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# ICC-ES Evaluation Report

# ESR-3558

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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**

**DIVISION: 09 00 00—FINISHES**

**SECTION: 09 22 16.23—FASTENERS**

**REPORT HOLDER:**

**SENCO BRANDS INC.**

**4270 IVY POINTE BOULEVARD  
CINCINNATI, OHIO 45245**

**EVALUATION SUBJECT:**

**SENCO SELF-DRILLING AND SELF-PIERCING SCREWS**



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**ESR-3558**

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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**

**DIVISION: 09 00 00—FINISHES**

**Section: 09 22 16.23—Fasteners**

**REPORT HOLDER:**

**SENCO BRANDS INC.**  
4270 IVY POINTE BOULEVARD  
CINCINNATI, OHIO 45245  
(513) 388-2000  
[www.senco.com](http://www.senco.com)

**EVALUATION SUBJECT:**

**SENCO SELF-DRILLING AND SELF-PIERCING SCREWS**

**1.0 EVALUATION SCOPE**

**Compliance with the following codes:**

- 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2015, 2012 and 2009 *International Residential Code*® (IRC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)<sup>†</sup>

<sup>†</sup>The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

**Property evaluated:**

Structural

**2.0 USES**

The Senco self-drilling and self-piercing screws are used to connect cold-formed steel members together and to connect gypsum wall board, wood or other building materials to cold-formed steel. The screws are used in engineered connections of cold-formed steel and connections prescribed by the code for cold-formed steel framing and for sheathing to steel connections.

**3.0 DESCRIPTION**

**3.1 General:**

The Senco self-drilling and self-piercing screws are tapping screws, case-hardened from carbon steel conforming to ASTM A510, Grade 1022. Tables 1A through 1D provide

screw designations, model numbers, descriptions including screw nominal size, threads per inch (tpi), length, screw diameter, drive recess, head style, head diameter, point style, drilling/piercing ranges, length of load-bearing area and coatings. Screws are supplied in boxes or tubs of individual screws or in collated screw strips. See Figures 1 through 8 for depictions of the screws described in Sections 3.2 through 3.6.

**3.2 PBH Self-drilling Screws:**

The #6 and #8 PBH self-drilling screws comply with ASTM C954, with a type “BSD” thread design. The screws have a Phillips bugle head (PBH) style and have a clear zinc coating, a gray phosphate coating or an exterior coating, as indicated in Table 1A. See Figure 1.

**3.3 PBH Self-piercing Screws:**

The #6 PBH self-piercing screws comply with ASTM C1002, Type S, with a fine thread design. The screws have a Phillips bugle head (PBH) and have a clear zinc coating, a gray phosphate coating or an exterior coating, as indicated in Table 1B. See Figure 2.

**3.4 PWH Self-drilling Screws:**

The #8 PWH self-drilling screws comply with ASTM C1513, with a coarse thread design. The screws have a Phillips reduced wafer head (PWH) style, and have a clear zinc coating, as indicated in Table 1C. See Figure 3.

**3.5 PMTH Self-piercing Screws:**

The #8 PMTH self-piercing screws comply with ASTM C1513, with a coarse thread design. The screws have a Phillips modified truss head (PMTH) style, and have a clear zinc coating, as indicated in Table 1D. See Figure 4.

**3.6 PMTH, SPWH, PWH, SPFH and RPFH Self-drilling Screws:**

The #8 PMTH, #8 SPWH, #10 PWH, #10 SPFH and #10 and #12 RPFH self-drilling screws comply with ASTM C1513. The screws have a type “BSD” thread design. The screws have a Phillips modified truss head (PMTH) style, square pan with washer head (SPWH) style, Phillips reduced wafer head (PWH) style, square pan framing head (SPFH) style, and Rex pan framing head (RPFH) style, respectively, and have a clear zinc coating or a yellow zinc coating, as indicated in Table 1D. See Figures 5, 6, 3, 7 and 8, for PMTH, SPWH, PWH, SPFH and RPFH screws, respectively.

**3.7 Cold-formed Steel:**

Cold-formed steel material must comply with Section A2 of AISI S100.

## 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 9) and drilling/piercing 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:

**4.1.2.1 Senco PBH Self-drilling Screws (Section 3.2):** These screws are recognized for use in fastening gypsum board to cold-formed steel framing 0.033 inch to 0.112 inch (0.8 to 2.8 mm) thick, in accordance with IBC Section 2506 and 2015 IRC Section R702.3.5.1 (2012 and 2009 IRC Section R702.3.6). They are also recognized for use in attaching gypsum board sheathing to cold-formed steel framing as prescribed in Section C2.2.3 of AISI S213, which is referenced in 2015 and 2012 IBC Section 2211.6 (2009 IBC Section 2210.6).

**4.1.2.2 Senco PBH Self-piercing Screws (Section 3.3):** These screws are recognized for use in fastening gypsum board to cold-formed steel framing less than 0.033 inch (0.84 mm) thick, in accordance with IBC Section 2506 and 2015 IRC Section R702.3.5.1 (2012 and 2009 IRC Section R702.3.6).

**4.1.2.3 Senco PWH Self-drilling Screws (Section 3.4):** The screws described in Section 3.4 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 IBC Section 2210).

**4.1.3 Engineered Design:** The PMTH self-piercing screws described in Section 3.5, and the PMTH, SPWH, PWH, SPFH and RPFH self-drilling screws described in Section 3.6, are recognized for use in engineered connections of cold-formed steel light-framed construction.

For the self-drilling and self-piercing screws, design of the connections must comply with Section E4 of AISI S100, using the nominal and allowable fastener tension and shear strengths for the screws shown in Table 5. Allowable connection strengths for use in Allowable Strength Design (ASD) for pull-out, pullover, and shear (bearing) capacity for common sheet steel thicknesses are provided in Tables 2, 3 and 4, respectively, based upon laboratory testing in accordance with AISI S905.

Instructions on how to calculate connection design strengths for use in Load and Resistance Factor Design (LRFD) are found in the footnotes of Tables 2, 3 and 4. For connections subject to tension, the least of the allowable pull-out, pullover, and tension fastener strength of screws found in Tables 2, 3, and 5, respectively, must be used for design. For connections subject to shear, the lesser of the allowable shear (bearing) and fastener strength found in Tables 4 and 5, respectively, must be used for design. 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 Table 4 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 distance and minimum end distance must be 1.5 times the nominal screw diameter. Additionally, under the 2009 IBC, when the distance 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 must be considered.

Connected members must be checked for rupture in accordance with Section E6 of AISI S100-12 under 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 the Senco self-drilling and self-piercing screws 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 variable speed screw driving tool set to not exceed 2,500 rpm. The screw must penetrate through the supporting steel with a minimum of three threads protruding past the back side of the supporting steel.

## 5.0 CONDITIONS OF USE

The Senco self-drilling and self-piercing 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** 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** Connections made with the Senco screws must be designed and constructed in accordance with Section 4.0 of this evaluation report and the approved construction documents. In the case of a conflict between these documents, the more restrictive requirements govern.
- 5.3** The allowable loads specified in Section 4.1.3 are not to be increased when the fasteners are used to resist short-term loads, such as wind or seismic forces.
- 5.4** The utilization of the strength values contained in this evaluation report, for the design of diaphragm consisting of steel deck panels fastened to cold-formed steel framing, is outside the scope of this report. Diaphragms constructed using the Senco self-drilling or self-piercing screws must be recognized in a current ICC-ES evaluation report based upon the ICC-ES Acceptance Criteria for Steel Deck Roof and Floor Systems (AC43).
- 5.5** Use of the screws in diaphragms consisting of wood structural panels fastened to cold-formed steel is outside the scope of this report.

- 5.6 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.
- 5.7 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 Tapping Screw Fasteners (AC118), dated February 2016.

**7.0 IDENTIFICATION**

Senco self-drilling and self-piercing screws are marked with a “D” on the top of the heads, as shown in Figures 1 through 8. Packages of Senco self-drilling and self-piercing screws are labeled with the report holder’s name (Senco Brands Inc.), the fastener brand name (Senco) and model number, and the evaluation report number (ESR-3558).

**TABLE 1A—SENCO SELF-DRILLING SCREWS (ASTM C954) FOR PRESCRIPTIVE CONNECTIONS OF GYPSUM BOARD PRODUCTS TO COLD-FORMED STEEL**

DESIGNATION <sup>1</sup> (Nom. size – tpi x head type) (Head designation)	DESCRIPTION (Nom. size x length)	SENCO MODEL NUMBER <sup>4</sup>	DRIVE RECESS	HEAD DIAMETER (in.)	NOMINAL DIAMETER (in.)	DRILL POINT (Number)	DRILL CAPACITY (in.)		LENGTH OF LOAD BEARING AREA <sup>3</sup> (in.)	COATING <sup>2</sup>
							Min.	Max.		
#6-20 x Bugle (PBH)	6 x 1	06C100XY	Phillips	0.324	0.138	#2	0.035	0.090	0.697	Clear Zinc, Grey Phosphate or Exterior
	6 x 1 <sup>1</sup> / <sub>4</sub>	06C125XY	Phillips	0.324	0.138	#2	0.035	0.090	0.947	
	6 x 1 <sup>5</sup> / <sub>8</sub>	06C162XY	Phillips	0.324	0.138	#2	0.035	0.090	1.322	
	6 x 2	06C200XY	Phillips	0.324	0.138	#2	0.035	0.090	1.697	
#8-18 x Bugle (PBH)	8 x 2 <sup>1</sup> / <sub>2</sub>	08C250XY	Phillips	0.324	0.163	#2	0.035	0.090	2.197	

**TABLE 1B—SENCO SELF-PIERCING SCREWS (ASTM C1002) FOR PRESCRIPTIVE CONNECTIONS OF GYPSUM BOARD PRODUCTS TO COLD-FORMED STEEL**

DESIGNATION <sup>1</sup> (Nom. size – tpi x head type) (Head designation)	DESCRIPTION (Nom. size x length)	SENCO MODEL NUMBER <sup>4</sup>	DRIVE RECESS	HEAD DIAMETER (in.)	NOMINAL DIAMETER (in.)	POINT	PIERCING CAPACITY (in.)		LENGTH OF LOAD BEARING AREA <sup>3</sup> (in.)	COATING <sup>2</sup>
							Min.	Max.		
#6-15 x Bugle (PBH)	6 x 1 <sup>1</sup> / <sub>4</sub>	06B125XY	Phillips	0.324	0.138	Self-piercing	0.021	0.036	0.814	Clear Zinc, Grey Phosphate or Exterior
	6 x 1 <sup>5</sup> / <sub>8</sub>	06B162XY	Phillips	0.324	0.138	Self-piercing	0.021	0.036	1.189	
	6 x 2	06B200XY	Phillips	0.324	0.138	Self-piercing	0.021	0.036	1.564	

**TABLE 1C—SENCO SELF-DRILLING SCREWS (ASTM C1513) FOR PRESCRIPTIVE CONNECTIONS OF WOOD-BASED SHEATHING TO COLD-FORMED STEEL**

DESIGNATION <sup>1</sup> (Nom. size – tpi x head type) (Head designation)	DESCRIPTION (Nom. size x length)	SENCO MODEL NUMBER	DRIVE RECESS	HEAD DIAMETER (in.)	NOMINAL DIAMETER (in.)	DRILL POINT (Number)	DRILL CAPACITY (in.)		LENGTH OF LOAD BEARING AREA <sup>3</sup> (in.)	COATING <sup>2</sup>
							Min.	Max.		
#8-18 x Reduced Wafer (PWH)	8 x 1	08G100C KNFDP	Phillips	0.324	0.164	#2	0.035	0.100	0.644	Clear Zinc

**TABLE 1D—SENCO SELF-DRILLING AND SELF-PIERCING SCREWS (ASTM C1513) FOR ENGINEERED STEEL-TO-STEEL CONNECTIONS**

DESIGNATION <sup>1</sup> (Nom. size – tpi x head type) (Head designation)	DESCRIPTION (Nom. size x length)	SENCO MODEL NUMBER	DRIVE RECESS	HEAD DIAMETER (in.)	NOMINAL DIAMETER (in.)	DRILL POINT (Number)	DRILL CAPACITY (in.)		LENGTH OF LOAD BEARING AREA <sup>3</sup> (in.)	COATING <sup>2</sup>
							Min.	Max.		
#8-15 x Modified Truss (PMTH)	8 x 1/2	08M050CTRFSP	Phillips	0.350	0.164	Self-piercing	0.021	0.036	0.123	Clear Zinc
#8-18 x Modified Truss (PMTH)	8 x 1/2	08M050CTRFDP	Phillips	0.350	0.164	#2	0.035	0.100	0.144	Clear Zinc
#8-18 x Pan with Washer (SPWH)	8 x 2	08X200CKADDS	Square	0.352	0.164	#2	0.035	0.100	1.621	Clear Zinc
	8 x 1 1/4	08X125CKADDS	Square	0.352	0.164	#2	0.035	0.100	0.871	Clear Zinc
#10-16 x Reduced Wafer (PWH)	10 x 3/4	10M075CKNFDP	Phillips	0.324	0.190	#2	0.035	0.110	0.355	Clear Zinc
#10-16 x Pan Framing (SPFH or RPFH)	10 x 3/4	10M075CTMFDS	Square	0.348	0.190	#2	0.035	0.110	0.290	Clear Zinc
	10 x 1	10M100CKMFDS	Square	0.348	0.190	#2	0.035	0.110	0.540	Clear Zinc
	10 x 7/8	10M062CBFFDX	Rex	0.348	0.190	#2	0.035	0.110	0.165	Clear Zinc
	10 x 3/4	10M075YTFFDX	Rex	0.348	0.190	#2	0.035	0.110	0.290	Yellow Zinc
#10-22 x Pan Framing (RPFH)	10 x 3/4	10M075YLFT4X	Rex	0.350	0.190	#4	0.175	0.312	0.276	Yellow Zinc
	10 x 3/4	10M075YKFT4X	Rex	0.350	0.190	#4	0.175	0.312	0.276	Yellow Zinc
#12-18 x Pan Framing (RPFH)	12 x 7/8	12M087YKFF4X	Rex	0.348	0.216	#4	0.175	0.312	0.370	Yellow Zinc
#12-14 x Pan Framing (RPFH)	12 x 1	12M100YKFF3X	Rex	0.348	0.216	#3	0.110	0.210	0.513	Yellow Zinc
	12 x 1 1/2	12M150CTFFDX	Rex	0.348	0.216	#2	0.035	0.110	1.013	Clear Zinc

For SI: 1 inch = 25.4 mm.

<sup>1</sup>Refer to Section 3.0 and Figures 1 through 8 for head configuration abbreviations.

<sup>2</sup>For coating abbreviations, Clear Zinc = Fe/Zn 3A per ASTM F1941; Yellow Zinc = Fe/Zn 3C per ASTM F1941; Exterior = Fe/Zn 8AS per ASTM F1941; Grey Phosphate = Grade C coating per ASTM F1137.

<sup>3</sup>Refer to Figure 9 for nominal screw length (L) and length of load bearing area (LLBA) description.

<sup>4</sup>The letter in the X position (7<sup>th</sup> digit) denotes the coating: C = Clear Zinc, P = Grey Phosphate, W = Exterior. The letter(s) in the Y position (8<sup>th</sup> digit) denote the type of packaging: B = 4000 pcs box, K = 1000 pcs box, no letter = 1000 pcs tub.

**TABLE 2—ALLOWABLE TENSILE PULL-OUT LOADS (P<sub>NOT/Ω</sub>), pounds-force<sup>1,2,3,4</sup>**

SCREW DESIGNATION	NOMINAL DIAMETER (in.)	STEEL F <sub>U</sub> =55 Ksi Ω = 3.0		STEEL F <sub>U</sub> =65 Ksi Ω = 3.0		
		Design Thickness of Member Not in Contact with the Screw Head (in.)				
		0.041	0.050	0.062	0.075	0.104
#8-15 x Modified Truss (PMTH)	0.164	130	167	-	-	-
#8-18 x Modified Truss (PMTH)	0.164	85	100	-	-	-
#8-18 x Pan with Washer (SPWH)	0.164	91	128	183	237	382
#10-16 x Reduced Wafer (PWH)	0.190	90	105	198	232	341
#10-16 x Pan Framing (SPFH or RPFH)	0.190	99	126	191	267	371
#10-22 x Pan Framing (RPFH)	0.190	94	100	201	250	372
#12-18 x Pan Framing (RPFH)	0.216	96	125	195	240	368
#12-14 x Pan Framing (RPFH)	0.216	87	118	176	231	390

For SI: 1 inch = 25.4 mm, 1 pound-force = 4.4 N, 1 ksi = 6.89 MPa.

<sup>1</sup>For tension connections, the least of the allowable pull-out, pullover, and fastener tension strength of screw found in Tables 2, 3, and 5, respectively must be used for design.

<sup>2</sup>Nominal load values are based upon laboratory testing in accordance with AISI S905.

<sup>3</sup>The allowable pull-out capacity for intermediate member thicknesses can be determined by interpolating within the values in the table for the applicable steel tensile strength.

<sup>4</sup>To calculate LRFD values, multiply values in table by the ASD safety factor of 3.0 and multiply again with the LRFD Φ factor of 0.5.

**TABLE 3—ALLOWABLE TENSILE PULL-OVER LOADS ( $P_{NOV}/\Omega$ ), pounds-force<sup>1,2,3,4</sup>**

SCREW DESIGNATION	NOMINAL DIAMETER (in.)	HEAD OR INTEGRAL WASHER DIAMETER (in.)	STEEL $F_u=55$ Ksi $\Omega = 3.0$		STEEL $F_u=65$ Ksi $\Omega = 3.0$		
			Design Thickness of Member in Contact with the Screw Head (in.)				
			0.041	0.050	0.062	0.075	0.104
#8-15 x Modified Truss (PMT)	0.164	0.350	359	367	-	-	-
#8-18 x Modified Truss (PMT)	0.164	0.350	381	385	387	387	-
#8-18 x Pan with Washer (SPWH)	0.164	0.352	477	488	488	547	557
#10-16 x Reduced Wafer (PWH)	0.190	0.324	448	451	490	518	638
#10-16 x Pan Framing (SPFH or RPFH)	0.190	0.348	502	502	788	881	881
#10-22 x Pan Framing (RPFH)	0.190	0.350	480	534	785	785	785
#12-18 x Pan Framing (RPFH)	0.216	0.348	490	490	769	873	1011
#12-14 x Pan Framing (RPFH)	0.216	0.348	495	506	766	835	1030

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

<sup>1</sup>For tension connections, the least of the allowable pull-out, pullover, and fastener tension strength of screw found in Tables 2, 3, and 5, respectively must be used for design.

<sup>2</sup>Nominal load values are based upon laboratory testing in accordance with AISI S905.

<sup>3</sup>The allowable pullover capacity for intermediate member thicknesses can be determined by interpolating within the values in the table for the applicable steel tensile strength.

<sup>4</sup>To calculate LRFD values, multiply values in table by the ASD safety factor of 3.0 and multiply again with the LRFD  $\Phi$  factor of 0.5.

**TABLE 4—ALLOWABLE SHEAR (BEARING) CAPACITY ( $P_{NS}/\Omega$ ) OF STEEL-TO-STEEL CONNECTIONS, pounds-force<sup>1,2,3,4</sup>**

SCREW DESIGNATION	NOMINAL DIAMETER (in.)	STEEL $F_u=55$ Ksi $\Omega = 3.0$		STEEL $F_u=65$ Ksi $\Omega = 3.0$		
		Design Thickness of Both Connected Members (in.)				
		0.041	0.050	0.062	0.075	0.104
#8-15 x Modified Truss (PMT)	0.164	294	334	-	-	-
#8-18 x Modified Truss (PMT)	0.164	223	268	412	428	-
#8-18 x Pan with Washer (SPWH)	0.164	211	271	425	425	425
#10-16 x Reduced Wafer (PWH)	0.190	232	277	446	485	511
#10-16 x Pan Framing (SPFH or RPFH)	0.190	232	279	512	517	517
#10-22 x Pan Framing (RPFH)	0.190	240	263	470	550	550
#12-18 x Pan Framing (RPFH)	0.216	245	292	573	573	573
#12-14 x Pan Framing (RPFH)	0.216	261	309	544	577	606

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

<sup>1</sup>The lower of the allowable shear (bearing) and the allowable fastener shear strength found in Tables 4 and 5, respectively must be used for design.

<sup>2</sup>Nominal load values are based on laboratory testing in accordance with AISI S905.

<sup>3</sup>The allowable bearing capacity for other member thicknesses can be determined by interpolating within the values in the table for the applicable steel tensile strength.

<sup>4</sup>To calculate LRFD values, multiply values in table by the ASD safety factor of 3.0 and multiply again with the LRFD  $\Phi$  factor of 0.5.

TABLE 5—SCREW FASTENER STRENGTH<sup>1,2,3,4</sup>

SCREW DESIGNATION	NOMINAL DIAMETER (in.)	NOMINAL FASTENER STRENGTH DETERMINED BY TESTING		ALLOWABLE FASTENER STRENGTH	
		Tension, $P_{ts}$ (lbf)	Shear, $P_{ss}$ (lbf)	Tension ( $P_{ts}/\Omega$ ) <sup>1</sup> (lbf)	Shear ( $P_{ss}/\Omega$ ) <sup>1</sup> (lbf)
#8-15 x Modified Truss (PMTH)	0.164	1423	1132	475	377
#8-18 x Modified Truss (PMTH)	0.164	2280	1351	760	450
#8-18 x Pan with Washer (SPWH)	0.164	1927	1377	642	459
#10-16 x Reduced Wafer (PWH)	0.190	2426	1736	809	579
#10-16 x Pan Framing (SPFH or RPFH)	0.190	3175	1779	1058	593
#10-22 x Pan Framing (RPFH)	0.190	2318	1795	773	598
#12-18 x Pan Framing (RPFH)	0.216	3585	2132	1195	711
#12-14 x Pan Framing (RPFH)	0.216	2826	2076	942	692

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

<sup>1</sup>For tension connections, the least of the allowable pull-out, pullover, and fastener tension strength of screw found in Tables 2, 3, and 5, respectively, must be used for design.

<sup>2</sup>For shear connections, the lower of the allowable shear (bearing) and the allowable fastener shear strength found in Tables 4 and 5, respectively, must be used for design.

<sup>3</sup>See Section 4.1.3 for fastener spacing and end distance requirements.

<sup>4</sup>To calculate LRFD values; multiply the nominal fastener strengths by the LRFD  $\Phi$  factor of 0.5.

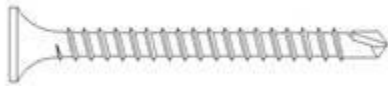


FIGURE 1—PHILLIPS BUGLE HEAD (PBH) SELF-DRILLING SCREW (SECTION 3.2)

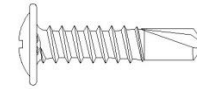


FIGURE 5—PHILLIPS MODIFIED TRUSS HEAD (PMTH) SELF-DRILLING SCREW (SECTION 3.6)

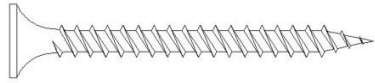


FIGURE 2—PHILLIPS BUGLE HEAD (PBH) SELF-PIERCING SCREW (SECTION 3.3)



FIGURE 6—SQUARE PAN WITH WASHER HEAD (SPWH) SELF-DRILLING SCREW (SECTION 3.6)

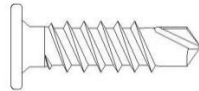


FIGURE 3—PHILLIPS REDUCED WAFER HEAD (PWH) SELF-DRILLING SCREW (SECTIONS 3.4 AND 3.6)

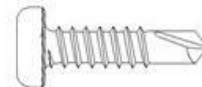


FIGURE 7—SQUARE PAN FRAMING HEAD (SPFH) SELF-DRILLING SCREW (SECTION 3.6)

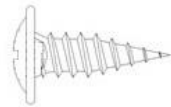


FIGURE 4—PHILLIPS MODIFIED TRUSS HEAD (PMTH) SELF-PIERCING SCREW (SECTION 3.5)



FIGURE 8—REX PAN FRAMING HEAD (RPFH) SELF-DRILLING SCREW (SECTION 3.6)

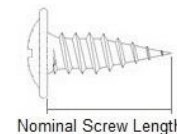
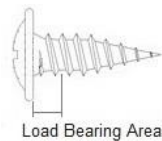
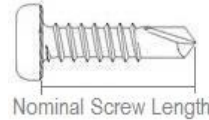
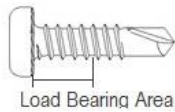
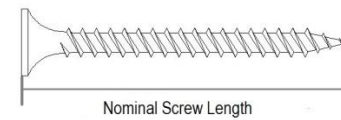
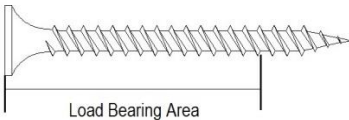
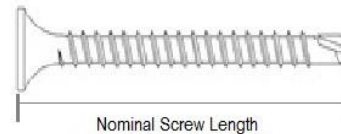
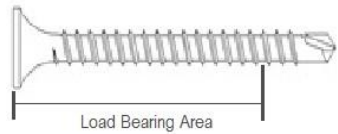


FIGURE 9—DESCRIPTION OF LENGTH OF LOAD-BEARING AREA (LLBA) AND NOMINAL SCREW LENGTH (L)