

# ICC-ES Evaluation Report

**ESR-4786**

Reissued July 2022

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Subject to renewal July 2024


This report also contains:

- LABC Supplement

- FBC Supplement

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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>REPORT HOLDER:</b> <b>HILTI, INC.</b></p>	<p><b>EVALUATION SUBJECT:</b> <b>HILTI SELF-DRILLING STAINLESS STEEL SCREWS</b></p>	
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## 1.0 EVALUATION SCOPE

### Compliance with the following codes:

- 2021, 2018, 2015, and 2012 [International Building Code® \(IBC\)](#)
- 2021, 2018, 2015, and 2012 [International Residential Code® \(IRC\)](#)

For evaluation for compliance with codes adopted by [Los Angeles Department of Building and Safety \(LADBS\)](#), see [ESR-4786 LABC and LARC Supplement](#).

### Property evaluated:

Structural

## 2.0 USES

The Hilti Self-drilling Stainless Steel Screws are used to connect miscellaneous building materials to steel base material. For structures regulated under the IRC, the screws may be used when an engineered design is submitted in accordance with IRC Section R301.1.3.

## 3.0 DESCRIPTION

### 3.1 General:

Hilti Self-drilling Stainless Steel Screws are #12 Hex Washer head (HWH) screws that have a self-drilling point and are supplied with a stainless steel washer with an EPDM sealing ring. They are bi-metal screws consisting of a hardened carbon steel tip welded to a stainless steel body which includes the hex head and threads. The tip is formed from carbon steel conforming to the manufacturer's specifications and has a zinc coating. The stainless steel of the screw and washer conforms to SS304 (A2). [Table 1](#) provides screw designations, head diameters, point styles, and drilling ranges. Screws are supplied in boxes of individual screws. See [Figures 1](#) through 3 for depictions of the screws.

### 3.2 Steel Base Material:

Cold-formed framing steel must comply with one of the ASTM specifications noted in A3.1 of AISI S100 (Section A2.1 for the 2015 and 2012 IBC). Base steel thickness must comply with Section B7.1 of AISI S100 (Section A2.4 of AISI S100 for the 2015 and 2012 IBC), and this report.

## 4.0 DESIGN AND INSTALLATION

### 4.1 Design:

**4.1.1 General:** The design values in this report are intended to aid the designer in meeting the requirements of IBC Section 1604.2. Determination of the suitability of a particular screw in this report for the specific

application is the responsibility of the registered design professional and is outside the scope of this report. The registered design professional is responsible for determining the available strengths for the connection, considering all applicable limit states such as pull-over or pull-through, tilting and bearing, etc., and for considering serviceability issues, such as fastener slip. The registered design professional is responsible for determining the required spacing, edge distance and end distance of the screws, based on the characteristics of the steel base material and the attached building material.

**4.1.2 Fastener Shear and Tensile Strength:** Shear and tensile strengths for the Hilti Self-Drilling Stainless Steel Screws are provided in [Table 2](#).

**4.1.3 Pull-out Strength:** Pull-out strengths for the Hilti Self-Drilling Stainless Steel Screws are provided in [Tables 3](#) and [4](#).

#### **4.2 Installation:**

Installation of the Hilti Self-drilling 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. Screw length must be adequate to accommodate the thickness of the connected building material, the thickness of the steel base material and the minimum required protrusion past the back side of the supporting steel base material. The minimum required protrusion dimensions are shown in [Table 1](#). The screw point style must be selected on the basis of the qualified drilling capacity, which is also shown in [Table 1](#). The tabulated drilling capacity refers to the thickness of the supporting steel member. Evaluation of the ability of the screw to self-drill through the attached building material and then into the steel base material is outside the scope of this report.

The required edge distance, end distance and spacing for the attached building material are outside the scope of this report. For the supporting steel base material, screws must be spaced a minimum of 3 times the nominal diameter of the screw and must be located not less than 1.5 times the diameter of the screw from any end or edge of the steel base material.

## **5.0 CONDITIONS OF USE:**

The Hilti Self-drilling Stainless Steel Screws described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** The screws must be installed in accordance with the manufacturer's published installation instructions and this report. If there is a conflict between the manufacturer's published installation instructions and this report, this report governs.
- 5.2** The Hilti Self-drilling Stainless Steel Screws have only been evaluated for fastener strength, quality control and pull-out strength. Evaluation of other applicable limit states for connections of building materials to the steel base material is outside the scope of the report.
- 5.3** Design of the connection of attached material to the steel base material, taking into account the properties of the attached material, must comply with the applicable requirements of the IBC, and be justified to the satisfaction of the code official.
- 5.4** The screws are manufactured under a quality control program with inspection by ICC-ES.

## **6.0 EVIDENCE SUBMITTED**

Data in accordance with the [ICC-ES Acceptance Criteria for Self-drilling Tapping Screws Used to Attach Miscellaneous Building Materials to Steel Base Material \(AC500\)](#), dated December 2017 (editorially revised January 2021).

## **7.0 IDENTIFICATION**

- 7.1** Hilti Self-drilling Stainless Steel Screws are marked with an "H" and "A2" on the top of the heads, as shown in [Figures 1](#) through [3](#). Packages of Hilti Self-drilling Stainless Steel Screws are labeled with the report holder's name (Hilti, Inc.), the model number, and the evaluation report number (ESR-4786).
- 7.2** The report holder's contact information is the following:

**HILTI, INC.**  
**7250 DALLAS PARKWAY, SUITE 1000**  
**PLANO, TEXAS 75024**  
**(800) 879-8000**  
[www.hilti.com](http://www.hilti.com)

TABLE 1—HILTI SELF-DRILLING STAINLESS STEEL SCREWS

MODEL NO.	DESIGNATION (Size – TPI)	NOMINAL SCREW DIAMETER (inch)	NOMINAL SCREW LENGTH (inches)	NOMINAL HEAD DIAMETER (inch)	DRILL POINT (No.)	DRILLING CAPACITY (inch)		MINIMUM REQUIRED PROTRUSION LENGTH (inch)
						Min.	Max.	
S-MD 12-14 x 2 HWH #3 SS304	#12-14	0.216	2	0.415	3	0.04	0.16	0.709
S-MD 12-14 x 2 1/2 HWH #3 SS304			2 1/2		3	0.10	0.24	0.657
S-MD 12-14 x 4 HWH #5 SS304			4		5	0.18	0.59	1.181

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

TABLE 2—HILTI SELF-DRILLING STAINLESS STEEL SCREW STRENGTH<sup>1</sup>

MODEL NO.	SCREW DESIGNATION	NOMINAL STRENGTH (lbf)		ASD STRENGTH (lbf)		LRFD STRENGTH (lbf)	
		Shear	Tension	Shear	Tension	Shear	Tension
S-MD 12-14 x 2 HWH #3 SS304	#12-14	2380	3500	790	1160	1180	1750
S-MD 12-14 x 2 1/2 HWH #3 SS304							
S-MD 12-14 x 4 HWH #5 SS304							

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

<sup>1</sup>The tabulated ASD allowable strength and LRFD design strength values are based on a safety factor,  $\Omega = 3.0$ , and a resistance factor,  $\phi = 0.5$ , respectively, in accordance with AISI S100.

TABLE 3—HILTI SELF-DRILLING STAINLESS STEEL SCREW PULL-OUT STRENGTH<sup>1</sup> (lbf) FOR 45 KSI SUBSTRATE STEEL

MODEL NO.	NOMINAL DIAMETER (inch)	MINIMUM THICKNESS OF SUPPORTING STEEL MEMBER (mil)				
		43	54	68	0.118-inch	0.25-inch
<b>Allowable Strength (ASD)</b>						
S-MD 12-14 x 2 HWH #3 SS304	0.216	110	140	195	390	-
S-MD 12-14 x 2 1/2 HWH #3 SS304						-
S-MD 12-14 x 4 HWH #5 SS304						465
<b>Design Strength (LRFD)</b>						
S-MD 12-14 x 2 HWH #3 SS304	0.216	175	225	310	620	-
S-MD 12-14 x 2 1/2 HWH #3 SS304						-
S-MD 12-14 x 4 HWH #5 SS304						740

For **SI**: 1 inch = 25.4 mm, 1 mil = 0.001 inch = 0.0254 mm, 1 lbf = 4.45 N.

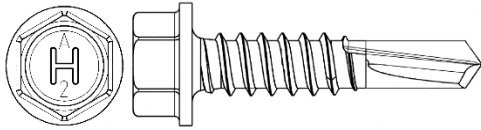
<sup>1</sup>The safety factor,  $\Omega$ , and resistance factor,  $\phi$ , used to determine the ASD and LRFD strengths are based on test results, in accordance with AISI S100.

TABLE 4—HILTI SELF-DRILLING STAINLESS SCREW PULL-OUT STRENGTH<sup>2</sup> (lbf) FOR 65 KSI SUBSTRATE STEEL

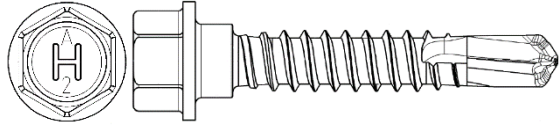
MODEL NO.	NOMINAL DIAMETER (inch)	MINIMUM THICKNESS OF SUPPORTING STEEL MEMBER (mil)				
		43	54	68	0.118-inch	0.25-inch
<b>Allowable Strength (ASD)</b>						
S-MD 12-14 x 2 HWH #3 SS304	0.216	135	155	210	395	-
S-MD 12-14 x 2 1/2 HWH #3 SS304						-
S-MD 12-14 x 4 HWH #5 SS304						670
<b>Design Strength (LRFD)</b>						
S-MD 12-14 x 2 HWH #3 SS304	0.216	220	245	340	630	-
S-MD 12-14 x 2 1/2 HWH #3 SS304						-
S-MD 12-14 x 4 HWH #5 SS304						1070

For **SI**: 1 inch = 25.4 mm, 1 mil = 0.001 inch = 0.0254 mm, 1 lbf = 4.45 N.

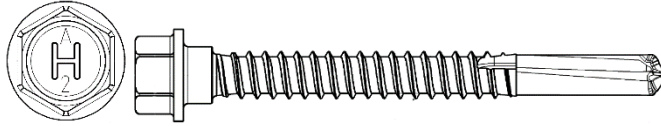
<sup>1</sup>The safety factor,  $\Omega$ , and resistance factor,  $\phi$ , used to determine the ASD and LRFD strengths are based on test results, in accordance with AISI S100.



**FIGURE 1 – S-MD 12-14 x 2 HWH #3 SS304 STAINLESS SELF-DRILLING SCREW**



**FIGURE 2 – S-MD 12-14 x 2 1/2 HWH #3 SS304 STAINLESS SELF-DRILLING SCREW**



**FIGURE 3 - S-MD 12-14 x 4 HWH #5 SS304 STAINLESS SELF-DRILLING SCREW**

**DIVISION: 05 00 00—METALS****Section: 05 05 23—Metal Fastenings****REPORT HOLDER:**

HILTI, INC.

**EVALUATION SUBJECT:**

HILTI SELF-DRILLING STAINLESS STEEL SCREWS

**1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that Hilti Self-drilling Stainless Steel Screws, described in ICC-ES evaluation report [ESR-4786](#), have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

**Applicable code editions:**

- 2023 *City of Los Angeles Building Code* (LABC)
- 2023 *City of Los Angeles Residential Code* (LARC)

**2.0 CONCLUSIONS**

The Hilti Self-drilling Stainless Steel Screws, described in Sections 2.0 through 7.0 of the evaluation report [ESR-4786](#), comply with the LABC Chapter 22, and the LARC and are subject to the conditions of use described in this supplement.

**3.0 CONDITIONS OF USE**

The Hilti Self-drilling Stainless Steel Screws described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-4786](#).
- The design, installation, conditions of use and identification of the self-drilling stainless steel screws are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report [ESR-4786](#).
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.

This supplement expires concurrently with the evaluation report, reissued July 2022 and revised November 2023.

DIVISION: 05 00 00—METALS

Section: 05 05 23—Metal Fastenings

## REPORT HOLDER:

HILTI, INC.

## EVALUATION SUBJECT:

HILTI SELF-DRILLING STAINLESS STEEL SCREWS

## 1.0 REPORT PURPOSE AND SCOPE

## Purpose:

The purpose of this evaluation report supplement is to indicate that Hilti Self-drilling Stainless Steel Screws, described in ICC-ES evaluation report ESR-4786, have also been evaluated for compliance with the codes noted below.

## Applicable code editions:

- 2023 Florida Building Code—Building
- 2023 Florida Building Code—Residential

## 2.0 CONCLUSIONS

The Hilti Self-drilling Stainless Steel Screws, described in Sections 2.0 through 7.0 of ICC-ES evaluation report ESR-4786, comply with the *Florida Building Code—Building* and the *Florida Building Code—Residential*. The design requirements must be determined in accordance with the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable. The installation requirements noted in ICC-ES evaluation report ESR-4786 for the 2021 *International Building Code*® meet the requirements of the *Florida Building Code—Building* or *Florida Building Code—Residential*, as applicable.

Use of the Hilti Self-drilling Stainless Steel Screws for compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code-Building* or the *Florida Building Code-Residential* has not been evaluated, and is outside the scope of this supplemental report.

For products falling under Florida Rule 61G20-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report, reissued July 2022 and revised April 2024.