

ICC-ES Evaluation Report

ESR-1408

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DIVISION: 05 00 00—METALS
Section: 05 05 23—Metal Fastenings

DIVISION: 09 00 00—FINISHES
Section: 09 22 16.23—Fasteners

REPORT HOLDER:

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EVALUATION SUBJECT

**PRO-TWIST™ MARKER® & DARTS® SELF-DRILLING
SCREWS**

1.0 EVALUATION SCOPE

Compliance with the following codes:

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

* ~~■ 2013 *Abu Dhabi International Building Code* (ADIBC)†~~

†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 Pro-Twist™ Marker® & Darts® self-drilling tapping screws described in this report are used to connect cold-formed steel members together and to connect gypsum board and other panel products 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:

Pro-Twist™ Marker® & Darts® self-drilling tapping screws are manufactured from carbon steel wire complying with ASTM A510, minimum grade 1018. See Table 1 for part numbers of recognized screws, screw descriptions (size, tpi, length), nominal diameter, head style, head diameter, drill point, coating information, drilling capacities and length of load bearing area.

3.2 Pan Framer Screws:

The #7 pan framer screws comply with the material and performance requirements of ASTM C1513. The dimensions of the screws comply with the manufacturer's quality documentation. See Figure 1.

3.3 Pancake Framer Screws:

The #10 and #12 pancake framer screws comply with ASTM C1513. See Figure 2.

3.4 Bugle Head Screws:

The #6 and #8 bugle head screws comply with ASTM C954. See Figure 3.

3.5 Hex Washer Head Screws:

The #8, #10, #12 and #14 hex washer head screws comply with ASTM C1513. See Figure 4 for coarse thread screws (HWD) and Figure 5 for fine thread screws (X5).

3.6 Modified Truss Head Screws:

The #8 and #10 modified truss head screws comply with ASTM C1513. See Figure 6.

3.7 Wafer Head Screws:

The #8 and #10 wafer head screws comply with ASTM C1513. See Figures 7, 8 and 9.

3.8 Flat Head Screws:

The #8 flat head screws comply with ASTM C1513. See Figure 10.

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 the thickness of the supporting steel, respectively, based on the length of load-bearing area (see Figure 12) and drilling capacity given in Table 1.

When tested for corrosion resistance in accordance with ASTM B117, the zinc coated and phosphate coated screws meet 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. The screws coated with PrimeGuard Plus showed no red rust after 24 hours of testing in accordance with ASTM B117.

4.1.2 Prescriptive Design:

4.1.2.1 Pancake Framer, Hex Washer Head, Modified Truss Head, Wafer Head and Flat Head Screws: The screws described in Sections 3.3, 3.5, 3.6, 3.7 and 3.8, respectively, 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 2012 IBC Section 2211 (2009 and 2006 IBC Section 2210).

4.1.2.2 Bugle Head Screws: The screws described in Section 3.4 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 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 2012 IBC Section 2211.6 (2009 IBC Section 2210.6; Section C2.2.3 of Section C2.2.3 of AISI—Lateral, referenced in 2006 IBC Section 2210.5).

4.1.3 Engineered Design for Pan Framer Screws, Pancake Framer Screws, Hex Washer Head Screws and Modified Truss Head Screws: The screws described in Sections 3.2, 3.3, 3.5 and 3.6, respectively, are recognized for use in engineered connections of cold-formed steel light-framed construction. Design of the connections 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, which are provided in Table 2. Connections subject to combined tension and shear loading must be designed in accordance with Section E4.5 of AISI S100.

Minimum edge distance when connecting cold-formed framing members must be three times the diameter of the screw, in accordance with Section D1.5 of AISI S200 (AISI-General for 2006 IBC). Under the 2009 and 2006 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 (AISI – NAS under the 2006 IBC) must be considered. Connected members must be checked for rupture in accordance with Section E5 of AISI S100-07/S2-10.

4.2 Installation:

Pro-Twist™ Marker® & Darts® self-drilling tapping screws are installed, without predrilling holes, using a screw gun

with a depth-sensitive nosepiece having a maximum speed of 2,500 rpm for No. 6, 7, 8 and 10, and a maximum speed of 1,800 rpm for No. 12 and 14. The fastener must penetrate a minimum of three thread pitches beyond the steel substrate.

5.0 CONDITIONS OF USE

The Pro-Twist™ Marker® & Darts® self-drilling tapping screws described in this report comply with, or are suitable alternatives to what is specified in, the code indicated 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. In the event of a conflict between this report and the manufacturer's published installation instructions, this report governs.
- 5.2** The allowable loads specified in Section 4.1.3 are not allowed to be increased when the fasteners are used to resist wind or seismic forces.
- 5.3** 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.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Tapping Screw Fasteners (AC118), dated June 2012.

7.0 IDENTIFICATION

The Pro-Twist™ Marker® & Darts® screws are identified by a "PT" marking on the fastener heads. Each box of fasteners has a label showing the PrimeSource Building Products, Inc. name and address, the Pro-Twist™ Marker® & Darts® logo (see Figure 11), fastener type and size, lot number, and the evaluation report number (ESR-1408).

TABLE 1—PRO-TWIST™ MARKER® & DARTS® SELF-DRILLING SCREWS

PART NUMBER	DESCRIPTION ¹ (Nominal size-tpi × length)	BASIC (NOMINAL) SCREW DIAMETER (inch)	HEAD DIAMETER (inch)	HEAD STYLE	DRILL POINT	COATING	DRILLING CAPACITY (inch)	LENGTH OF LOAD BEARING AREA ² (inch)
PFD716	7-18 X 7/16	0.151	0.305	Pan Framer	TEK PT/2	Black Phosphate	0.033-0.112	0.113
PFZD716	7-18 X 7/16	0.151	0.305	Pan Framer	TEK PT/2	Zinc	0.033-0.112	0.113
PPH1058	10-16 X 5/8	0.190	0.431	Pancake Framer	TEK PT/3	Zinc	0.110-0.175	0.237
PPH12034	12-14 X 3/4	0.216	0.457	Pancake Framer	TEK PT/3	Zinc	0.110-0.210	0.205
SD100	6-20 X 1	0.138	0.325	Bugle	TEK PT/2	Black Phosphate	0.033-0.112	0.697
SDZ100	6-20 X 1	0.138	0.325	Bugle	TEK PT/2	Zinc	0.033-0.112	0.697
SD118	6-20 X 1 1/8	0.138	0.325	Bugle	TEK PT/2	Black Phosphate	0.033-0.112	0.822
SDZ118	6-20 X 1 1/8	0.138	0.325	Bugle	TEK PT/2	Zinc	0.033-0.112	0.822
SD114	6-20 X 1 1/4	0.138	0.325	Bugle	TEK PT/2	Black Phosphate	0.033-0.112	0.947
SDZ114	6-20 X 1 1/4	0.138	0.325	Bugle	TEK PT/2	Zinc	0.033-0.112	0.947
SD114PGP	6-20 X 1 1/4	0.138	0.325	Bugle	TEK PT/2	PGP	0.033-0.112	0.947
SD158	6-20 X 1 5/8	0.138	0.325	Bugle	TEK PT/2	Black Phosphate	0.033-0.112	1.322
SDZ158	6-20 X 1 5/8	0.138	0.325	Bugle	TEK PT/2	Zinc	0.033-0.112	1.322
SD158PGP	6-20 X 1 5/8	0.138	0.325	Bugle	TEK PT/2	PGP	0.033-0.112	1.322

TABLE 1—PRO-TWIST™ MARKER® & DARTS® SELF-DRILLING SCREWS (Continued)

PART NUMBER	DESCRIPTION ¹ (Nominal size- tpi x length)	BASIC (NOMINAL) SCREW DIAMETER (inch)	HEAD DIAMETER (inch)	HEAD STYLE	DRILL POINT	COATING	DRILLING CAPACITY (inch)	LENGTH OF LOAD BEARING AREA ² (inch)
SD178	6-20 X 1 ⁷ / ₈	0.138	0.325	Bugle	TEK PT/2	Black Phosphate	0.033-0.112	1.572
SDZ178	6-20 X 1 ⁷ / ₈	0.138	0.325	Bugle	TEK PT/2	Zinc	0.033-0.112	1.572
SD178PGP	6-20 X 1 ⁷ / ₈	0.138	0.325	Bugle	TEK PT/2	PGP	0.033-0.112	1.572
SD238	8-18 X 2 ³ / ₈	0.164	0.325	Bugle	TEK PT/2	Black Phosphate	0.033-0.112	2.031
SDZ238	8-18 X 2 ³ / ₈	0.164	0.325	Bugle	TEK PT/2	Zinc	0.033-0.112	2.031
SD258	8-18 X 2 ⁵ / ₈	0.164	0.325	Bugle	TEK PT/2	Black Phosphate	0.033-0.112	2.281
SDZ258	8-18 X 2 ⁵ / ₈	0.164	0.325	Bugle	TEK PT/2	Zinc	0.033-0.112	2.281
SD300	8-18 X 3	0.164	0.325	Bugle	TEK PT/2	Black Phosphate	0.033-0.112	2.656
SDZ300	8-18 X 3	0.164	0.325	Bugle	TEK PT/2	Zinc	0.033-0.112	2.656
HWD812	8-18 X 1 ¹ / ₂	0.164	0.335	Hex Washer	TEK PT/2	Zinc	0.033-0.112	0.176
HWD858	8-18 X 5 ⁵ / ₈	0.164	0.335	Hex Washer	TEK PT/2	Zinc	0.033-0.112	0.301
HWD834	8-18 X 3 ³ / ₄	0.164	0.335	Hex Washer	TEK PT/2	Zinc	0.033-0.112	0.426
HWD8100	8-18 X 1	0.164	0.335	Hex Washer	TEK PT/2	Zinc	0.033-0.112	0.676
HWD8114	8-18 X 1 ¹ / ₄	0.164	0.335	Hex Washer	TEK PT/2	Zinc	0.033-0.112	0.926
HWD8112	8-18 X 1 ¹ / ₂	0.164	0.335	Hex Washer	TEK PT/2	Zinc	0.033-0.112	1.176
HWD8200	8-18 X 2	0.164	0.335	Hex Washer	TEK PT/2	Zinc	0.033-0.112	1.676
HWD1012	10-16 X 1 ¹ / ₂	0.190	0.399	Hex Washer	TEK PT/3	Zinc	0.110-0.175	0.133
HWD1058	10-16 X 5 ⁵ / ₈	0.190	0.399	Hex Washer	TEK PT/3	Zinc	0.110-0.175	0.258
HWD1034	10-16 X 3 ³ / ₄	0.190	0.399	Hex Washer	TEK PT/3	Zinc	0.110-0.175	0.383
HWD10100	10-16 X 1	0.190	0.399	Hex Washer	TEK PT/3	Zinc	0.110-0.175	0.633
HWD10114	10-16 X 1 ¹ / ₄	0.190	0.399	Hex Washer	TEK PT/3	Zinc	0.110-0.175	0.833
HWD10112	10-16 X 1 ¹ / ₂	0.190	0.399	Hex Washer	TEK PT/3	Zinc	0.110-0.175	1.133
HWD10200	10-16 X 2	0.190	0.399	Hex Washer	TEK PT/3	Zinc	0.110-0.175	1.633
HWD12034	12-14 X 3 ³ / ₄	0.216	0.415	Hex Washer	TEK PT/3	Zinc	0.110-0.210	0.268
HWD12078	12-14 X 7 ⁷ / ₈	0.216	0.415	Hex Washer	TEK PT/4	Zinc	0.110-0.210	0.393
HWD12100	12-14 X 1	0.216	0.415	Hex Washer	TEK PT/3	Zinc	0.110-0.210	0.518
HWD12114	12-14 X 1 ¹ / ₄	0.216	0.415	Hex Washer	TEK PT/3, PT5	Zinc	0.110-0.210	0.768
HWD12112	12-14 X 1 ¹ / ₂	0.216	0.415	Hex Washer	TEK PT/3, PT5	Zinc	0.110-0.210	1.018
HWD12200	12-14 X 2	0.216	0.415	Hex Washer	TEK PT/3, PT5	Zinc	0.110-0.210	1.518
HWD12212	12-14 X 2 ¹ / ₂	0.216	0.415	Hex Washer	TEK PT/3	Zinc	0.110-0.210	2.018
HWD12300	12-14 X 3	0.216	0.415	Hex Washer	TEK PT/3	Zinc	0.110-0.210	2.518
HWD14034	14-14 X 3 ³ / ₄	0.250	0.500	Hex Washer	TEK PT/3	Zinc	0.110-0.250	0.237
HWD14100	14-14 X 1	0.250	0.500	Hex Washer	TEK PT/3	Zinc	0.110-0.250	0.487
HWD14114	14-14 X 1 ¹ / ₄	0.250	0.500	Hex Washer	TEK PT/3	Zinc	0.110-0.250	0.737
HWD14112	14-14 X 1 ¹ / ₂	0.250	0.500	Hex Washer	TEK PT/3	Zinc	0.110-0.250	0.987
HWD14200	14-14 X 2	0.250	0.500	Hex Washer	TEK PT/3	Zinc	0.110-0.250	1.487
HWD14212	14-14 X 2 ¹ / ₂	0.250	0.500	Hex Washer	TEK PT/3	Zinc	0.110-0.250	1.987
HWD14300	14-14 X 3	0.250	0.500	Hex Washer	TEK PT/3	Zinc	0.110-0.250	2.487
HWD14400	14-14 X 4	0.250	0.500	Hex Washer	TEK PT/3	Zinc	0.110-0.250	3.487
HWD14500	14-14 X 5	0.250	0.500	Hex Washer	TEK PT/3	Zinc	0.110-0.250	4.487
HWD14600	14-14 X 6	0.250	0.500	Hex Washer	TEK PT/3	Zinc	0.110-0.250	5.487
X512114	12-24 X 1 ¹ / ₄	0.216	0.415	Hex Washer	TEK PT/5	PGP	0.250-0.500	0.584
X512112	12-24 X 1 ¹ / ₂	0.216	0.415	Hex Washer	TEK PT/5	PGP	0.250-0.500	0.834
X512200	12-24 X 2	0.216	0.415	Hex Washer	TEK PT/5	PGP	0.250-0.500	1.334
MTD812	8-18 X 1 ¹ / ₂	0.164	0.437	Modified Truss	TEK PT/2	Zinc	0.033-0.112	0.156

TABLE 1—PRO-TWIST™ MARKER® & DARTS® SELF-DRILLING SCREWS (Continued)

PART NUMBER	DESCRIPTION ¹ (Nominal size— tpi × length)	BASIC (NOMINAL) SCREW DIAMETER (inch)	HEAD DIAMETER (inch)	HEAD STYLE	DRILL POINT	COATING	DRILLING CAPACITY (inch)	LENGTH OF LOAD BEARING AREA ² (inch)
MTD834	8-18 X 3/4	0.164	0.437	Modified Truss	TEK PT/2	Zinc	0.033-0.112	0.406
MTD8100	8-18 X 1	0.164	0.437	Modified Truss	TEK PT/2	Zinc	0.033-0.112	0.656
MTD8114	8-18 X 1 1/4	0.164	0.437	Modified Truss	TEK PT/2	Zinc	0.033-0.112	0.906
MTD8158	8-18 X 1 5/8	0.164	0.437	Modified Truss	TEK PT/2	Zinc	0.033-0.112	1.281
MTD8178	8-18 X 1 7/8	0.164	0.437	Modified Truss	TEK PT/2	Zinc	0.033-0.112	1.531
MTD8200	8-18 X 2	0.164	0.437	Modified Truss	TEK PT/2	Zinc	0.033-0.112	1.656
MTD8212	8-18 X 2 1/2	0.164	0.437	Modified Truss	TEK PT/2	Zinc	0.033-0.112	2.156
MTD8300	8-18 X 3	0.164	0.437	Modified Truss	TEK PT/2	Zinc	0.033-0.112	2.656
MTD1034	10-16 X 3/4	0.190	0.437	Modified Truss	TEK PT/3	Zinc	0.110-0.175	0.362
CBD114	8-18 X 1 1/4	0.164	0.402	Wafer	TEK PT/2	PGP	0.033-0.112	0.883
CBD158	8-18 X 1 5/8	0.164	0.402	Wafer	TEK PT/2	PGP	0.033-0.112	1.258
PWD1034P	10-24 X 3/4	0.190	0.472	Wafer	TEK PT/3	PGP	0.110-0.175	0.412
PWD10100P	10-24 X 1	0.190	0.472	Wafer	TEK PT/3	PGP	0.110-0.175	0.662
PWD10114P	10-24 X 1 1/4	0.190	0.472	Wafer	TEK PT/3	PGP	0.110-0.175	0.912
PWD10112P	10-24 X 1 1/2	0.190	0.472	Wafer	TEK PT/3	PGP	0.110-0.175	1.162
PWD101716P	10-24 X 1 7/16	0.190	0.472	Wafer	TEK PT/3	PGP	0.110-0.175	0.998
PF10158P	10-24 X 1 5/8	0.190	0.362	Wafer	TEK PT/2	PGP	0.110-0.175	1.219
PF12200P	12-24 X 2	0.216	0.413	Flat	TEK PT/3	PGP	0.110-0.210	1.479
PF12212P	12-24 X 2 1/2	0.216	0.413	Flat	TEK PT/3	PGP	0.110-0.210	1.979
PF14234P	14-20 X 2 3/4	0.250	0.480	Flat	TEK PT/4	PGP	0.175-0.250	2.009
PF14314P	14-20 X 3 1/4	0.250	0.480	Flat	TEK PT/4	PGP	0.175-0.250	2.509

For **SI**: 1 inch = 25.4 mm.¹ tpi = threads per inch²Length of load-bearing area is the length of the screw minus the distance from the point to the third full thread.

PGP = PrimeGuard Plus

TABLE 2—SHEAR AND TENSILE STRENGTHS OF PRO-TWIST™ MARKER® & DARTS® SELF-DRILLING TAPPING SCREWS

FASTENER DESCRIPTION			NOMINAL SCREW STRENGTH (lbf)		ALLOWABLE SHEAR LOAD PER FASTENER (lbf)	ALLOWABLE TENSION LOAD PER FASTENER (lbf)
Head Style	Nominal Size— tpi	Basic (Nominal) Screw Diameter (in.)	Shear, P _{ss}	Tension, P _{ts}		
Pan Framer	7-18	0.151	1,040	1,497	347	499
Pancake Framer	10-16	0.190	1,755	2,313	585	771
	12-14	0.216	2,089	2,927	696	976
Hex Washer	8-18	0.164	1,274	1,974	425	658
	10-16	0.190	1,484	1,158	495	386
	12-14	0.216	2,077	2,603	692	868
	12-24	0.216	2,447	4,200	816	1,400
	14-14	0.250	2,772	3,201	924	1,067
Modified Truss	8-18	0.164	1,363	1,993	454	664
	10-16	0.190	1,855	2,605	618	868

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



FIGURE 1—PFD AND PFZD PAN FRAMER HEAD SCREW

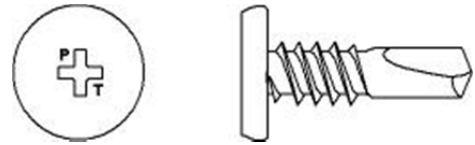


FIGURE 2—PPH PANCAKE FRAMER HEAD SCREW

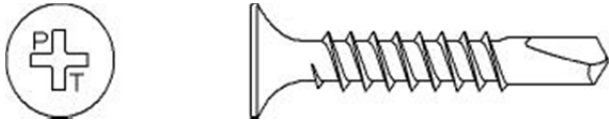


FIGURE 3—SD AND SDZ BUGLE HEAD SCREW

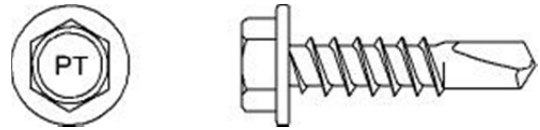


FIGURE 4—HWD HEX WASHER HEAD SCREW

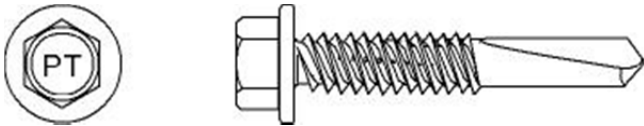


FIGURE 5—X5 HEX WASHER HEAD SCREW

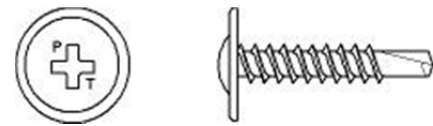


FIGURE 6—MTD MODIFIED TRUSS HEAD SCREW

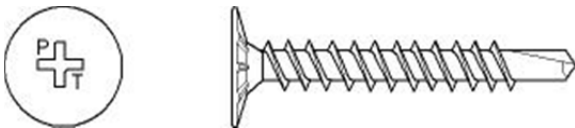


FIGURE 7—CBD WAFER HEAD SCREW

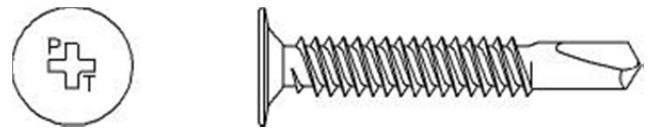


FIGURE 8—PWD WAFER HEAD SCREW

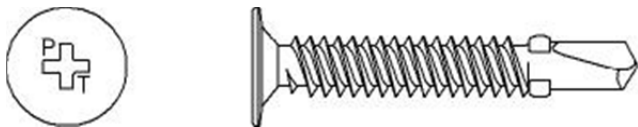


FIGURE 9—PWD101716P WAFER HEAD SCREW WITH WINGS

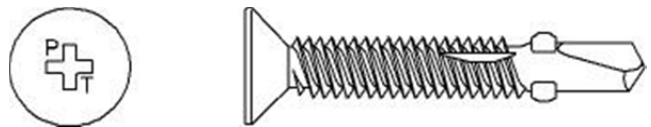


FIGURE 10—PF FLAT HEAD SCREW



FIGURE 11— PRO-TWIST™ MARKER® & DARTS®
LOGO

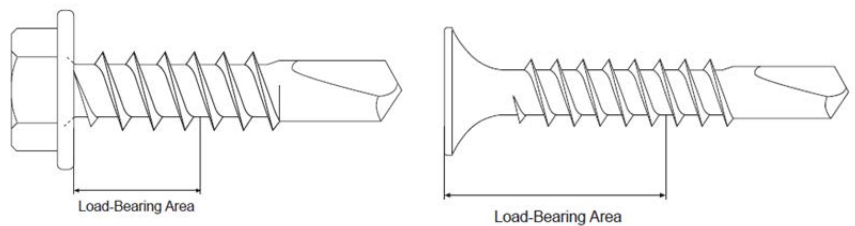


FIGURE 12—DESCRIPTION OF LENGTH OF LOAD BEARING AREA