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Hilti, Inc.
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Tulsa, OK 74146

Attn: Hilti Technical Services
(877) 749-6337

RESEARCH REPORT: RR 25974
(CSI #050523)

BASED UPON ICC-ES EVALUATION
REPORT NO. ESR- 3592

REEVALUATION DUE

DATE: March 1, 2017

Issued Date: March 1, 2015

Code: 2014 LABC

GENERAL APPROVAL – Reevaluation - Hilti X-HSN 24 Powder-Driven Fasteners for Attachment of Steel Deck Diaphragms

DETAILS

The above products are approved when in compliance with the use, description, design, installation, conditions of use, and identification in ICC-ES Report No. ESR-3592, reissued December 1, 2014 of the ICC Evaluation Service, LLC. The report, in its entirety, is attached and made a part of this general approval.

The approval is subject to the following conditions:

1. Steel metal deck profiles using X-HSN24 fasteners shall have a Los Angeles Research Report and an accompanying Evaluation Report. Shear capacity and diaphragm stiffness of a given metal diaphragm shall be in accordance with the respective steel metal deck Los Angeles Research Report and attached Evaluation Report.
2. In accordance with Section 4.0 of the attached ESR-3592, Hilti X-HSN 24 Powder-Driven Fasteners may be used in lieu of the Hilti X-ENDK22 THQ12 or X-EDN19 THQ12 fasteners in steel metal deck diaphragms. The conditions in the respective steel metal deck Los Angeles Research Report, as well as the conditions under Los Angeles Research Reports 25296 and 25877 shall be followed.

Hilti, Inc.

RE: Hilti X-HSN 24 Powder-Driven Fasteners for Attachment of Steel Deck Diaphragms

DISCUSSION

The clerical modification is to update contact name and phone number

This report is in compliance with the 2014 City of Los Angeles Building Code.

The approval is based on tests and analyses in accordance with ICC-ES AC43 and AC70, dated October 2010 and May 2013 respectively.

This general approval will remain effective provided the Evaluation Report is maintained valid and unrevised with the issuing organization. Any revision to the report must be submitted to this Department for review with appropriate fee to continue the approval of the revised report.

Addressee to whom this Research Report is issued is responsible for providing copies of it, complete with any attachments indicated, to architects, engineers and builders using items approved herein in design or construction which must be approved by Department of Building and Safety Engineers and Inspectors.

This general approval of an equivalent alternate to the Code is only valid where an engineer and/or inspector of this Department has determined that all conditions of this Approval have been met in the project in which it is to be used.

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EB
RR25974
R02/23/15
2209

Attachments: ICC-ES Evaluation Report No. ESR-3592 (2 Pages).

ICC-ES Evaluation Report**ESR-3592**

Reissued December 2014

This report is subject to renewal December 2016.www.icc-es.org | (800) 423-6587 | (562) 699-0543

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DIVISION: 05 00 00—METALS
Section: 05 05 23—Metal Fastenings
Section: 05 31 00—Steel Decking

REPORT HOLDER:

HILTI, INC
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www.us.hilti.com

EVALUATION SUBJECT:**STEEL DECK DIAPHRAGMS ATTACHED WITH HILTI
X-HSN 24 POWDER-DRIVEN FRAME FASTENERS****1.0 EVALUATION SCOPE****Compliance with the following codes:**2012, 2009 and 2006 *International Building Code*® (IBC)**Properties evaluated:**

Structural

2.0 USES

The Hilti X-HSN 24 powder-driven frame fasteners are used as equivalent alternatives to Hilti's X-EDNK22 THQ12 and X-EDN19 THQ12 frame fasteners for the attachment of steel deck roof and floor panels to supporting steel framing.

3.0 DESCRIPTION

The X-HSN 24 fasteners are manufactured from hardened carbon steel with an electroplated zinc coating complying with ASTM B633, SC 1, Type III. The fasteners are 0.960 inch (24.4 mm) long, with a 0.157-inch-diameter (4.0 mm), fully knurled tip and tapered shank. The X-HSN 24 fasteners have a dome-style head and a premounted 0.472-inch-diameter (12 mm) steel top hat washer with red plastic collation strip. Table 1 provides a depiction of the Hilti X-HSN 24 powder-driven fastener and the corresponding base steel material application limits.

4.0 DESIGN AND INSTALLATION

Allowable diaphragm shear values and stiffness values (calculated or tabulated) for steel deck roof and floor diaphragms using Hilti's X-EDNK22 THQ12 or X-EDN19 THQ12 frame fasteners are provided in ICC-ES AC43 evaluation reports for steel deck roof and floor diaphragms issued to Hilti, Inc., and other ICC-ES evaluation report holders. The allowable diaphragm shear values and

stiffness values found in these reports for Hilti's X-EDNK22 THQ12 or X-EDN19 THQ12 frame fasteners may be used for the X-HSN 24 frame fasteners provided all other components of the steel deck roof and floor diaphragm system remain the same as described in the applicable ICC-ES AC43 evaluation report. Installation details for the X-HSN 24 frame fastener are provided in Table 1.

Allowable tension pullout and pullover capacities for the X-HSN 24 fastener are provided in Tables 2 and 3, respectively, and may be used in place of the pullout and pullover capacities listed for the X-EDNK22 THQ12 or X-EDN19 THQ12 in the applicable ICC-ES evaluation report, for the purpose of determining uplift resistance for bare roof deck.

5.0 CONDITIONS OF USE

Steel deck diaphragms comprised of steel deck panels attached to steel supports with Hilti X-HSN 24 powder-driven fasteners, as described in this report, comply with those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** The conditions of use stated in other ICC-ES evaluation reports specifying Hilti's X-EDNK22 THQ12 or X-EDN19 THQ12 fasteners must be adhered to, as applicable.
- 5.2** The X-HSN 24 fasteners are manufactured, identified, and installed in accordance with this report, the manufacturer's installation instructions and approved plans. If there is a conflict, this report governs.
- 5.3** Calculations demonstrating compliance with this report 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 to be constructed.
- 5.4** Hilti fasteners may be used for attachment of steel deck roof systems temporarily exposed to the exterior during construction prior to application of built-up roof covering systems. The fasteners on permanently exposed steel deck roof coverings must be covered with a corrosion-resistant paint or sealant that is subject to the approval of the building official.

6.0 EVIDENCE SUBMITTED


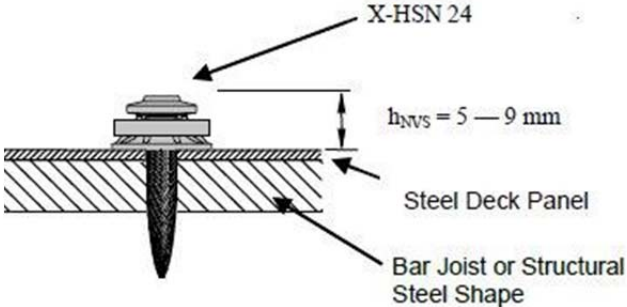
- 6.1** Data in accordance with the ICC-ES Acceptance Criteria for Steel Deck Roof and Floor Systems (AC43), dated October 2010 (editorially revised September 2013).

- 6.2 Data in accordance with the ICC-ES Acceptance Criteria for Fasteners Power-driven into Concrete, Steel and Masonry Elements (AC70), dated February 2013.
- 6.3 Data on side-by-side comparison testing between the X-HSN 24 fastener and the X-EDNK22 THQ12 and X-EDN19 THQ12 fasteners.

7.0 IDENTIFICATION

The Hilti X-HSN 24 powder-driven fastener described in this report is identified by an “H” stamped on the fastener head and by a red plastic collation strip. All fasteners are packaged in containers noting the product designation, the company name of Hilti and the evaluation report number (ESR-3592).

TABLE 1—X-HSN 24 FRAME FASTENER INSTALLATION GUIDE

STEEL SUPPORT FRAMING THICKNESS (t_f) ^{1,2}	FASTENER TYPE	NAIL HEAD STANDOFF (h_{NVS})
Bar Joist or Structural Steel Shape with $\frac{1}{8}$ inch $\leq t_f \leq \frac{3}{8}$ inch	 X-HSN 24	 $h_{NVS} = 5 - 9$ mm Steel Deck Panel Bar Joist or Structural Steel Shape

For SI: 1 inch = 25.4 mm, 1 ksi = 6.89 Mpa

¹Steel support framing tensile strength (f_u) must be less than 91 ksi for base steel thicknesses (t_f) of $\frac{5}{16}$ inch or less. Steel support framing tensile strength (f_u) must be less than 75 ksi for base steel thicknesses (t_f) greater than $\frac{5}{16}$ inch.

²Steel support framing must be manufactured from code-compliant steel meeting the minimum strength requirements of ASTM A36, ASTM A572 Grade 50, or ASTM A992.

TABLE 2—ALLOWABLE (ASD) TENSION PULLOUT LOADS TO RESIST UPLIFT LOADS FOR STEEL DECKS ATTACHED WITH X-HSN 24 FASTENERS (lbf)¹

FASTENER	STEEL SUPPORT FRAMING THICKNESS ² (inch)				
	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$
X-HSN 24	ASTM A36, ASTM A572 Grade 50 or ASTM A992				
	435	635	750	750	750

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

¹Tabulated allowable (ASD) values based upon a Ω safety factor of 5.0. To obtain LRFD pullout capacities, multiply tabulated values by 1.6.

²Steel support framing must be as described in Table 1.

TABLE 3—ALLOWABLE (ASD) TENSION PULLOVER LOADS TO RESIST UPLIFT LOADS FOR STEEL DECKS ATTACHED WITH X-HSN 24 FASTENERS (lbf)¹

FASTENER	STEEL SUPPORT FRAMING THICKNESS ² (inch)	DECK PANEL DESIGN THICKNESS ³ (gage/inch)			
		22 (0.0295)	20 (0.0358)	18 (0.0474)	16 (0.0598)
X-HSN 24	$\geq \frac{1}{8}$ $\leq \frac{3}{8}$	500	560	725	865

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

¹Tabulated allowable (ASD) values are based upon a Ω safety factor of 3.0. To obtain LRFD pullout capacities, multiply tabulated values by 1.6.

²Steel support framing must be as described in Table 1.

³Steel decks must have minimum yield strength of 33 ksi.