

# ICC-ES Evaluation Report


**ESR-3528**

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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: 06 00 00—WOOD, PLASTICS AND COMPOSITES</b></p> <p><b>Section: 06 05 23—Wood, Plastic, and Composite 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>INTERCORP DBA OF U.S. NITTO</b></p> | <p><b>EVALUATION SUBJECT:</b></p> <p><b>STRONG-POINT® SCREWS</b></p> |  |
|--|--|--|---|

## 1.0 EVALUATION SCOPE

**Compliance with the following codes:**

- 2012, 2009 and 2006 [International Building Code® \(IBC\)](#)
- 2012 and 2009 [International Residential Code® \(IRC\)](#)

**Property evaluated:**

- Structural

## 2.0 USES

Strong-Point® screws are used to connect cold-formed steel members together and to connect gypsum wallboard, wood, or other building materials to cold-formed steel framing (CFS). The screws are used in engineered connections of CFS and connections prescribed in the code for CFS framing and for sheathing to steel connections.

## 3.0 DESCRIPTION

### 3.1 General:

The Strong-Point® screws are self-drilling tapping screws that are manufactured from carbon steel conforming to ASTM A510, Grade 1018 or 1022, and are case-hardened. The screws have an electroplated zinc coating or phosphate coating, complying with the minimum corrosion-resistance requirements of ASTM F1941. [Table 1](#) provides screw descriptions, including sizes, head styles, point styles, drilling capacities and finishes for the screws. Screws are supplied in boxes of individual screws. See [Figures 1](#) through [5](#) for depictions of the screws described in Section 3.2.

### 3.2 Strong-Point<sup>®</sup> Self-drilling Tapping Screws:

**3.2.1 D###:** The #6 and #8 D### self-drilling screws comply with ASTM C954. The screws are fully threaded, coarse threaded screws with a Phillips Bugle Head (PBH) and a phosphate or zinc coating. See [Figure 1](#).

**3.2.2 H####:** The #12 H#### self-drilling screws comply with ASTM C1513. The #10 and #14 H#### screws comply with the material and performance requirements of ASTM C1513. The H#### screws are fully threaded, coarse threaded screws with a Hex Washer Head (HWH) and an electroplated zinc coating. See [Figure 2](#).

**3.2.3 H5 and H5#:** The #12 H5 and H5# self-drilling screws comply with ASTM C1513. The screws are fully threaded, fine threaded screws with a Hex Washer Head (HWH) and an electroplated zinc coating. See [Figure 3](#).

**3.2.4 M##Z and M###Z:** The #8 M##Z and #12 M###Z screws comply with ASTM C1513. The #10 M###Z screws comply with the material and performance requirements of ASTM C1513. The screws also comply with ASTM C954. The screws are fully threaded, coarse threaded screws with a Phillips Modified Truss Head (PMT) and an electroplated zinc coating. See [Figure 4](#). **PC# and PC##:** The #10 PC# and PC## screws comply with the material and performance requirements of ASTM C1513. The screws are fully threaded, coarse threaded screws with a Phillips Pancake Head (PPH) and an electroplated zinc coating. See [Figure 5](#).

### 3.3 Connected Steel Members:

Connected steel member material must comply with Section A2 of AISI S100 and must have the minimum tensile strength,  $F_u$ , and minimum design thickness shown in the [Tables 2](#) through [4](#).

## 4.0 DESIGN AND INSTALLATION

### 4.1 Design:

**4.1.1 General:** Screw thread length and point style must be selected to suit the thickness of the fastened materials and the 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, 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 D#### Screws:** The D### screws described in Section 3.2.1 are recognized for use in fastening gypsum board materials to CFS 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 CFS 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 AISI—Lateral, referenced in 2006 IBC Section 2210.5).

**4.1.2.2 H####, H5 and H5# Screws:** The #12 H#### and #12 H5 and H5# screws described in Sections 3.2.2 and 3.2.3, respectively, are recognized for use where self-drilling ASTM C1513 screws of the same size and head style are prescribed in the IRC and in AISI Standards referenced in IBC Section 2210.

**4.1.2.3 M##Z Screws:** The #8 M##Z and #10 and #12 M###Z screws described in Section 3.2.4 are recognized for use in attaching metal plaster bases (lath) to CFS where screws complying with ASTM C954 are prescribed in the code.

**4.1.3 Engineered Design:** The #10, #12 and #14 H####; #12 H5 and H5#; #8 M##Z and #10 and #12 M###Z; and #10 PC# and PC## screws described in Sections 3.2.2 through 3.2.5, respectively, 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 2006 IBC), using the available fastener tension and shear strengths for screws shown in [Table 5](#), and the connection capacities shown in [Tables 2](#) through [4](#). For connections subject to tension, the least of the allowable pull-out, pullover, and fastener tension strength of screws found in [Tables 2](#), [3](#) and [5](#) must be used for design. For connections subject to shear, the lesser of the connection shear and fastener shear strength found in [Tables 4](#) and [5](#), respectively, must be used for design. Connections subject to combined tension and shear loading must be designed in accordance with Section E4.5 of AISI S100.

The values in [Tables 2](#) through [4](#) are based on a minimum spacing between the centers of fasteners of three times the diameter of the screw, and a minimum distance from the center of the fastener to the edge of any connected part of 1.5 times the diameter of the screw. 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 connections 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.

#### 4.2 Installation:

Installation of the Strong-Point<sup>®</sup> self-drilling tapping 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 Strong-Point<sup>®</sup> 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. In the event of a conflict between this report and the manufacturer's published installation instructions, this report governs.
- 5.2 The allowable loads (ASD) specified in Section 4.1 must not be increased when the screws 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 must be prepared by a registered design professional when required by the statutes of the jurisdiction in which the project is located.
- 5.4 Connected members must be checked for rupture in accordance with Section E5 of AISI S100.
- 5.5 The use of the screws in steel deck diaphragms is outside the scope of this report. Diaphragms constructed using the screws must be recognized in a current ICC-ES evaluation report.

### 6.0 EVIDENCE SUBMITTED

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

### 7.0 IDENTIFICATION

- 7.1 The Strong-Point<sup>®</sup> screws are marked with an S and a P on the top surface of the screw heads, as shown in [Figures 1](#) through [5](#). Packages of Strong-Point<sup>®</sup> screws are labeled with the report holder's name (Intercorp), product number, nominal screw size, nominal screw length, point type, finish, and the evaluation report number (ESR-3528).
- 7.2 The report holder's contact information is the following:

**INTERCORP DBA OF U.S. NITTO**  
**641 NORTH POPLAR**  
**ORANGE, CALIFORNIA 92868**  
**(714) 744-2622**  
[www.intercorpusa.com](http://www.intercorpusa.com)

TABLE 1—INTERCORP SELF-DRILLING SCREWS

| PRODUCT NUMBER | DESIGNATION <sup>1</sup><br>(Nominal size-tpi) | BASIC/<br>NOMINAL<br>SCREW<br>DIAMETER<br>(inch) | NOMINAL<br>SCREW<br>LENGTH<br>(inches) | HEAD<br>STYLE <sup>2</sup> | NOMINAL<br>HEAD<br>DIAMETER<br>(inch) | POINT<br>TYPE | DRILLING<br>CAPACITY (inch) |       | LENGTH OF<br>LOAD<br>BEARING<br>AREA <sup>3</sup><br>(inches) | COATING <sup>4</sup> |
|----------------|--|--|--|----------------------------|---------------------------------------|---------------|-----------------------------|-------|---|----------------------|
|                |  |  |  |                            |                                       |               | Min.                        | Max.  |   |                      |
| D610           | #6-20  | 0.138  | 1.000                                  | PBH                        | 0.321                                 | 2             | 0.030                       | 0.090 | 0.625   | Phosphate or zinc    |
| D611           |  |  | 1.125                                  |                            |                                       |               |                             |       | 0.750   |                      |
| D614           |  |  | 1.250                                  |                            |                                       |               |                             |       | 0.875   |                      |
| D615           |  |  | 1.625                                  |                            |                                       |               |                             |       | 1.25  |                      |
| D617           |  |  | 1.875                                  |                            |                                       |               |                             |       | 1.50  |                      |
| D823           | #8-18  | 0.164  | 2.375                                  | PBH                        | 0.321                                 | 2             | 0.030                       | 0.100 | 2.00  | Phosphate or zinc    |
| D825           |  |  | 2.625                                  |                            |                                       |               |                             |       | 2.25  |                      |
| D830           |  |  | 3.000                                  |                            |                                       |               |                             |       | 2.63  |                      |
| H1012          | #10-16   | 0.190  | 0.750                                  | HWH                        | 0.399                                 | 3             | 0.035                       | 0.176 | 0.325   | Zinc                 |
| H1016          |  |  | 1.000                                  |                            |                                       |               |                             |       | 0.575   |                      |
| H1020          |  |  | 1.250                                  |                            |                                       |               |                             |       | 8.25  |                      |
| H1024          |  |  | 1.500                                  |                            |                                       |               |                             |       | 1.08  |                      |
| H1032          |  |  | 2.000                                  |                            |                                       |               |                             |       | 1.58  |                      |
| H1040          |  |  | 2.500                                  |                            |                                       |               |                             |       | 2.08  |                      |
| H1048          |  |  | 3.000                                  |                            |                                       |               |                             |       | 2.58  |                      |
| H1212          | #12-14   | 0.216  | 0.750                                  | HWH                        | 0.415                                 | 3             | 0.035                       | 0.210 | 0.300   | Zinc                 |
| H1216          |  |  | 1.000                                  |                            |                                       |               |                             |       | 0.550   |                      |
| H1220          |  |  | 1.250                                  |                            |                                       |               |                             |       | 0.800   |                      |
| H1224          |  |  | 1.500                                  |                            |                                       |               |                             |       | 1.05  |                      |
| H1232          |  |  | 2.000                                  |                            |                                       |               |                             |       | 1.55  |                      |
| H1240          |  |  | 2.500                                  |                            |                                       |               |                             |       | 2.00  |                      |
| H1248          |  |  | 3.000                                  |                            |                                       |               |                             |       | 2.45  |                      |
| H1264          |  |  | 4.000                                  |                            |                                       |               |                             |       | 3.45  |                      |
| H1412          | #14-14   | 0.250  | 0.750                                  | HWH                        | 0.500                                 | 3             | 0.060                       | 0.220 | 0.200   | Zinc                 |
| H1416          |  |  | 1.000                                  |                            |                                       |               |                             |       | 0.450   |                      |
| H1420          |  |  | 1.250                                  |                            |                                       |               |                             |       | 0.700   |                      |
| H1424          |  |  | 1.500                                  |                            |                                       |               |                             |       | 0.950   |                      |
| H1432          |  |  | 2.000                                  |                            |                                       |               |                             |       | 1.55  |                      |
| H1440          |  |  | 2.500                                  |                            |                                       |               |                             |       | 2.00  |                      |
| H1448          |  |  | 3.000                                  |                            |                                       |               |                             |       | 2.45  |                      |
| H1464          |  |  | 4.000                                  |                            |                                       |               |                             |       | 3.45  |                      |
| H1472          |  |  | 4.500                                  |                            |                                       |               |                             |       | 3.95  |                      |
| H1480          |  |  | 5.000                                  |                            |                                       |               |                             |       | 4.45  |                      |
| H1496          | 6.000  | 5.45   |  |                            |                                       |               |                             |       |   |                      |
| H5             | #12-24   | 0.216  | 1.250                                  | HWH                        | 0.415                                 | 5             | 0.125                       | 0.500 | 0.585   | Zinc                 |
| H52            |  |  | 1.500                                  |                            |                                       |               |                             |       | 0.835   |                      |
| H53            |  |  | 2.000                                  |                            |                                       |               |                             |       | 1.34  |                      |
| H54            |  |  | 3.000                                  |                            |                                       |               |                             |       | 2.34  |                      |
| M82Z           | #8-18  | 0.164  | 0.500                                  | PMTH                       | 0.437                                 | 2             | 0.030                       | 0.100 | 0.125   | Zinc                 |
| M83Z           |  |  | 0.750                                  |                            |                                       |               |                             |       | 0.375   |                      |
| M84Z           |  |  | 1.000                                  |                            |                                       |               |                             |       | 0.625   |                      |
| M85Z           |  |  | 1.250                                  |                            |                                       |               |                             |       | 0.875   |                      |
| M87Z           |  |  | 1.625                                  |                            |                                       |               |                             |       | 1.25  |                      |
| M88Z           |  |  | 1.875                                  |                            |                                       |               |                             |       | 1.50  |                      |
| M92Z           |  |  | 2.500                                  |                            |                                       |               |                             |       | 2.13  |                      |
| M95Z           |  |  | 3.000                                  |                            |                                       |               |                             |       | 2.63  |                      |
| M106Z          | #10-16   | 0.190  | 0.750                                  | PMTH                       | 0.437                                 | 3             | 0.035                       | 0.176 | 0.325   | Zinc                 |
| M126Z          | #12-14   | 0.216  | 0.750                                  | PMTH                       | 0.437                                 | 3             | 0.035                       | 0.210 | 0.300   | Zinc                 |
| PC5            | #10-16   | 0.190  | 0.625                                  | PPH                        | 0.411                                 | 3             | 0.035                       | 0.176 | 0.200   | Zinc                 |
| PC8            |  |  | 1.000                                  |                            |                                       |               |                             |       | 0.575   |                      |
| PC12           |  |  | 1.500                                  |                            |                                       |               |                             |       | 1.08  |                      |

For SI: 1 inch = 25.4 mm.

Table 1 Notes:

<sup>1</sup> tpi = threads per inch

<sup>2</sup>Head styles: PBH = Phillips Bugle Head; HWH = Hex Washer Head; PMTH = Phillips Modified Truss Head; PPH = Phillips Pancake Head.

<sup>3</sup>Length of Load Bearing Area provided by manufacturer which excludes the length of the drill point and the length of three full threads. See Figures 1 through 5.

<sup>4</sup>Zinc = Electroplated zinc in accordance with the manufacturer's specifications; Phosphate = Gray Phosphate in accordance with the manufacturer's specifications.

TABLE 2—PULL-OUT STRENGTH FOR SCREWS USED IN ENGINEERED STEEL-TO-STEEL CONNECTIONS<sup>1</sup> (lbf)

| DESIGNATION                     | HEAD STYLE         | NOMINAL SCREW DIAMETER (inch) | MINIMUM TENSILE STRENGTH AND DESIGN THICKNESS OF STEEL MEMBER NOT IN CONTACT WITH THE SCREW HEAD <sup>3</sup> |            |            |                         |            |            |                         |            |            |
|---------------------------------|--------------------|-------------------------------|---|------------|------------|-------------------------|------------|------------|-------------------------|------------|------------|
|                                 |                    |                               | F <sub>u</sub> = 45 ksi   |            |            | F <sub>u</sub> = 65 ksi |            |            | F <sub>u</sub> = 58 ksi |            |            |
|                                 |                    |                               | 0.030 inch  | 0.036 inch | 0.048 inch | 0.060 inch              | 0.075 inch | 0.090 inch | 0.125 inch              | 0.188 inch | 0.250 inch |
| <b>ALLOWABLE STRENGTH (ASD)</b> |                    |                               |   |            |            |                         |            |            |                         |            |            |
| #8-18                           | PMTH               | 0.164                         | 27  | 79         | 110        | 189                     | 299        | -          | -                       | -          | -          |
| #10-16                          | HWH<br>PMTH<br>PPH | 0.190                         | -   | 87         | 121        | 193                     | 299        | 424        | -                       | -          | -          |
| #12-14                          | HWH<br>PMTH        | 0.216                         | -   | -          | -          | 234                     | 312        | 446        | 601                     | 1103       | -          |
| #12-24                          | HWH                | 0.216                         | -   | -          | -          | -                       | -          | -          | -                       | 1265       | 1355       |
| #14-14                          | HWH                | 0.250                         | -   | -          | -          | -                       | 325        | 457        | 658                     | 1282       | -          |
| <b>DESIGN STRENGTH (LRFD)</b>   |                    |                               |   |            |            |                         |            |            |                         |            |            |
| #8-18                           | PMTH               | 0.164                         | 44  | 126        | 177        | 303                     | 479        | -          | -                       | -          | -          |
| #10-16                          | HWH<br>PMTH<br>PPH | 0.190                         | -   | 140        | 193        | 309                     | 479        | 679        | -                       | -          | -          |
| #12-14                          | HWH<br>PMTH        | 0.216                         | -   | -          | -          | 374                     | 507        | 724        | 961                     | 1764       | -          |
| #12-24                          | HWH                | 0.216                         | -   | -          | -          | -                       | -          | -          | -                       | 2037       | 2168       |
| #14-14                          | HWH                | 0.250                         | -   | -          | -          | -                       | 519        | 731        | 1052                    | 2050       | -          |

For SI: 1 inch = 25.4 mm, 1 lb = 4.4 N, 1 ksi = 6.895 MPa.

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

TABLE 3—PULL-OVER STRENGTH FOR SCREWS USED IN ENGINEERED STEEL-TO-STEEL CONNECTIONS<sup>1,2</sup> (lbf)

| DESIGNATION                     | HEAD STYLE | NOMINAL HEAD DIAMETER (inch) | MINIMUM TENSILE STRENGTH AND DESIGN THICKNESS OF STEEL MEMBER IN CONTACT WITH THE SCREW HEAD |            |            |                         |            |            |                         |            |            |
|---------------------------------|------------|------------------------------|--|------------|------------|-------------------------|------------|------------|-------------------------|------------|------------|
|                                 |            |                              | F <sub>u</sub> = 45 ksi  |            |            | F <sub>u</sub> = 65 ksi |            |            | F <sub>u</sub> = 58 ksi |            |            |
|                                 |            |                              | 0.030 inch   | 0.036 inch | 0.048 inch | 0.060 inch              | 0.075 inch | 0.090 inch | 0.125 inch              | 0.188 inch | 0.250 inch |
| <b>ALLOWABLE STRENGTH (ASD)</b> |            |                              |  |            |            |                         |            |            |                         |            |            |
| #8-18                           | PMTH       | 0.437                        | 295  | 354        | 472        | 852                     | 1065       | -          | -                       | -          | -          |
| #10-16                          | HWH        | 0.399                        | -  | 322        | 430        | 776                     | 970        | 1164       | -                       | -          | -          |
| #10-16                          | PMTH       | 0.437                        | -  | 354        | 472        | 852                     | 1065       | 1278       | -                       | -          | -          |
| #10-16                          | PPH        | 0.411                        | -  | 333        | 444        | 801                     | 1002       | 1202       | -                       | -          | -          |
| #12-14                          | HWH        | 0.415                        | -  | -          | -          | 809                     | 1012       | 1214       | 1504                    | 2263       | -          |
| #12-14                          | PMTH       | 0.437                        | -  | -          | -          | 852                     | 1065       | 1278       | 1584                    | 2383       | -          |
| #12-24                          | HWH        | 0.415                        | -  | -          | -          | -                       | -          | -          | -                       | 2263       | 3009       |
| #14-14                          | HWH        | 0.500                        | -  | -          | -          | -                       | 1219       | 1463       | 1813                    | 2726       | -          |
| <b>DESIGN STRENGTH (LRFD)</b>   |            |                              |  |            |            |                         |            |            |                         |            |            |
| #8-18                           | PMTH       | 0.437                        | 442  | 531        | 708        | 1278                    | 1598       | -          | -                       | -          | -          |
| #10-16                          | HWH        | 0.399                        | -  | 484        | 645        | 1164                    | 1455       | 1746       | -                       | -          | -          |
| #10-16                          | PMTH       | 0.437                        | -  | 531        | 708        | 1278                    | 1598       | 1917       | -                       | -          | -          |
| #10-16                          | PPH        | 0.411                        | -  | 499        | 666        | 1202                    | 1503       | 1803       | -                       | -          | -          |
| #12-14                          | HWH        | 0.415                        | -  | -          | -          | 1214                    | 1517       | 1821       | 2257                    | 3394       | -          |
| #12-14                          | PMTH       | 0.437                        | -  | -          | -          | 1278                    | 1598       | 1917       | 2376                    | 3574       | -          |
| #12-24                          | HWH        | 0.415                        | -  | -          | -          | -                       | -          | -          | -                       | 3394       | 4513       |
| #14-14                          | HWH        | 0.500                        | -  | -          | -          | -                       | 1828       | 2194       | 2719                    | 4089       | -          |

For SI: 1 inch = 25.4 mm, 1 lb = 4.4 N, 1 ksi = 6.895 MPa.

Table 3 Notes:

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

<sup>2</sup>The allowable pull-over capacity for other member thicknesses can be determined by interpolation within the table for the values that have the same steel tensile strength, F<sub>u</sub>.

**TABLE 4—CONNECTION SHEAR STRENGTH LIMITED BY TILTING AND BEARING FOR SCREWS USED IN ENGINEERED STEEL-TO-STEEL CONNECTIONS<sup>1</sup> (lbf)**

| DESIGNATION                     | HEAD STYLE         | NOMINAL SCREW DIAMETER (inch) | MINIMUM TENSILE STRENGTH AND DESIGN THICKNESS OF STEEL MEMBER <sup>2</sup> |            |            |                         |            |            |                         |            |            |
|---------------------------------|--------------------|-------------------------------|--|------------|------------|-------------------------|------------|------------|-------------------------|------------|------------|
|                                 |                    |                               | F <sub>u</sub> = 45 ksi  |            |            | F <sub>u</sub> = 65 ksi |            |            | F <sub>u</sub> = 58 ksi |            |            |
|                                 |                    |                               | 0.030 inch   | 0.036 inch | 0.048 inch | 0.060 inch              | 0.075 inch | 0.090 inch | 0.125 inch              | 0.188 inch | 0.250 inch |
| <b>ALLOWABLE STRENGTH (ASD)</b> |                    |                               |  |            |            |                         |            |            |                         |            |            |
| #8-18                           | PMTH               | 0.164                         | 136  | 141        | 318        | -                       | -          | -          | -                       | -          | -          |
| #10-16                          | HWH<br>PMTH<br>PPH | 0.190                         | -  | 153        | 318        | 579                     | 673        | -          | -                       | -          | -          |
| #12-14                          | HWH<br>PMTH        | 0.216                         | -  | -          | 318        | 579                     | 683        | 704        | -                       | -          | -          |
| #12-24                          | HWH                | 0.216                         | -  | -          | -          | -                       | -          | -          | 653                     | 914        | 917        |
| #14-14                          | HWH                | 0.250                         | -  | -          | -          | 606                     | 895        | 1018       | -                       | -          | -          |
| <b>DESIGN STRENGTH (LRFD)</b>   |                    |                               |  |            |            |                         |            |            |                         |            |            |
| #8-18                           | PMTH               | 0.164                         | 214  | 226        | 508        | -                       | -          | -          | -                       | -          | -          |
| #10-16                          | HWH<br>PMTH<br>PPH | 0.190                         | -  | 245        | 508        | 919                     | 1070       | -          | -                       | -          | -          |
| #12-14                          | HWH<br>PMTH        | 0.216                         | -  | -          | 508        | 926                     | 1092       | 1126       | -                       | -          | -          |
| #12-24                          | HWH                | 0.216                         | -  | -          | -          | -                       | -          | -          | 1045                    | 1463       | 1468       |
| #14-14                          | HWH                | 0.250                         | -  | -          | -          | 969                     | 1432       | 1629       | -                       | -          | -          |

For SI: 1 inch = 25.4 mm, 1 lb = 4.4 N, 1 ksi = 6.895 MPa.

<sup>1</sup>For shear connections, the least of the shear connection capacity and fastener shear strength of screws found in [Tables 4](#) and [5](#), respectively, must be used for design.

<sup>2</sup>Thickness of thinner steel member in the connection.

**TABLE 5—FASTENER STRENGTH FOR SCREWS USED IN ENGINEERED STEEL-TO-STEEL CONNECTIONS<sup>1,2</sup> (lbf)**

| DESIGNATION | HEAD STYLE | NOMINAL SCREW DIAMETER | NOMINAL STRENGTH |         | ALLOWABLE STRENGTH DESIGN (ASD) |         | LOAD AND RESISTANCE FACTOR DESIGN (LRFD) |         |
|-------------|------------|------------------------|------------------|---------|---------------------------------|---------|--|---------|
|             |            |                        | Shear            | Tension | Shear                           | Tension | Shear                                    | Tension |
| #10-16      | HWH        | 0.190                  | 1934             | 3102    | 645                             | 1034    | 967                                      | 1551    |
| #12-14      |            | 0.216                  | 2089             | 4129    | 696                             | 1376    | 1045                                     | 2065    |
| #12-24      |            | 0.216                  | 2546             | 4156    | 849                             | 1385    | 1273                                     | 2078    |
| #14-14      |            | 0.250                  | 3288             | 4307    | 1096                            | 1436    | 1644                                     | 2154    |
| #8-18       | PMTH       | 0.164                  | 1523             | 2051    | 508                             | 684     | 762                                      | 1026    |
| #10-16      |            | 0.190                  | 1934             | 3102    | 645                             | 1034    | 967                                      | 1551    |
| #12-14      |            | 0.216                  | 2089             | 4129    | 696                             | 1376    | 1045                                     | 2065    |
| #10-16      | PPH        | 0.190                  | 1934             | 3102    | 645                             | 1034    | 967                                      | 1551    |

For SI: 1 lbf = 4.4 N

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

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

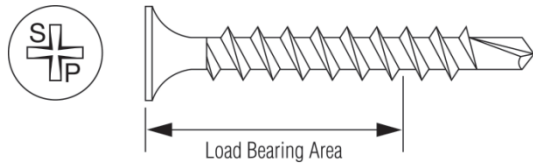


FIGURE 1—D### SCREW

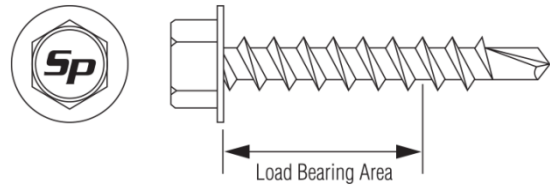


FIGURE 2—H#### SCREW

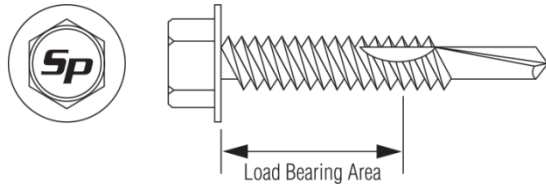


FIGURE 3—H5 AND H5# SCREW

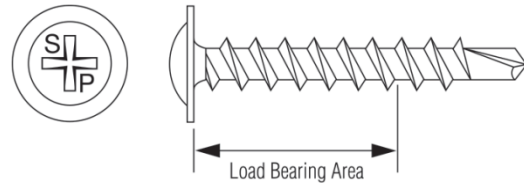


FIGURE 4—M##Z AND M###Z SCREW

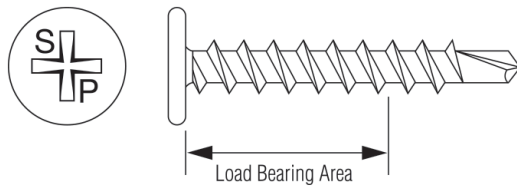


FIGURE 5—PC# AND PC## SCREW