

# ICC-ES Evaluation Report


ESR-3231

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<p><b>DIVISION: 05 00 00—METALS</b></p> <p><b>Section: 05 05 23—Metal Fastenings</b></p> <p><b>DIVISION: 09 00 00—FINISHES</b></p> <p><b>Section: 09 22 16.23—Fasteners</b></p>	<p><b>REPORT HOLDER:</b></p> <p><b>BRIGHTON BEST INTERNATIONAL, INC.</b></p>	<p><b>EVALUATION SUBJECT:</b></p> <p><b>PROFERRED SELF-DRILL™ SCREWS</b></p>	
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## 1.0 EVALUATION SCOPE

### Compliance with the following codes:

- 2015, 2012, 2009 and 2006 [International Building Code® \(IBC\)](#)
- 2015, 2012, 2009 and 2006 [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 Brighton Best International, Inc., Proferred Self-Drill™ Screws are used to connect cold-formed steel members together and to connect gypsum wallboard 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:

Brighton Best International, Inc., Proferred Self-Drill™ Screws are formed from carbon steel wire conforming to ASTM A510 Grade 1018 to 1022. The screws have a minimum core hardness of HRC 32. [Table 1](#) provides screw part numbers; designations, including nominal screw size, TPI, nominal screw length and head style; nominal head or integral washer diameters, nominal screw diameters, point styles, drilling capacities, length of load-bearing area and coatings. See [Figure 1](#) for depictions of the screws described in Sections 3.2 through 3.6.

### 3.2 PBH Screws:

The #6 and #8 PBH screws comply with ASTM C954 and have a Phillips bugle head (PBH) style.

### 3.3 PWH Screws:

The #8 and #10 PWH screws comply with ASTM C1513 and have a Phillips wafer head (PWH) style.

### 3.4 PMT Screws:

The #8 and #10 PMT screws comply with ASTM C1513 and have a Phillips modified truss head (PMT) style

### 3.5 PPH Screws:

The #6, #8, #10, #12 and 1/4 PPH screws comply with ASTM C1513 and have a Phillips pan head (PPH) style.

### 3.6 HWH, HHWH, and HWHSW Screws:

The #6, #8, #10, #12 and 1/4 HWH screws comply with ASTM C1513 and have a hex washer head (HWH) style. The #10 HHWH screw complies with ASTM C1513 and has a high hex washer head (HHWH) style for increased wrenching ability. The #10, #12, and 1/4 HWHSW screws comply with ASTM C1513 and have a hex washer head style with a rubber faced sealing washer (HWHSW).

### 3.7 Cold-formed Steel:

Cold-formed steel material must comply with the ASTM Specifications listed in Chapter A of AISI S100 and must have the minimum tensile strength ( $F_u$ ) noted in the tables of 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 and the drilling capacity given in [Table 1](#).

When tested for corrosion resistance in accordance with ASTM B117, screws with coatings described in [Table 1](#) met the minimum requirements listed in ASTM F1941, as required by ASTM C1513, with no white corrosion after three hours and no red dust after 12 hours.

**4.1.2 Prescriptive Design:** The PBH screws described in Section 3.2 are recognized for use in fastening gypsum board to cold-formed steel framing 0.033 inch to 0.112 inch (0.80 to 2.8 mm) thick in accordance with IBC Section 2506 and 2015 IRC Section R702.3.5.1 (2012, 2009, and 2006 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; Section C2.2.3 of AISI—Lateral, referenced in 2006 IBC Section 2210.5).

The PWH, PMT, PPH, HWH, HHWH, and HWHSW screws described in Sections 3.3 through 3.6 are recognized for use where ASTM C1513 screws of the same size, head type and type (self-drilling) are prescribed in the IRC and in the AISI standards referenced in Section 2211 of the 2015 and 2012 IBC (Section 2210 of the 2009 and 2006 IBC).

**4.1.3 Engineered Design of Steel-to-Steel Connections:** The PPH, HWH, HHWH, and HWHSW screws described in Sections 3.5 and 3.6 are recognized for use in engineered connections of cold-formed steel, light-framed construction. Design of connections must comply with Section E4 of AISI S100 (AISI — NAS for the 2006 IBC), using the fastener tension and shear strengths shown in [Table 5](#). Alternatively, allowable connection strengths and design strengths for use in Allowable Strength Design (ASD) and Load and Resistance Factor design (LRFD), respectively, for pull-out, pull-over, and shear (bearing) capacity, are provided in [Tables 2, 3, and 4](#), respectively. The connection values are applicable to 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, in which case the minimum edge distance must be 1.5 times the nominal screw diameter). When the spacing between screws is 2 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 and end distance must be 1.5 times the nominal screw diameter. Additionally, 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 S100-07 (AISI — NAS for the 2006 IBC) must be considered.

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

#### 4.2 Installation:

Installation of 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 screw-driving tool. The installation speed should 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 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 Screws 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 screw strength values specified in Section 4.1.3 and [Tables 2](#) through [5](#) must not be increased for short-duration loads, such as wind or earthquake loads.
- 5.3 The utilization of the nominal screw strength values contained in this evaluation report, for the design of cold-formed steel diaphragms, is outside the scope of this report. Diaphragms constructed using the 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).
- 5.4 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 must 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 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

- 7.1 The Proferred Self-Drill™ screws are identified by a "pfc" or "BBI" marking (see [Figure 3](#)) on the fastener heads. Each box of screws has a label bearing the company name (Brighton Best International, Inc.), brand name (Proferred Self-Drill™), screw type, size, part number, P.O. number, manufacturing lot number, quantity, and the evaluation report number (ESR-3231).
- 7.2 The report holder's contact information is the following:

**BRIGHTON BEST INTERNATIONAL, INC.**  
**12801 LEFFINGWELL AVENUE**  
**SANTE FE SPRINGS, CALIFORNIA 90670**  
**(310) 984 2589**  
[www.brightonbest.com](http://www.brightonbest.com)

TABLE 1—BRIGHTON BEST INTERNATIONAL, INC., PROFFERED SELF-DRILL™ SCREWS

PART NO.	DESCRIPTION (Nominal Size. – TPI x Nominal Length (in.) x Head Style) <sup>1</sup>	NOMINAL HEAD OR INTEGRAL WASHER DIAMETER (in.)	NOMINAL SCREW DIAMETER (in.)	POINT NUMBER	DRILLING CAPACITY (in.)		LENGTH OF LOAD BEARING AREA <sup>2</sup> (in.)	COATING <sup>3</sup>
					MIN.	MAX.		
637010	#6-20 x 1 PBH	0.327	0.138	2	0.033	0.112	0.519	Phos
636350	#6-20 x 1 PBH	0.327	0.138	2	0.033	0.112	0.519	ZNC3
637020	#6-20 x 1 <sup>1</sup> / <sub>8</sub> PBH	0.327	0.138	2	0.033	0.112	0.644	Phos
636352	#6-20 x 1 <sup>1</sup> / <sub>8</sub> PBH	0.327	0.138	2	0.033	0.112	0.644	ZNC3
637030	#6-20 x 1 <sup>1</sup> / <sub>4</sub> PBH	0.327	0.138	2	0.033	0.112	0.769	Phos
636405	#6-20 x 1 <sup>1</sup> / <sub>4</sub> PBH	0.327	0.138	2	0.033	0.112	0.769	ZNC3
637040	#6-20 x 1 <sup>5</sup> / <sub>8</sub> PBH	0.327	0.138	2	0.033	0.112	1.144	Phos
636356	#6-20 x 1 <sup>5</sup> / <sub>8</sub> PBH	0.327	0.138	2	0.033	0.112	1.144	ZNC3
637050	#6-20 x 1 <sup>7</sup> / <sub>8</sub> PBH	0.327	0.138	2	0.033	0.112	1.394	Phos
636358	#6-20 x 1 <sup>7</sup> / <sub>8</sub> PBH	0.327	0.138	2	0.033	0.112	1.394	ZNC3
637060	#8-18 x 2 <sup>3</sup> / <sub>8</sub> PBH	0.327	0.164	2	0.033	0.112	1.878	Phos
636371	#8-18 x 2 <sup>3</sup> / <sub>8</sub> PBH	0.327	0.164	2	0.033	0.112	1.878	ZNC3
637070	#8-18 x 2 <sup>5</sup> / <sub>8</sub> PBH	0.327	0.164	2	0.033	0.112	2.128	Phos
636406	#8-18 x 2 <sup>5</sup> / <sub>8</sub> PBH	0.327	0.164	2	0.033	0.112	2.128	ZNC3
637080	#8-18 x 3 PBH	0.327	0.164	2	0.033	0.112	2.503	Phos
636370	#8-18 x 3 PBH	0.327	0.164	2	0.033	0.112	2.503	ZNC3
636505	#8-18 x 1 PWH	0.465	0.164	2	0.033	0.112	0.633	ZNC3
636610	#10-16 x 3 <sup>1</sup> / <sub>4</sub> PWH	0.465	0.190	3	0.110	0.175	0.299	ZNC3
636615	#10-16 x 1 PWH	0.465	0.190	3	0.110	0.175	0.549	ZNC3
636620	#10-16 x 1 <sup>1</sup> / <sub>2</sub> PWH	0.465	0.190	3	0.110	0.175	1.049	ZNC3
636006	#8-18 x 1 <sup>1</sup> / <sub>2</sub> PMT	0.420	0.164	2	0.033	0.112	0.097	ZNC3
636009	#8-18 x 9 <sup>1</sup> / <sub>16</sub> PMT	0.420	0.164	2	0.033	0.112	0.160	ZNC3
636008	#8-18 x 3 <sup>1</sup> / <sub>4</sub> PMT	0.420	0.164	2	0.033	0.112	0.347	ZNC3
636011	#8-18 x 1 PMT	0.420	0.164	2	0.033	0.112	0.597	ZNC3
636016	#8-18 x 1 <sup>1</sup> / <sub>4</sub> PMT	0.420	0.164	2	0.033	0.112	0.847	ZNC3
636020	#8-18 x 1 <sup>5</sup> / <sub>8</sub> PMT	0.420	0.164	2	0.033	0.112	1.222	ZNC3
636025	#8-18 x 1 <sup>7</sup> / <sub>8</sub> PMT	0.420	0.164	2	0.033	0.112	1.472	ZNC3
636030	#8-18 x 2 <sup>1</sup> / <sub>2</sub> PMT	0.420	0.164	2	0.033	0.112	2.097	ZNC3
636035	#8-18 x 3 PMT	0.420	0.164	2	0.033	0.112	2.597	ZNC3
636102	#10-16 x 3 <sup>1</sup> / <sub>4</sub> PMT	0.420	0.190	3	0.110	0.175	0.307	ZNC3
636330	#6-20 x 3 <sup>1</sup> / <sub>8</sub> PPH	0.264	0.138	2	0.033	0.112	0.071	ZNC3
636333	#6-20 x 1 <sup>1</sup> / <sub>2</sub> PPH	0.264	0.138	2	0.033	0.112	0.196	ZNC3
636336	#6-20 x 5 <sup>1</sup> / <sub>8</sub> PPH	0.264	0.138	2	0.033	0.112	0.321	ZNC3
636339	#6-20 x 3 <sup>1</sup> / <sub>4</sub> PPH	0.264	0.138	2	0.033	0.112	0.446	ZNC3

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TABLE 1—BRIGHTON BEST INTERNATIONAL, INC. PROFFERED SELF-DRILL™ SCREWS (continued)

PART NO.	DESCRIPTION (Nominal Size. – TPI x Nominal Length (in.) x Head Style) <sup>1</sup>	NOMINAL HEAD OR INTEGRAL WASHER DIAMETER (in.)	NOMINAL SCREW DIAMETER (in.)	POINT NUMBER	DRILLING CAPACITY (in.)		LENGTH OF LOAD BEARING AREA <sup>2</sup> (in.)	COATING <sup>3</sup>
					MIN.	MAX.		
636342	#8-18 x 3/8 PPH	0.315	0.164	2	0.033	0.112	0.064	ZNC3
636345	#8-18 x 1/2 PPH	0.315	0.164	2	0.033	0.112	0.133	ZNC3
636348	#8-18 x 5/8 PPH	0.315	0.164	2	0.033	0.112	0.258	ZNC3
636351	#8-18 x 3/4 PPH	0.315	0.164	2	0.033	0.112	0.383	ZNC3
636354	#8-18 x 1 PPH	0.315	0.164	2	0.033	0.112	0.633	ZNC3
636357	#8-18 x 1 1/2 PPH	0.315	0.164	2	0.033	0.112	1.133	ZNC3
636360	#10-16 x 1/2 PPH	0.362	0.190	2	0.033	0.112	0.112	ZNC3
636363	#10-16 x 5/8 PPH	0.362	0.190	3	0.110	0.175	0.174	ZNC3
636366	#10-16 x 3/4 PPH	0.362	0.190	3	0.110	0.175	0.299	ZNC3
636369	#10-16 x 1 PPH	0.362	0.190	3	0.110	0.175	0.549	ZNC3
636372	#10-16 x 1 1/2 PPH	0.362	0.190	3	0.110	0.175	1.049	ZNC3
636375	#10-16 x 2 PPH	0.362	0.190	3	0.110	0.175	1.549	ZNC3
636378	#10-16 x 2 1/2 PPH	0.362	0.190	3	0.110	0.175	2.049	ZNC3
636381	#10-16 x 3 PPH	0.362	0.190	3	0.110	0.175	2.549	ZNC3
636384	#12-14 x 3/4 PPH	0.415	0.216	3	0.110	0.210	0.225	ZNC3
636387	#12-14 x 1 PPH	0.415	0.216	3	0.110	0.210	0.475	ZNC3
636390	#12-14 x 1 1/2 PPH	0.415	0.216	3	0.110	0.210	0.975	ZNC3
636393	#12-14 x 2 PPH	0.415	0.216	3	0.110	0.210	1.475	ZNC3
636396	#12-14 x 2 1/2 PPH	0.415	0.216	3	0.110	0.210	1.975	ZNC3
636399	#12-14 x 3 PPH	0.415	0.216	3	0.110	0.210	2.475	ZNC3
636400	1/4-14 x 1 1/4 PPH	0.483	0.25	3	0.110	0.220	0.670	ZNC3
636404	1/4-14 x 3 PPH	0.483	0.25	3	0.110	0.220	2.420	ZNC3
636200	#6-20 x 3/8 HWH	0.315	0.138	2	0.033	0.112	0.071	ZNC3
636202	#6-20 x 1/2 HWH	0.315	0.138	2	0.033	0.112	0.196	ZNC3
636210	#8-18 x 1/2 HWH	0.335	0.164	2	0.033	0.112	0.133	ZNC3
636212	#8-18 x 5/8 HWH	0.335	0.164	2	0.033	0.112	0.258	ZNC3
636216	#8-18 x 3/4 HWH	0.335	0.164	2	0.033	0.112	0.383	ZNC3
636218	#8-18 x 1 HWH	0.335	0.164	2	0.033	0.112	0.633	ZNC3
636220	#8-18 x 1 1/4 HWH	0.335	0.164	2	0.033	0.112	0.883	ZNC3
636222	#8-18 x 1 1/2 HWH	0.335	0.164	2	0.033	0.112	1.133	ZNC3
636230	#10-16 x 1/2 HWH	0.402	0.190	2	0.033	0.112	0.112	ZNC3
636240	#10-16 x 5/8 HWH	0.402	0.190	3	0.110	0.175	0.174	ZNC3
636242	#10-16 x 3/4 HWH	0.402	0.190	3	0.110	0.175	0.299	ZNC3
636244	#10-16 x 1 HWH	0.402	0.190	3	0.110	0.175	0.549	ZNC3
636246	#10-16 x 1 1/4 HWH	0.402	0.190	3	0.110	0.175	0.799	ZNC3
636250	#10-16 x 1 1/2 HWH	0.402	0.190	3	0.110	0.175	1.049	ZNC3

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TABLE 1—BRIGHTON BEST INTERNATIONAL, INC. PROFERRED SELF-DRILL™ SCREWS (continued)

PART NO.	DESCRIPTION (Nominal Size. – TPI x Nominal Length (in.) x Head Style) <sup>1</sup>	NOMINAL HEAD OR INTEGRAL WASHER DIAMETER (in.)	NOMINAL SCREW DIAMETER (in.)	POINT NUMBER	DRILLING CAPACITY (in.)		LENGTH OF LOAD BEARING AREA <sup>2</sup> (in.)	COATING <sup>3</sup>
					MIN.	MAX.		
636252	#10-16 x 2 HWH	0.402	0.190	3	0.110	0.175	1,549	ZNC3
636256	#12-14 x 3/4 HWH	0.413	0.216	3	0.110	0.210	0,225	ZNC3
636258	#12-14 x 1 HWH	0.413	0.216	3	0.110	0.210	0,475	ZNC3
636260	#12-14 x 1 1/4 HWH	0.413	0.216	3	0.110	0.210	0,725	ZNC3
636262	#12-14 x 1 1/2 HWH	0.413	0.216	3	0.110	0.210	0,975	ZNC3
636264	#12-14 x 2 HWH	0.413	0.216	3	0.110	0.210	1,475	ZNC3
636266	#12-14 x 2 1/2 HWH	0.413	0.216	3	0.110	0.210	1,975	ZNC3
636268	#12-14 x 3 HWH	0.413	0.216	3	0.110	0.210	2,475	ZNC3
636272	#12-14 x 4 HWH	0.413	0.216	3	0.110	0.210	3,475	ZNC3
636280	1/4-14 x 3/4 HWH	0.500	0.250	3	0.110	0.210	0,170	ZNC3
636282	1/4-14 x 1 HWH	0.500	0.250	3	0.110	0.210	0,420	ZNC3
636284	1/4-14 x 1 1/4 HWH	0.500	0.250	3	0.110	0.210	0,670	ZNC3
636286	1/4-14 x 1 1/2 HWH	0.500	0.250	3	0.110	0.210	0,920	ZNC3
636288	1/4-14 x 2 HWH	0.500	0.250	3	0.110	0.210	1,420	ZNC3
636290	1/4-14 x 3 HWH	0.500	0.250	3	0.110	0.210	2,420	ZNC3
636550	#10-16 x 3/4 HHWH	0.413	0.190	3	0.110	0.175	0,299	ZNC3
638010	#10-16 x 3/4 HWHSW	0.413	0.190	3	0.110	0.175	0,299	ZNC3
638015	#10-16 x 1 HWHSW	0.413	0.190	3	0.110	0.175	0,549	ZNC3
638020	#10-16 x 1 1/4 HWHSW	0.413	0.190	3	0.110	0.175	0,799	ZNC3
638025	#10-16 x 1 1/2 HWHSW	0.413	0.190	3	0.110	0.175	1,049	ZNC3
638030	#10-16 x 2 HWHSW	0.413	0.190	3	0.110	0.175	1,549	ZNC3
638050	#12-14 x 3/4 HWHSW	0.429	0.216	3	0.110	0.210	0,225	ZNC3
638055	#12-14 x 1 HWHSW	0.429	0.216	3	0.110	0.210	0,475	ZNC3
638060	#12-14 x 1 1/4 HWHSW	0.429	0.216	3	0.110	0.210	0,725	ZNC3
638065	#12-14 x 1 1/2 HWHSW	0.429	0.216	3	0.110	0.210	0,975	ZNC3
638070	#12-14 x 2 HWHSW	0.429	0.216	3	0.110	0.210	1,475	ZNC3
638100	1/4-14 x 3/4 HWHSW	0.520	0.250	3	0.110	0.210	0,170	ZNC3
638105	1/4-14 x 1 HWHSW	0.520	0.250	3	0.110	0.210	0,420	ZNC3
638110	1/4-14 x 1 1/4 HWHSW	0.520	0.250	3	0.110	0.210	0,670	ZNC3
638115	1/4-14 x 1 1/2 HWHSW	0.520	0.250	3	0.110	0.210	0,920	ZNC3
638120	1/4-14 x 2 HWHSW	0.520	0.250	3	0.110	0.210	1,420	ZNC3

For SI: 1 inch = 25.4 mm.

<sup>1</sup>Head style abbreviations, PBH = Phillips Bugle Head; PWH = Phillips Wafer Head; PMT = Phillips Modified Truss Head; PPH = Phillips Pan Head; HWH = Hex Washer Head; HHWH = High Hex Washer Head; HWHSW = Hex Washer Head with Sealing Washer. TPI denotes thread per inch.

<sup>2</sup>Refer to Figure 2 for the length of load-bearing area.

<sup>3</sup>Coating abbreviations: ZNC3 = ASTM F1941 Zinc-Clear RoHS compliant; Phos = Phosphate coating (gray to black).

TABLE 2—TENSILE PULL-OUT CAPACITIES FOR CONNECTION SCREWS (pounds-force)<sup>1,2</sup>

Steel Fu = 45 ksi						
Screw Designation	Nominal Diameter (in.)	Design (uncoated) thickness of member not in contact with the screw head				
		0.035 inch (20 gage)	0.048 inch (18 gage)	0.060 inch (16 gage)	0.071 inch (14 gage)	0.098 inch (12 gage)
<b>PPH, HWH, HHWH, and HWHSW</b>						
<b>Allowable Strength (ASD)</b>						
#6-20	0.138	78	112	166	215	305
#8-18	0.164	82	120	174	225	385
#10-16	0.190	58	129	185	241	403
#12-14	0.216	92	133	178	244	398
1/4"-14	0.250	87	139	187	238	412
<b>Design Strength (LRFD)</b>						
#6-20	0.138	125	179	266	345	488
#8-18	0.164	131	191	279	360	615
#10-16	0.190	94	206	295	386	645
#12-14	0.216	148	212	285	391	637
1/4 " -14	0.250	139	223	300	381	660

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

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

<sup>2</sup>The pull-out capacity for other member thicknesses can be determined by interpolating within the table.

TABLE 3—TENSILE PULL-OVER CAPACITIES FOR CONNECTION SCREWS (pounds-force)<sup>1,2</sup>

Steel Fu = 45 ksi						
Screw Designation	Washer or Head Diameter (in.)	Design (uncoated) thickness of member in contact with the screw head				
		0.035 inch (20 gage)	0.048 inch (18 gage)	0.060 inch (16 gage)	0.071 inch (14 gage)	0.098 inch (12 gage)
<b>PPH</b>						
<b>Allowable Strength (ASD)</b>						
#6-20	0.256	202	276	346	409	564
#8-18	0.307	242	332	414	490	677
#10-16	0.358	282	387	483	572	789
#12-14	0.407	321	440	549	650	897
1/4"-14	0.473	372	511	639	756	1043
<b>Design Strength (LRFD)</b>						
#6-20	0.256	302	415	518	613	847
#8-18	0.307	363	497	622	736	1015
#10-16	0.358	423	580	725	858	1184
#12-14	0.407	481	659	824	975	1346
1/4"-14	0.473	559	766	958	1133	1564
<b>HWH, HHWH, or HWHSW</b>						
<b>Allowable Strength (ASD)</b>						
#6-20	0.302	238	326	408	482	666
#8-18	0.322	254	348	435	514	710
#10-16	0.384	302	415	518	613	847
#12-14	0.398	313	430	537	636	878
1/4"-14	0.476	375	514	643	760	1050
<b>Design Strength (LRFD)</b>						
#6-20	0.302	357	489	612	724	999
#8-18	0.322	380	522	652	772	1065
#10-16	0.384	454	622	778	920	1270
#12-14	0.398	470	645	806	954	1316
1/4"-14	0.476	562	771	964	1141	1574

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

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

<sup>2</sup>The pull-over capacity for other member thicknesses can be determined by interpolating within the table.



TABLE 4—SHEAR (BEARING) CAPACITIES FOR CONNECTION SCREWS (pounds-force)<sup>1,2</sup>

Steel Fu = 45 ksi						
Screw Designation	Nominal Diameter (in.)	Thickness of Uncoated Top Sheet - Thickness of Uncoated Bottom Sheet				
		0.035-0.035 inch (20 - 20 gage)	0.048-0.048 inch (18 - 18 gage)	0.060-0.060 inch (16 - 16 gage)	0.071-0.071 inch (14 - 14 gage)	0.098-0.098 inch (12 - 12 gage)
<b>PPH</b>						
<b>Allowable Strength (ASD)</b>						
#6-20	0.138	143	197	246	291	402
#8-18	0.164	167	234	292	346	477
#10-16	0.190	180	271	339	401	553
#12-14	0.216	192	308	385	455	629
1/4"-14	0.250	206	331	446	527	728
<b>Design Strength (LRFD)</b>						
#6-20	0.138	215	295	369	437	602
#8-18	0.164	251	351	438	519	716
#10-16	0.190	270	406	508	601	830
#12-14	0.216	288	462	577	683	943
1/4"-14	0.250	309	497	668	791	1091
<b>HWH, HHWH, or HWHSW</b>						
<b>Allowable Strength (ASD)</b>						
#6-20	0.138	143	197	246	291	402
#8-18	0.164	167	234	292	346	477
#10-16	0.190	222	343	515	521	587
#12-14	0.216	220	339	525	648	780
1/4"-14	0.250	228	359	554	708	942
<b>Design Strength (LRFD)</b>						
#6-20	0.138	215	295	369	437	602
#8-18	0.164	251	351	438	519	716
#10-16	0.190	355	548	824	833	939
#12-14	0.216	352	542	840	1037	1248
1/4"-14	0.250	364	574	887	1132	1507

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

<sup>1</sup>For shear connections, the lesser of the screw shear (bearing) capacity and shear strength found in Tables 4 and 5, respectively, must be used for design.

<sup>2</sup>The shear (bearing) capacity for other member thicknesses can be determined by interpolating within the table.

TABLE 5—SCREW STRENGTH (pounds-force)<sup>1,2,3</sup>

SCREW DESIGNATION	NOMINAL SCREW DIAMETER (in.)	NOMINAL SCREW STRENGTH		ALLOWABLE SCREW STRENGTH (ASD)		DESIGN SCREW STRENGTH (LRFD)	
		Tension, P <sub>ts</sub>	Shear, P <sub>ss</sub>	Tension, P <sub>ts</sub> /Ω	Shear, P <sub>ss</sub> /Ω	Tension, φ P <sub>ts</sub>	Shear, φ P <sub>ss</sub>
<b>PPH, HWH, HHWH, and HWHSW</b>							
#6	0.138	1652	1006	551	335	826	503
#8	0.164	1457	1207	486	402	729	604
#10	0.190	1857	1883	583	628	929	941
#12	0.216	3602	2269	1201	756	1801	1135
1/4"	0.250	3852	3047	1109	1015	1775	1524

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

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

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

<sup>3</sup>Tabulated values are for screw sizes listed in Table 1.

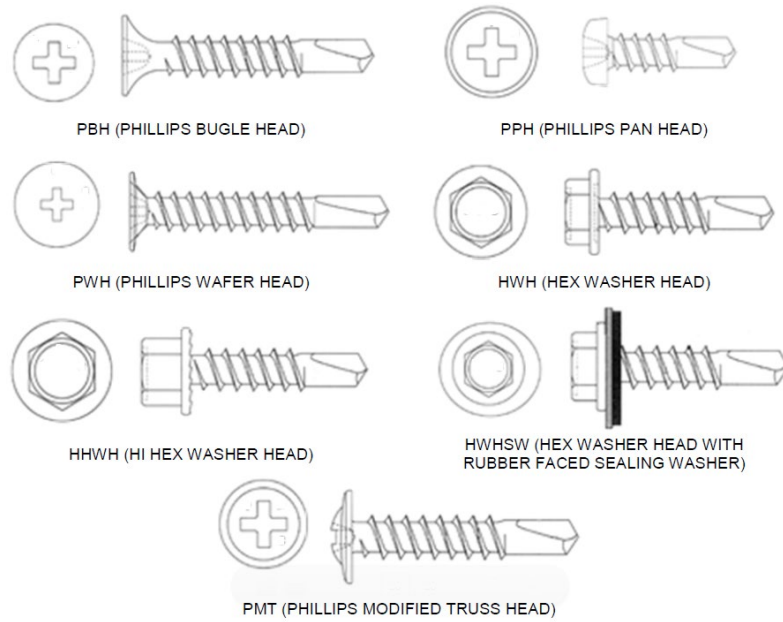


FIGURE 1—PREFERRED SELF-DRILL™ FASTENERS

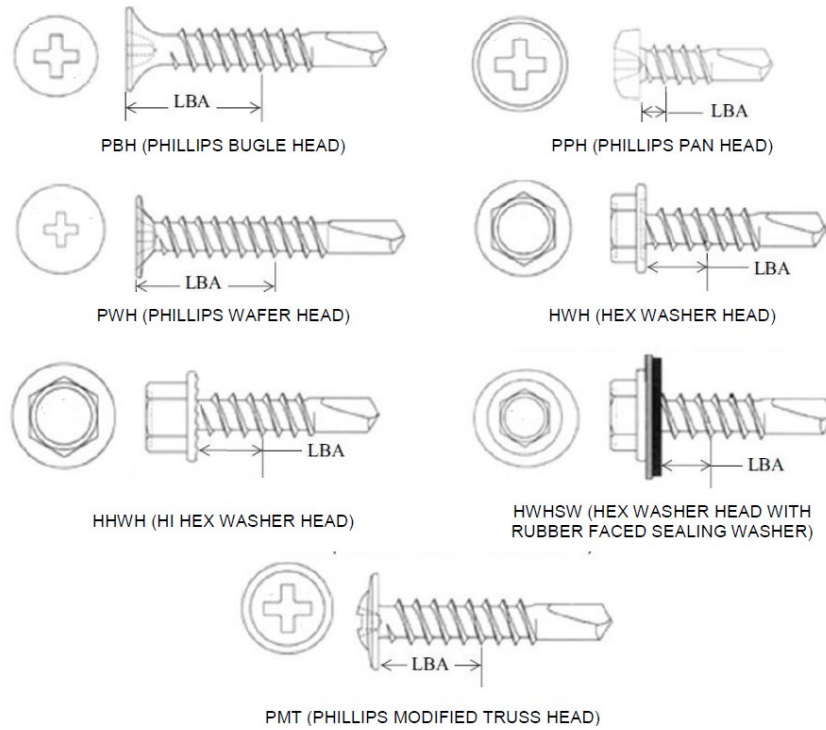


FIGURE 2—DEPICTION OF LENGTH OF LOAD-BEARING AREA (LBA)



FIGURE 3—EXAMPLE HEAD MARKINGS