

DESIGNATION	NOMINAL STRENGTH		ALLOWABLE STRENGTH (ASD)		DESIGN STRENGTH (LRFD)	
	Shear: P_s	Tension: P_t	Shear: P_s/Ω	Tension: P_t/Ω	Shear: ΦP_s	Tension: ΦP_t
STANDARD DRILL SCREWS						
#10-16	1679	2670	560	890	840	1335
#12-14	2032	3211	667	1070	1016	1606
1/4-14	2559	5021	853	1674	1280	2511
EXTENDED DRILLING CAPACITY SCREWS						
#12-24	2283	4034	761	1345	1142	2017
ARCHITECTURAL ROOF CLIP FASTENERS						
#10-16	1560	2326	520	775	780	1163

For SI: 1 inch = 25.4 mm, 1 lbf = 4.4 N.

TABLE 3A—ALLOWABLE (ASD) SHEAR (BEARING) CAPACITY OF SCREW CONNECTIONS^{1,2,3}, lbf

DESIGNATION	NOMINAL DIAMETER (in.)	THICKNESS OF STEEL IN CONTACT WITH SCREW HEAD (in.)	THICKNESS OF STEEL NOT IN CONTACT WITH SCREW HEAD (in.)										
			0.030	0.036	0.048	0.060	0.075	0.090	0.125	0.188	0.250	0.375	
STANDARD DRILL SCREWS													
#10-16	0.190	0.030	143	193	231	231	231	231	231	231	-	-	-
		0.036	143	188	277	277	277	277	277	277	-	-	-
		0.048	143	188	289	369	369	369	369	369	-	-	-
		0.060	143	188	289	404	462	462	-	-	-	-	-
		0.075	143	188	289	404	564	577	-	-	-	-	-
		0.090	143	188	289	404	564	693	-	-	-	-	-
#12-14	0.216	0.030	150	205	255	255	255	255	255	255	255	-	-
		0.036	150	197	304	306	306	306	306	306	-	-	-
		0.048	150	197	304	408	408	408	408	408	-	-	-
		0.060	150	197	304	424	510	510	510	510	-	-	-
		0.075	150	197	304	424	593	638	638	638	-	-	-
		0.090	150	197	304	424	593	765	765	765	-	-	-
		0.125	150	197	304	424	593	765	-	-	-	-	-
1/4-14	0.250	0.030	160	222	292	292	292	292	292	292	292	-	-
		0.036	160	211	325	350	350	350	350	350	-	-	-
		0.048	160	211	325	454	467	467	467	467	-	-	-
		0.060	160	211	325	454	583	583	583	583	-	-	-
		0.075	160	211	325	454	634	729	729	729	-	-	-
		0.090	160	211	325	454	634	833	875	875	-	-	-
EXTENDED DRILLING CAPACITY SCREWS													
#12-24	0.216	0.036	-	-	-	-	-	-	-	404	-	370	400
		0.060	-	-	-	-	-	-	-	829	-	630	677
		0.090	-	-	-	-	-	-	-	588	-	643	667
ARCHITECTURAL ROOF CLIP FASTENERS													
#10-16	0.190	0.030	-	-	232	286	350	335	-	-	-	-	
		0.036	-	-	343	423	484	472	-	-	-	-	

For SI: 1 inch = 25.4 mm, 1 lbf = 4.4 N, 1 ksi = 6.89 MPa.

¹⁻³See notes following Table 3B.

TABLE 3B—DESIGN (LRFD) SHEAR (BEARING) CAPACITY OF SCREW CONNECTIONS^{1,2,3}, lbf

DESIGNATION	NOMINAL DIAMETER (in.)	THICKNESS OF STEEL IN CONTACT WITH SCREW HEAD (in.)	DESIGN THICKNESS OF STEEL NOT IN CONTACT WITH SCREW HEAD (in.)									
			0.030	0.036	0.048	0.060	0.075	0.090	0.125	0.188	0.250	0.375
STANDARD DRILL SCREWS												
#10-16	0.190	0.030	214	290	346	346	346	346	346	-	-	-
		0.036	214	281	416	416	416	416	416	-	-	-
		0.048	214	281	433	554	554	554	554	-	-	-
		0.060	214	281	433	605	693	693	-	-	-	-
		0.075	214	281	433	605	846	866	-	-	-	-
		0.090	214	281	433	605	846	1039	-	-	-	-
#12-14	0.216	0.030	225	307	383	383	383	383	383	383	-	-
		0.036	225	296	456	459	459	459	459	-	-	-
		0.048	225	296	455	612	612	612	612	-	-	-
		0.060	225	296	455	636	765	765	765	-	-	-
		0.075	225	296	455	636	889	957	957	-	-	-
		0.090	225	296	455	636	889	1148	1148	-	-	-
1/4-14	0.250	0.030	241	316	437	437	437	437	437	437	-	-
		0.036	241	316	487	525	525	525	525	-	-	-
		0.048	241	316	487	680	700	700	700	-	-	-
		0.060	241	316	487	680	875	875	875	-	-	-
		0.075	241	316	487	680	951	1094	1094	-	-	-
		0.090	241	316	487	680	951	1250	1312	-	-	-
#12-24	0.216	0.036	-	-	-	-	-	-	647	-	591	640
		0.060	-	-	-	-	-	-	1327	-	1008	1083
		0.090	-	-	-	-	-	-	941	-	1029	1068
ARCHITECTURAL ROOF CLIP FASTENERS												
#10-16	0.190	0.030	-	-	373	458	559	535	-	-	-	-
		0.036	-	-	548	676	775	755	-	-	-	-

For SI: 1 inch = 25.4 mm, 1 lbf = 4.4 N, 1 ksi = 6.89 MPa.

¹Values are based on steel members with a minimum yield strength of $F_y = 33$ ksi and tensile strength of $F_u = 45$ ksi. When both pieces of steel have $F_u \geq 58$ ksi, the capacities in the table may be multiplied by 1.29 and when both pieces of steel have $F_u \geq 65$ ksi, the capacities in the table may be multiplied by 1.44.

²For shear connections, the lower of the fastener shear strength and the shear (bearing) capacity must be used for design.

³Capacity for other member thickness may be determined by interpolating within the table.

TABLE 4A—ALLOWABLE (ASD) TENSION PULL-OUT CAPACITY OF SCREW CONNECTIONS^{1,2,3}, lbf

DESIGNATION	NOMINAL DIAMETER (in.)	THICKNESS OF STEEL NOT IN CONTACT WITH SCREW HEAD (in.)									
		0.030	0.036	0.048	0.060	0.075	0.090	0.125	0.188	0.250	0.375
STANDARD DRILL SCREWS											
#10-16	0.190	73	87	116	145	182	218	303	454	-	-
#12-14	0.216	80	96	129	161	201	241	335	502	-	-
¹ / ₄ -14	0.250	92	110	147	184	230	275	383	574	-	-
EXTENDED DRILLING CAPACITY SCREWS											
#12-24	0.216	-	-	-	-	-	-	257	-	808	986
ARCHITECTURAL ROOF CLIP FASTENERS											
#10-16	0.190	-	-	127	173	215	324	-	-	-	-

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.4 N, 1 ksi = 6.89 MPa.

¹⁻³See notes following Table 4B.

TABLE 4B—DESIGN (LRFD) TENSION PULL-OUT CAPACITY OF SCREW CONNECTIONS^{1,2,3}, lbf

DESIGNATION	NOMINAL DIAMETER (in.)	THICKNESS OF STEEL NOT IN CONTACT WITH SCREW HEAD (in.)									
		0.030	0.036	0.048	0.060	0.075	0.090	0.125	0.188	0.250	0.375
STANDARD DRILL SCREWS											
#10-16	0.190	109	131	174	218	273	327	454	681	-	-
#12-14	0.216	120	145	193	241	301	361	502	753	-	-
¹ / ₄ -14	0.250	138	165	220	275	344	413	574	861	-	-
EXTENDED DRILLING CAPACITY SCREWS											
#12-24	0.216	-	-	-	-	-	-	412	-	1293	1578
ARCHITECTURAL ROOF CLIP FASTENERS											
#10-16	0.190	-	-	204	277	343	519	-	-	-	-

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.4 N, 1 ksi = 6.89 MPa.

¹Values are based on steel members with a minimum yield strength of $F_y = 33$ ksi and tensile strength of $F_u = 45$ ksi. When the steel not in contact with the screw head has $F_u \geq 58$ ksi, the capacities in the table may be multiplied by 1.29 and when the steel not in contact with the screw head has $F_u \geq 65$ ksi, the capacities in the table may be multiplied by 1.44.

²For tension connections, the lowest of the pull-out, pull-over, and fastener tension strength must be used for design.

³Capacity for other member thickness may be determined by interpolating within the table.

TABLE 5A—ALLOWABLE (ASD) TENSION PULL-OVER CAPACITY OF SCREW CONNECTIONS^{1,2,3}, lbf

DESIGNATION	NOMINAL HEAD DIAMETER (in.)	THICKNESS OF STEEL IN CONTACT WITH SCREW HEAD (in.)									
		0.030	0.036	0.048	0.060	0.075	0.090	0.125	0.188	0.250	
STANDARD DRILL SCREWS											
#10-16	0.399	259	311	415	518	648	778	1080	-	-	
#12-14	0.415	269	322	430	537	672	806	1119	1679	-	
¹ / ₄ -14	0.415	269	322	430	537	672	806	1119	1679	-	
¹ / ₄ -14	0.500	324	389	518	648	810	972	1350	2025	-	
EXTENDED DRILLING CAPACITY SCREWS											
#12-24	0.415	269	322	430	537	672	806	1119	1684	2239	
ARCHITECTURAL ROOF CLIP FASTENERS											
#10-16	0.437	288	346	461	576	721	865	-	-	-	

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.4 N, 1 ksi = 6.89 MPa.

¹⁻³See notes following Table 5B.

TABLE 5B—DESIGN (LRFD) TENSION PULL-OVER CAPACITY OF SCREW CONNECTIONS^{1,2,3}, lbf

DESIGNATION	NOMINAL HEAD DIAMETER (in.)	THICKNESS OF STEEL IN CONTACT WITH SCREW HEAD (in.)								
		0.030	0.036	0.048	0.060	0.075	0.090	0.125	0.188	0.250
STANDARD DRILL SCREWS										
#10-16	0.399	389	467	622	778	972	1166	1620	-	-
#12-14	0.415	403	484	645	806	1007	1209	1679	2519	-
¹ / ₄ -14	0.415	403	484	645	806	1007	1209	1679	2519	-
¹ / ₄ -14	0.500	486	583	778	972	1215	1458	2025	3038	-
EXTENDED DRILLING CAPACITY SCREWS										
#12-24	0.415	403	484	645	806	1007	1209	1679	2525	3358
ARCHITECTURAL ROOF CLIP FASTENERS										
#10-16	0.437	432	519	692	865	1081	1297	-	-	-

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.4 N, 1 ksi = 6.89 MPa.

¹Values are based on steel members with a minimum yield strength of $F_y = 33$ ksi and tensile strength of $F_u = 45$ ksi. When the steel in contact with the screw head has $F_u \geq 58$ ksi, the capacities in the table may be multiplied by 1.29 and when the steel in contact with the screw head has $F_u \geq 65$ ksi, the capacities in the table may be multiplied by 1.44.

²For tension connections, the lowest of the pull-out, pull-over, and fastener tension strength must be used for design.

³Capacity for other member thickness may be determined by interpolating within the table.

TABLE 6—MINIMUM FASTENER SPACING AND EDGE DISTANCE

BASIC SCREW DIAMETER (inch)	FASTENED MATERIAL	MINIMUM SPACING (3d)	MINIMUM EDGE DISTANCE (1.5d)	MINIMUM EDGE DISTANCE FOR FRAMING MEMBERS (3d)
0.190 (#10)	Steel	⁹ / ₁₆ "	⁵ / ₁₆ "	⁹ / ₁₆ "
0.216 (#12)	Steel	¹¹ / ₁₆ "	³ / ₈ "	¹¹ / ₁₆ "
¹ / ₄	Steel	³ / ₄ "	³ / ₈ "	³ / ₄ "

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

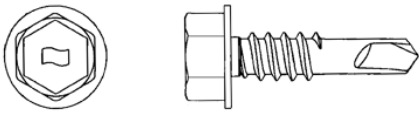


FIGURE 1—#10-16 INDENTED HIGH HEX WASHER HEAD TYPE 1 SCREW

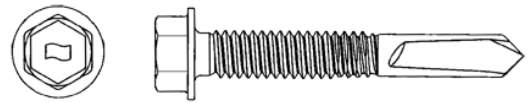


FIGURE 8—#12-24 INDENTED HEX WASHER HEAD TYPE 8 SCREW

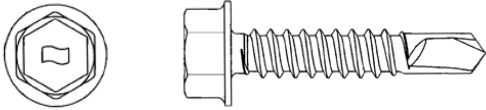


FIGURE 2—#10-16 INDENTED HIGH HEX WASHER HEAD TYPE 2 SCREW

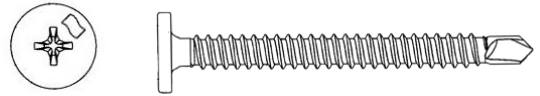


FIGURE 9—#10-16 PANCAKE HEAD TYPE 9 SCREW

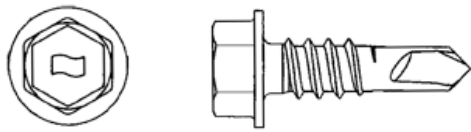


FIGURE 3—#12-14 INDENTED HEX WASHER HEAD TYPE 3 SCREW

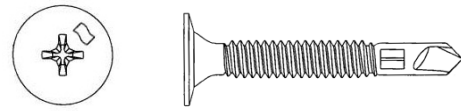


FIGURE 10—#10-24 PHILLIPS WAFFER HEAD TYPE 10 SCREW (#12-24 TYPE 11 SCREW SIMILAR)

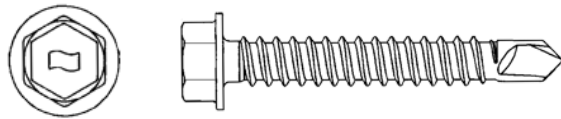


FIGURE 4—#12-14 INDENTED HEX WASHER HEAD TYPE 4 SCREW (TYPE 4A SIMILAR)

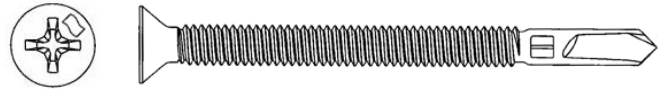


FIGURE 11—#12-24 PHILLIPS FLAT HEAD TYPE 12 SCREW

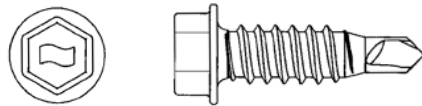


FIGURE 5—1/4-14 INDENTED HEX WASHER HEAD TYPE 5 SCREW

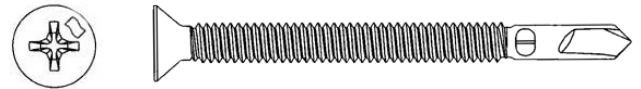


FIGURE 12—1/4-20 PHILLIPS FLAT HEAD TYPE 13 SCREW

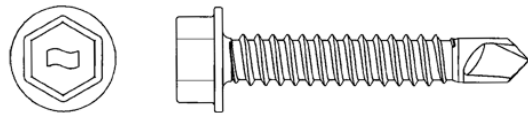


FIGURE 6—1/4-14 INDENTED HEX WASHER HEAD TYPE 6 SCREW

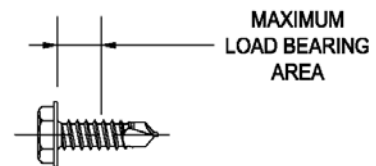


FIGURE 13—PANCAKE HEAD AND INDENTED HEX WASHER HEAD LOAD BEARING AREA

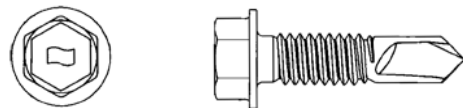


FIGURE 7—#12-24 INDENTED HEX WASHER HEAD TYPE 7 SCREW

ICC-ES Evaluation Report

ESR-3294 FBC Supplement

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EVALUATION SUBJECT:

ELCO SELF-DRILLING STRUCTURAL SCREW FASTENERS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that Elco Self-drilling Structural Screw Fasteners, recognized in ICC-ES master evaluation report ESR-3294, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2014 *Florida Building Code—Building*
- 2014 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The Elco Self-drilling Structural Screw Fasteners, described in Sections 2.0 through 7.0 of the master evaluation report ESR-3294, comply with the *Florida Building Code—Building* and *Florida Building Code—Residential*, provided the design and installation are in accordance with the 2012 *International Building Code*® (IBC) provisions noted in the master report, and the following conditions apply:

1. Design wind loads must be based on Section 1609 of the *Florida Building Code—Building* or Section R301.2.1 of the *Florida Building Code—Residential*, as applicable.
2. Load combinations must be in accordance with Section 1605.2 or Section 1605.3 of the *Florida Building Code—Building*, as applicable.

Use of the Elco Self-drilling Structural Screw Fasteners has also been found to be in compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and *Florida Building Code—Residential*.

For products falling under Florida Rule 9N-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the master report, reissued April 2018.