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# ICC-ES Report

**ESR-1752**

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**REPORT HOLDER:**

## HILTI, INC.

**5400 SOUTH 122ND EAST AVENUE**
**TULSA, OKLAHOMA 74146**

**EVALUATION SUBJECT:**

## HILTI LOW-VELOCITY POWER-DRIVEN FASTENERS

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**ESR-1752***

*Reissued September 2013*

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**REPORT HOLDER:**

**HILTI, INC.**
**5400 SOUTH 122nd EAST AVENUE**
**TULSA, OKLAHOMA 74146**
**800-879-8000**
**www.us.hilti.com**
**HNATechnicalServices@hilti.com**

**EVALUATION SUBJECT:**

**HILTI LOW-VELOCITY POWER-DRIVEN FASTENERS**

## 1.0 EVALUATION SCOPE

**Compliance with the following codes:**

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

**Properties evaluated:**

Structural

## 2.0 USES

Hilti low-velocity power-driven fasteners are used to attach light-gage cold-formed steel framing and architectural, electrical and mechanical components to normal-weight concrete, sand-lightweight concrete, metal deck panels with sand-lightweight concrete fill, concrete masonry units (CMUs) and steel-base materials. The fasteners are alternatives to the cast-in-place anchors described in 2012 IBC Section1908 (2009 and 2006 IBC Section 1911) for placement in concrete; the embedded anchors described in Section 2.1.4 of TMS 402/ACI 530/ASCE 5 (which is referenced in IBC Section 2107) for placement in grouted masonry; and the welds and bolts used to attach materials to steel, described in IBC Sections 2204.1 and 2204.2, respectively. The fasteners may be used where an engineered design is submitted in accordance with IRC Section R301.1.3.

## 3.0 DESCRIPTION

### 3.1 General:

Hilti low-velocity power-driven fasteners are manufactured from hardened steel complying with the manufacturer's quality documentation.

**3.1.1 X-EGN, X-GN and X-GHP:** The X-EGN fastener is a gas-driven fastener for installation into steel. The X-GN fastener is a gas-driven fastener for installation into concrete, CMUs, and concrete-filled metal deck panels. The X-GHP fastener is a gas-driven fastener for installation into steel, concrete, and concrete-filled metal deck panels. All fastener head diameters are 0.268 inch (6.8 mm), and the fasteners have a tapered smooth shank with a nominal diameter at the base of 0.118 inch (3.0 mm). The X-EGN and X-GHP fasteners have a 2-to-10-micron zinc finish, and the X-GN fastener is zinc-plated to ASTM B633, SC1, Type III. The fasteners are collated into plastic strips of ten fasteners each.

**3.1.2 X-C:** The X-C fastener is a powder-actuated fastener for installation into concrete, CMUs, and concrete-filled metal deck panels. X-C fasteners have a shank diameter of 0.138 inch (3.5 mm). The fastener is zinc-plated to ASTM B633, SC1, Type III.

**3.1.3 X-C22P8TH:** The X-C22P8TH fastener is a powder-actuated fastener for installation into concrete and concrete-filled metal deck panels. It has a shank diameter of 0.138 inch (3.5 mm) and is supplied with a premounted steel tophat washer and a plastic washer. The fastener is zinc-plated to ASTM B633, SC1, Type III.

**3.1.4 X-C20 THP:** The X-C20 THP fastener is a powder-actuated fastener for installation into sand-lightweight concrete and concrete-filled metal deck panels. It has a shank diameter of 0.138 inch (3.5 mm) and is supplied with a premounted plastic tophat washer. The fastener is zinc-plated to ASTM B633, SC1, Type III.

**3.1.5 X-S13 THP:** The X-S13 THP fastener is a powder-actuated fastener for installation into steel. It has a shank diameter of 0.145 inch (3.7 mm) and is supplied with a premounted plastic tophat washer. The fastener is zinc-plated to ASTM B633, SC1, Type III.

**3.1.6 X-S16P8TH: The X-S16P8TH fastener is a powder** actuated fastener for installation into steel. It has a shank diameter of 0.145 inch (3.7 mm) and is supplied with a premounted steel tophat washer and a plastic washer. The fastener is zinc-plated to ASTM B633, SC1, Type III.

***Revised December 2014**

**3.2 Materials:**

**3.2.1 Normal-weight Concrete:** Normal-weight concrete must be stone-aggregate and comply with IBC Section 1905 or IRC Section R402.2, as applicable. The minimum concrete compressive strength at the time of fastener installation is noted in Table 2.

**3.2.2 Sand-lightweight Concrete:** Lightweight concrete must be sand-lightweight and must comply with IBC Chapter 19. The minimum concrete compressive strength at the time of fastener installation is noted in Tables 3 and 4.

**3.2.3 Concrete Masonry Units (CMUs):** CMUs must be minimum 8-inch-thick (203 mm), normal-weight or lightweight block, complying with ASTM C90. Mortar must comply with ASTM C270 Type N (minimum) in accordance with 2012 IBC Section 2103.9 (2009 and 2006 IBC Section 2103.8) or IRC Section R607, as applicable. Grouted concrete-masonry construction must be fully grouted and must have a minimum prism strength, $f'_m$, of 1,500 psi (10.3 MPa) at the time of fastener installation. Grout must comply with Article 2.2 of TMS 602/ACI 530.1/ASCE 6, referenced in 2012 IBC Section 2103.13 (2009 and 2006 IBC Section 2103.12) or IRC Section R609.1.1, as applicable, as coarse grout.

**3.2.4 Steel:** Structural steel used in supports must comply with the minimum strength requirements of ASTM A36, ASTM A572 Grade 50 or ASTM A992, as applicable, and must have minimum yield and tensile strengths and thickness as noted in Table 1.

**3.2.5 Steel Deck Panels:** Steel deck panels must comply with a code-referenced material standard and have the minimum thickness and minimum yield strength noted in Tables 3 and 4. See Figures 1 through 3 for panel configuration requirements.

**4.0 DESIGN AND INSTALLATION**

**4.1 Design:**

**4.1.1 Allowable Loads:** The most critical applied loads, excluding seismic load effects, resulting from the load combinations in IBC Section 1605.3.1 or 1605.3.2 must not exceed the allowable loads. For fasteners which are subjected to seismic loads, see Section 4.1.2 for additional information. The allowable tension and shear loads for fasteners installed in structural steel are shown in Table 1. The allowable tension and shear loads with required embedment depths, for fasteners installed in normal-weight concrete, are shown in Table 2. The allowable tension and shear loads for fasteners installed in sand-lightweight concrete are shown in Table 3. The allowable tension and shear loads for fasteners installed through steel deck panels into sand-lightweight concrete fill are shown in Tables 3 and 4. The allowable tension and shear loads with required embedment depths for fasteners installed in hollow and grouted concrete-masonry construction, are shown in Table 5. The stress increases and load reductions described in IBC Section 1605.3 are not allowed for wind loads acting alone or for wind loads combined with gravity loads. No increase is allowed for vertical loads acting alone. Allowable loads apply to the connection of the fastener to the base material only. Design of the connection to the attached material must comply with the applicable requirements of the IBC.

Allowable loads for fasteners subjected to combined shear and tension forces are determined by the following formula:

$$(p/P_a) + (v/V_a) \leq 1$$

where:

p = Actual tension load, lbf (N).

$P_a$ = Allowable tension load, lbf (N).

v = Actual shear load, lbf (N).

$V_a$ = Allowable shear load, lbf (N).

**4.1.2 Seismic Considerations:** The Hilti fasteners are recognized for use when subjected to seismic loads as follows:

1. The Hilti fasteners may be used with nonstructural components listed in Section 13.1.4 of ASCE 7, which are exempt from the requirements of ASCE 7.
2. Concrete base materials: The Hilti fasteners installed in concrete may be used to support distributed systems and distribution systems where the service load on any individual fastener does not exceed the lesser of 90 lbf (400 N) or the allowable load shown in Tables 2, 3 and 4, as applicable.
3. Steel base materials: The Hilti fasteners installed in steel may be used where the service load on any individual fastener does not exceed the lesser of 250 lbf (1112 N) or the allowable load shown in Table 1.
4. For interior, nonstructural walls that are not subject to sustained tension loads and are not a bracing application, the power-driven fasteners may be used to attach steel track to concrete or steel in all Seismic Design Categories. In Seismic Design Categories D, E, and F, the allowable shear load due to transverse pressure shall be no more than 90 pounds (400 N) when attaching to concrete; or 250 pounds (1,112N) when attaching to steel. Substantiating calculations shall be submitted addressing the fastener-to-base-material capacity and the fastener-to-attached-material capacity. Interior nonstructural walls are limited to locations where bearing walls, shear walls or braced walls are not required by the approved plans. The design load on the fastener must not exceed the allowable load established in this report for the concrete or steel base material.

**4.2 Installation:**

The fasteners must be installed in accordance with this report and the Hilti, Inc., published installation instructions. A copy of these instructions must be available on the jobsite at all times during installation. Installation must be limited to dry, interior locations.

Fastener installation requires the use of a low-velocity power-actuated tool in accordance with Hilti, Inc., recommendations. Installers of powder-actuated fasteners must be certified by Hilti, Inc., and have a current, Hilti-issued, operator's license. Installers of gas-driven fasteners do not require an operator's license.

When installation is in steel, minimum spacing between fasteners is 1 inch (25 mm) on center, and minimum edge distance is $^1/_2$ inch (12.7 mm). Unless otherwise noted, when installation is in normal-weight and sand-lightweight concrete, minimum spacing between fasteners is 4 inches (102 mm) on center and minimum edge distance is 3 inches (76 mm). Unless otherwise noted, concrete thickness must be a minimum of three times the embedment depth of the fastener. For concrete masonry units, the minimum fastener spacing is 8 inches (203 mm), and the minimum edge (boundary) distance is 8 inches (203 mm), with no more than one power-driven fastener installed per individual CMU cell.

For fasteners installed into concrete or masonry, the fasteners must not be driven until the concrete or masonry has reached the designated strength.

### 4.3 Connections of Drywall Tracks to Foundation:

Attachment of cold-formed steel tracks to the perimeter of concrete slabs is allowed under the following conditions:

1. No cold joint exists between the slab and foundation below the track.
2. Track is not installed on slabs supported by concrete block foundation walls.

## 5.0 CONDITIONS OF USE

The Hilti low-velocity power-driven fasteners 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 are manufactured and identified in accordance with this report.

**5.2** Fasteners must be installed in accordance with this report and the Hilti, Inc., instructions. In the event of conflict between this report and the Hilti, Inc., published instructions, this report governs.

**5.3** Calculations demonstrating that the actual loads are less than the allowable loads described in Section 4.1 must be submitted to the code official for approval. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is constructed.

**5.4** Refer to Section 4.1.2 for seismic considerations.

**5.5** The use of fasteners attaching cold-formed-steel tracks to foundations must comply with Section 4.3 of this report.

**5.6** The fasteners must be limited to dry, interior locations, which include exterior walls which are protected by an exterior wall envelope.

**5.7** The use of fasteners is limited to installation in uncracked concrete or masonry. Cracking occurs when $f_t > f_r$ due to service loads or deformations.

**5.8** Installers of powder-actuated fasteners must be certified by Hilti, Inc., and have a current, Hilti-issued, operator's license. Installers of gas-driven fasteners do not require an operator's license.

## 6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Fasteners Power-driven in Concrete, Steel, and Masonry Elements (AC70), dated June 2014.

## 7.0 IDENTIFICATION

Hilti low-velocity power-driven fasteners are identified by an "H" imprinted on the fastener head. All fasteners are packaged in containers that bear the fastener type and size, the manufacturer's name (Hilti, Inc.), and the evaluation report number (ESR-1752).

**TABLE 1—ALLOWABLE LOADS FOR FASTENERS DRIVEN INTO STEEL[1,2] (lbf)**

| FASTENER DESCRIPTION | FASTENER | SHANK DIAMETER (INCH) | STEEL THICKNESS (INCH) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1/8 | | 3/16 | | 1/4 | | 3/8 | | 1/2 | | 3/4 | |
| | | | Tension | Shear | Tension | Shear | Tension | Shear | Tension | Shear | Tension | Shear | Tension | Shear |
| Steel Fastener w/Plastic Tophat Washer | X-S13 THP | 0.145 | 140 | 300 | 300 | 450 | 300 | 450 | 300 | 450 | -- | -- | -- | -- |
| Steel Fastener w/Metal Tophat Washer | X-S16P8TH | 0.145 | -- | -- | 225 | 420 | 225 | 430 | 225 | 430 | 225 | 430 | -- | -- |
| Gas Fastener | X-EGN | 0.118 | 140 | 230 | 220 | 245 | 225 | 290 | 280[4] | 330[4] | 280[4] | 330[4] | 280[4] | 330[4] |
| Gas Fastener | X-EGN[3] | 0.118 | -- | -- | 220 | 295 | 260 | 355 | 280[4] | 385[4] | 280[4] | 385[4] | 280[4] | 385[4] |
| Gas Fastener | X-GHP | 0.118 | 125 | 230 | 170 | 245 | 200 | 230 | 250 | 255 | -- | -- | -- | -- |

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

[1]Unless otherwise noted, fasteners must be driven to where the point of the fastener penetrates through the steel base material.
[2]Unless otherwise noted, steel base material must have minimum yield and tensile strengths ($F_y$ and $F_u$) equal to 36 ksi and 58 ksi, respectively.
[3]Steel base material must have minimum yield and tensile strengths ($F_y$ and $F_u$) equal to 50 ksi and 65 ksi, respectively.
[4]For steel base-material thickness greater than or equal to 3/8 inch, fastener point penetration through the steel is not necessary, provided a minimum embedment of 0.320 inch is achieved.

**TABLE 2—ALLOWABLE LOADS FOR FASTENERS DRIVEN INTO NORMAL-WEIGHT CONCRETE[1,2] (lbf)**

| FASTENER DESCRIPTION | FASTENER | DIAMETER (INCH) | EMBEDMENT (INCHES) | CONCRETE COMPRESSIVE STRENGTH | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 2,000 psi | | 4,000 psi | | 6,000 psi | |
| | | | | Tension | Shear | Tension | Shear | Tension | Shear |
| Gas Fastener | X-GN | 0.118 | 3/4 | 95 | 120 | 95 | 120 | -- | -- |
| | | | 1 | 115 | 220 | 115 | 220 | -- | -- |
| Gas Fastener | X-GHP | 0.118 | 5/8 | -- | -- | 50 | 120 | 50 | 90 |
| Standard Fastener | X-C (Black Collated Strip or Guidance Washer) | 0.138 | 3/4 | 45 | 75 | 65 | 105 | 95 | 195 |
| | | | 1 | 85 | 150 | 160 | 200 | 105 | 270 |
| | | | 1 1/4 | 130 | 210 | 270 | 290 | 165 | 325 |
| | | | 1 1/2 | 175 | 260 | 270 | 360 | -- | -- |
| Standard Fastener | X-C (White Collated Strip or Guidance Washer) | 0.138 | 3/4 | 45 | 75 | 60 | 105 | -- | -- |
| | | | 1 | 85 | 150 | 90 | 200 | -- | -- |
| | | | 1 1/4 | 130 | 210 | 130 | 290 | -- | -- |
| Standard Fastener w/Metal Tophat Washer | X-C22 P8TH (Black Collated Strip or Guidance Washer) | 0.138 | 3/4 | 55 | 130 | 90 | 170 | 100 | 200 |
| Standard Fastener w/Metal Tophat Washer | X-C22 P8TH (White Collated Strip or Guidance Washer) | 0.138 | 3/4 | 55 | 130 | 90 | 170 | -- | -- |

For **SI:** 1 inch = 25.4 mm, 1 psi = 6.8948 kPa, 1 pound = 4.4 N.

[1]Fasteners must not be driven until the concrete has reached the designated minimum compressive strength.
[2]Concrete thickness must be a minimum of 3 times the embedment depth of the fastener.

**TABLE 3—ALLOWABLE LOADS FOR FASTENERS INSTALLED IN MINIMUM 3,000 psi LIGHTWEIGHT CONCRETE[1,2] (lbf)**

| FASTENER DESCRIPTION | FASTENER | DIAMETER (INCH) | EMBEDMENT (INCHES) | FASTENER LOCATION | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Installed into Concrete | | Installed Through Steel Deck Panel into Concrete[5] | | | |
| | | | | | | Tension | | Shear | |
| | | | | Tension | Shear | Upper Flute | Lower Flute | Upper Flute | Lower Flute |
| Gas Fastener | X-GN[3] | 0.118 | 3/4 | 115 | 140 | 75 | 85 | 175 | 215 |
| | | | 1 | 170 | 220 | 155 | 160 | 255 | 315 |
| Gas Fastener | X-GHP[3] | 0.118 | 5/8 | 60 | 140 | 60 | 60 | 175 | 215 |
| Standard Fastener | X-C[4] (Black Collated Strip or Guidance Washer) | 0.138 | 3/4 | 120 | 175 | 120 | 95 | 265 | 265 |
| | | | 1 | 180 | 260 | 215 | 155 | 485 | 485 |
| | | | 1 1/4 | 225 | 400 | 250 | 200 | 500 | 500 |
| | | | 1 1/2 | 285 | 400 | 285 | 210 | 555 | 555 |
| Standard Fastener | X-C[4] (White Collated Strip or Guidance Washer) | 0.138 | 3/4 | 110 | 175 | 120 | -- | 265 | 265 |
| | | | 1 | 135 | 180 | 215 | 145 | 485 | 485 |
| | | | 1 1/4 | 220 | 260 | 250 | 200 | 500 | 500 |
| Standard Fastener w/Metal Tophat Washer | X-C22P8TH[4] (Black Collated Strip or Guidance Washer) | 0.138 | 3/4 | 120 | 220 | 120 | 95 | 260 | 260 |
| | X-C22P8TH[4] (White Collated Strip or Guidance Washer) | 0.138 | 3/4 | 110 | 220 | 120 | 60 | 260 | 260 |
| | X-C20 THP[4] | 0.138 | 3/4 | 55 | 110 | -- | 45 | 285 | 285 |

For **SI:** 1 inch = 25.4 mm, 1 psi = 6.8948 kPa, 1 lbf = 4.4 N.

[1]Fasteners must not be driven until the concrete has reached the designated minimum compressive strength.
[2]Unless otherwise noted, concrete thickness must be a minimum of 3 times the embedment depth of the fastener.
[3]Steel deck panel profile must be 3-inch-deep composite floor deck panel with minimum No. 20 gage (0.0359-inch-thick base steel thickness) and minimum yield strength of 38 ksi. Sand-lightweight concrete fill above top of metal deck panel profiles must be 2 1/2 inches thick for the 5/8 and 3/4-inch fastener embedment and 3 1/4 inches for the 1-inch fastener embedment.
[4]The steel deck panel profile must be 3-inch-deep composite floor deck panel, 33 mils thick with a 0.0329-inch base-metal thickness and minimum yield strength of 33 ksi. Lower and upper flute width must be a minimum of 3 7/8 inches. Sand-lightweight concrete fill depth above top of metal deck panel must be a minimum of 3 1/4 inches.
[5]See Figure 1 for nominal flute dimensions, fastener locations, and load orientations. See notes 3 and 4 above for minimum concrete thickness.

**TABLE 4—ALLOWABLE LOADS FOR FASTENERS INSTALLED IN MINIMUM 3,000 psi SAND-LIGHTWEIGHT CONCRETE OVER $1^1/_2$-INCH-DEEP, B-DECK STEEL PANEL[1,2] (lbf)**

| FASTENER DESCRIPTION | FASTENER | DIAMETER (INCH) | EMBEDMENT (INCHES) | FASTENER LOCATION | | | |
|---|---|---|---|---|---|---|---|
| | | | | Installed Through Metal Deck Into Concrete[5] | | | |
| | | | | Tension | | Shear | |
| | | | | Upper Flute | Lower Flute | Upper Flute | Lower Flute |
| Gas Fastener | X-GN[3] | 0.118 | $^3/_4$ | 75 | 85 | 175 | 215 |
| | | | 1 | 155 | 160 | 255 | 315 |
| Gas Fastener | X-GHP[3] | 0.118 | $^5/_8$ | 60 | 60 | 175 | 215 |
| Standard Fastener | X-C[4, 6] | 0.138 | $^3/_4$ | 80 | 80 | 315 | 315 |
| | | | 1 | 205 | 205 | 445 | 445 |
| Standard Fastener w/Metal Tophat Washer | X-C22P8TH[4, 6] | 0.138 | $^3/_4$ | 90 | 110 | 295 | 295 |

For **SI:** 1 inch = 25.4 mm, 1 psi = 6.8948 kPa, 1 lbf = 4.4 N.

[1]Fasteners must not be driven until the concrete has reached the designated minimum compressive strength.
[2]Unless otherwise noted, concrete thickness must be a minimum of 3 times the embedment depth of the fastener.
[3]Steel deck panel profile must be $1^1/_2$-inch-deep, B-type deck panel, minimum No. 20 gage (0.0359-inch-thick base steel thickness) and minimum yield strength of 38 ksi. Sand-lightweight concrete fill above top of metal deck panel profiles must be $2^1/_2$ inches thick for the $^3/_4$-inch fastener embedment and $3^1/_4$ inches for the 1-inch fastener embedment.
[4]The steel deck panel profiles are $1^1/_2$-inch-deep, B-type deck panel with a thickness of 33 mils (0.0329-inch-thick steel) and minimum yield strength of 38 ksi. Fasteners may be installed through steel deck panels having either normal and inverted orientations with minimum lower flute widths of $1^3/_4$ and $3^1/_2$ inches, respectively. Fasteners must be placed at centerline of deck panel flutes. Figures 2 and 3 describe additional flute dimensions, fastener locations and load orientations for both deck panel profiles.
[5]See Figures 2 and 3 for nominal flute dimensions, fastener locations, and load orientations. See note 3 and 4 above for minimum concrete thickness.
[6]Allowable load values apply to fasteners with black or white collated strip or guidance washer.

**TABLE 5—ALLOWABLE LOADS FOR FASTENERS INSTALLED IN CONCRETE MASONRY UNITS (CMU)[1,2,7] (lbf)**

| FASTENER DESCRIPTION | FASTENER | SHANK DIAMETER | MINIMUM EMBEDMENT | HOLLOW CMU | | | | GROUT FILLED CMU | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Face Shell[3] | | Mortar Joint | | Face Shell[3] | | Mortar Joint | | Top of Grouted Cell[5] | |
| | | | | Tension | Shear[6] | Tension | Shear[4] | Tension | Shear[6] | Tension | Shear[4] | Tension | Shear[6] |
| Gas Fastener | X-GN | 0.118 | $^3/_4$ | 90 | 115 | 65 | 55 | 95 | 120 | 70 | 85 | 65 | 90 |
| | | | 1 | 115 | 130 | 70 | 65 | 130 | 140 | 85 | 120 | 75 | 95 |
| Standard Fastener | X-C[8] | 0.138 | $^3/_4$ | 40 | 85 | 15 | 50 | 85 | 85 | 45 | 85 | -- | -- |
| | | | 1 | -- | -- | -- | -- | -- | -- | -- | -- | 115 | 175 |

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

[1]See Section 3.2.3 for CMU, mortar and grout requirements.
[2]No more than one fastener may be installed in an individual masonry unit cell.
[3]Fastener can be located anywhere on the face shell.
[4]Shear direction can be horizontal or vertical (bed joint or head joint) along the CMU wall plane.
[5]Fastener located in center of grouted cell installed vertically.
[6]Shear can be in any direction.
[7]Fasteners must be installed a minimum of 8 inches from the end of the wall. Multiple fasteners in a bed joint must be spaced a minimum of 8 inches.
[8]Allowable load values apply to fasteners with black or white collated strip or guidance washer.

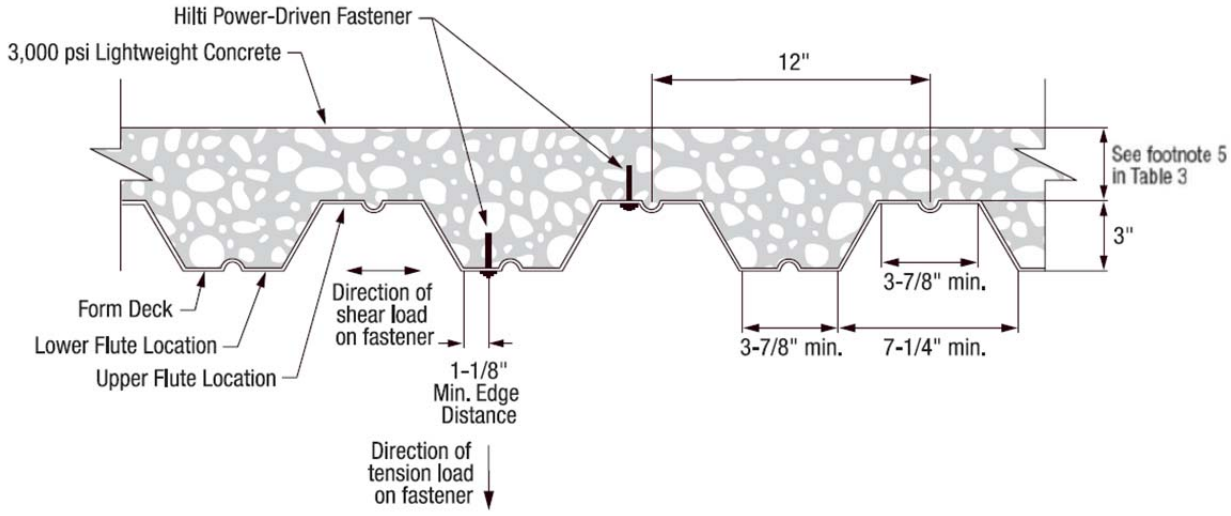



**FIGURE 1—HILTI FASTENER LOCATIONS IN 3-INCH-DEEP COMPOSITE FLOOR DECK PANEL**

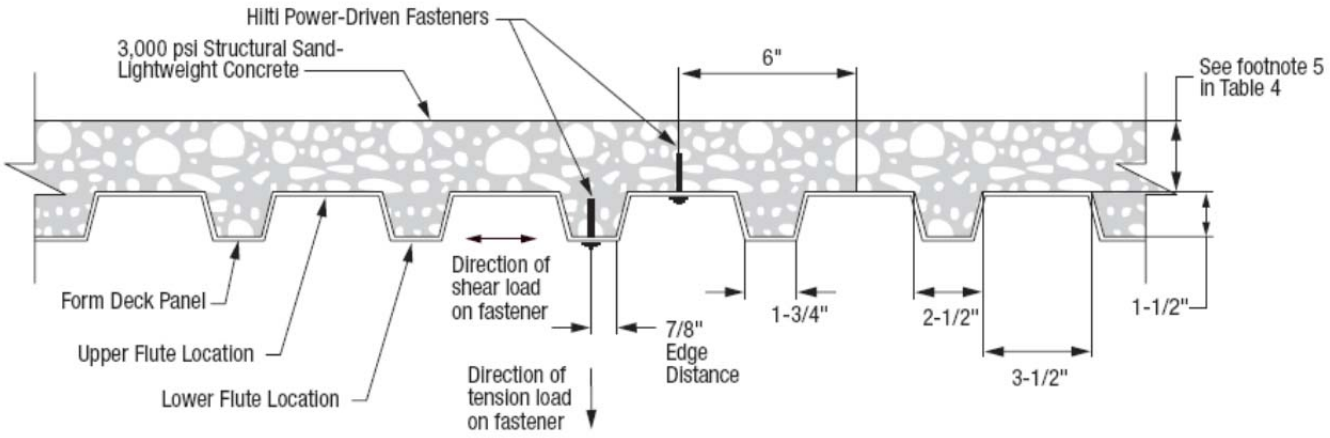
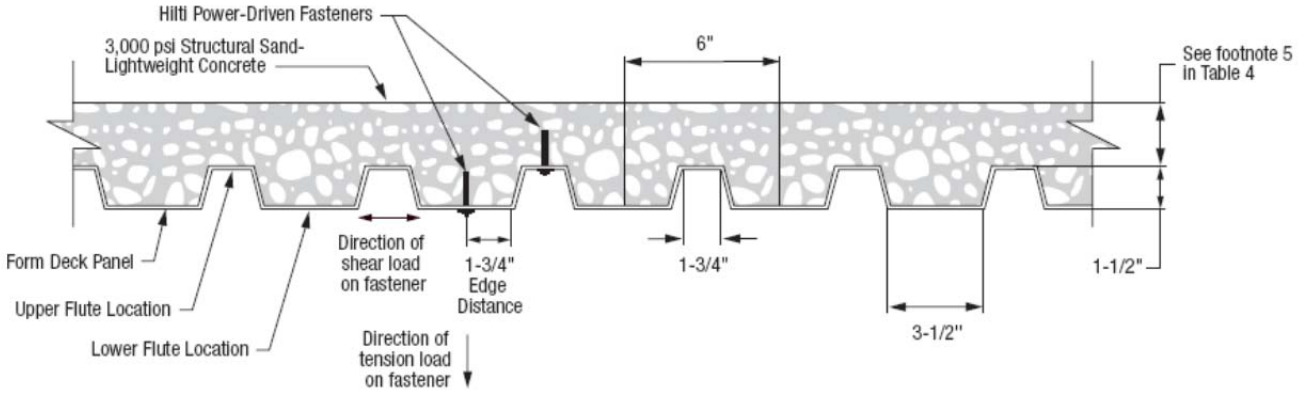



**FIGURE 2—HILTI FASTENER LOCATIONS IN $1^1/_2$-INCH-DEEP COMPOSITE FLOOR DECK PANEL**




For **SI:** 1 inch = 25.4 mm, 1 psi = 6895 Pa.

**FIGURE 3—HILTI FASTENER LOCATIONS IN $1^1/_2$-INCH-DEEP COMPOSITE FLOOR DECK PANEL, INVERTED DECK PANEL PROFILE ORIENTATION**

# ICC-ES Evaluation Report

# ESR-1752 FBC Supplement*

*Reissued September 2013*
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**Section: 09 22 16.23—Fasteners**

**REPORT HOLDER:**

**HILTI, INC.**
**5400 SOUTH 122ND EAST AVENUE**
**TULSA, OKLAHOMA 74146**
**(800) 879-8000**
**www.us.hilti.com**
**HNATechnicalServices@hilti.com**

**EVALUATION SUBJECT:**

**HILTI LOW-VELOCITY POWER-DRIVEN FASTENERS**

## 1.0 REPORT PURPOSE AND SCOPE

**Purpose:**

The purpose of this evaluation report supplement is to indicate that the Hilti Low-Velocity Fasteners, recognized in ICC-ES master report ESR-1752, have also been evaluated for compliance with the codes noted below.

**Applicable code editions:**

- 2010 *Florida Building Code—Building*
- 2010 *Florida Building Code—Residential*

## 2.0 CONCLUSIONS

The Hilti Low-velocity Power-Driven Fasteners, described in Sections 2.0 through 7.0 of the master report ESR-1752, comply with the 2010 *Florida Building Code—Building* and the 2010 *Florida Building Code—Residential*, provided the design and installation are in accordance with the *International Building Code®* provisions noted in the master report, and the following additional conditions apply:

- Design wind loads must be based on Section 1609 of the 2010 *Florida Building Code—Building* or Section 301.2.1.1 of the 2010 *Florida Building Code—Residential*, as applicable.
- Load combinations must be in accordance with Section 1605.2 or Section 1605.3 of the 2010 *Florida Building Code—Building*, as applicable.

Use of the Hilti fasteners has also been found to be in compliance with the High-Velocity Hurricane Zone provisions of the 2010 *Florida Building Code—Building* and the 2010 *Florida Building Code—Residential* under the following conditions:

- Design wind loads must be based on Section 1620 of the *Florida Building Code—Building.*

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- The fasteners have not been evaluated for use as cast-in-place anchors for compliance with the High-velocity Hurricane Zone provisions and this use is outside the scope of this evaluation report.

For products falling under Florida Rule 9N-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 master report reissued August 2013, revised December 2014.