1.0 RECOGNITION

The Shearflex® Standoff Screw recognized in this report has been evaluated for use as a shear connector at the interface of a composite steel joist and a concrete floor slab to transfer longitudinal shear forces between the composite steel joist and concrete slab to ensure the composite steel joist and concrete floor slab act as a composite member. The structural and dimensional properties of the Shearflex® Standoff Screw were evaluated for compliance with the following codes:

- 2019 California Building Code (CBC) –attached Supplement

The Shearflex® Standoff Screw has been evaluated in accordance with IAPMO EC-023.

2.0 LIMITATIONS

Use of the Shearflex® Standoff Screw described in this report is subject to the following limitations:

2.1 The Shearflex® Standoff Screw is to be used only as part of the Nucor Vulcraft / Verco Group Ecospan® Composite Floor System.

2.2 This evaluation report only addresses a method of shear transfer that is an alternative to the IBC prescribed under the auspices of the Steel Joist Institute's Standard Specifications for Composite Steel Joists (SJI 200-2015), effective August 1, 2016, Section 4.5.4, welded stud shear connectors, which are used to develop composite action between a structural concrete slab and the supporting steel joists to resist bending induced by vertical loads. Conformance with other aspects of the code, such as requirements for a complete structural system and fire resistance ratings, is outside of the scope of the evaluation report.

2.3 Use of the Shearflex® Standoff Screw as part of the lateral force-resisting system (wind or seismic) has not been evaluated and is beyond the scope of this report.

2.4 Composite Steel Joists shall comply with SJI 200-2015 under the 2018 IBC or SJI-CJ-2010 under the 2015 and 2012 IBC. The top chord of the composite steel joists shall be fabricated from steel conforming to:

- ASTM A242/A242M Grade 50 minimum
- ASTM A529/A529M Grade 50 minimum
- ASTM A572/A572M Grade 50 minimum
- ASTM A588/A588M Grade 50 minimum
- ASTM A992/A992M Grade 50 minimum

2.5 The thickness of the steel joist top chord shall not be less than 0.109 inches (2.77 mm) nor greater than 0.313 inches (7.95 mm).

2.6 The concrete slab may be supported by cold-formed steel decking or may be formed to span directly between the supporting steel joists. When cold-formed steel decking is used, the minimum thickness of the concrete slab above the deck shall be two inches (50.8 mm).

2.7 Steel deck panels permitted to be used with Shearflex® Standoff Screw are:

- 1-5/16 inch (33.3 mm) (Deep) VERCOR® PLB®, HSB®, PLBTM FORMLOK®, B FORMLOK®, BR FORMLOK® as manufactured by Verco Decking, Inc., a Nucor Company. Verco's steel deck panels have been evaluated in IAPMO ER 0217.
- 1.0C, 1.5C Inverted, 1.5B, 1.5PLB™, 1.5VL, 1.5VLI, 1.5PLVLI, 1.5VLP, 1.5C, and 1.5VLR as manufactured by Vulcraft, a Division of Nucor Corporation. Vulcraft's steel deck panels are evaluated in ICC-ES ESR 1227.

2.8 Concrete shall comply with IBC Chapter 19, ACI 318, and SJI 200-2015 under the 2018 IBC or SJI-CJ-2010 under the 2015 and 2012 IBC. For the determination of available strength, concrete shall have a compressive strength, \( f'_c \), of not less than 3 ksi (20.7 MPa) nor more than 10 ksi (68.9 MPa) for normal weight concrete and not less than 3 ksi (20.7 MPa) nor more than 6 ksi (41.3 MPa) for structural lightweight concrete.

2.9 The Shearflex® Standoff Screw is manufactured under a quality control program with inspections by IAPMO Uniform ES.
3.0 PRODUCT USE

3.1 General: Calculations and details showing that the fasteners and the composite connections are adequate to resist the applied loads shall be submitted to the building official for approval. The calculations shall be signed and sealed by a registered design professional, when required by the statutes of the jurisdiction in which the project is to be constructed.

3.2 Design

3.2.1 The nominal strength, Qn, and nominal slip capacity, Sn, for the Shearflex® Standoff Screw are provided in Table 1 of this report for combinations of screw size and deck panel type.

3.2.2 The nominal strength for the Shearflex® Standoff Screw and the connections made with the Shearflex® Standoff Screw are not permitted to be increased for short-duration loads.

3.2.3 The ductility of the Shearflex® Standoff Screw shall be considered in the design of composite joists.

3.2.4 The Shearflex® Standoff Screw shall be designed using the nominal strength as established in this report as an alternative to the SJI 200-2015 under the 2018 IBC or SJI-CJ-2010, Section 103.6(d) under the 2015 and 2018 IBC.

3.3 Installation: The Shearflex Standoff Screw shall be installed in accordance with Vulcraft / Verco's installation instructions, 2016v2.0, and this report. The Shearflex® Standoff Screw shall be located in accordance with the approved construction documents. In the event of a conflict between this report and the manufacturer’s published installation instructions, the more restrictive shall govern.

3.3.1 A copy of the Shearflex® Standoff Screw installation instructions, 2016v2.0, shall be supplied with the delivery of the Shearflex® Standoff Screw.

3.3.2 The Shearflex® Standoff Screw shall be installed only with the Nucor Vulcraft / Verco Group Shearset® tool.

3.3.3 The Shearflex® Standoff Screw shall be installed with an end distance and an edge distance not less than 3/8 inch (9.5 mm) as measured from the longitudinal centerline of the screw.

4.0 PRODUCT DESCRIPTION

Shearflex® Standoff Screws are manufactured from steel conforming to SAE 4037 through-hardened to a Rockwell C of 30 to 35. Shearflex® Standoff Screws are manufactured with a thread diameter of 3/8 inch (9.5 mm) and lengths of 2½ and 3 inches (63.5 and 76.2 mm). As shown in Figure 1 of this report, the "Thread Diameter" of the screw references the diameter of the threaded portion of the fastener. The length of the Shearflex® Standoff Screw references the distance from the underside of the steel deck clamping collar to the top of the fastener head. Figure 1 of this report includes a typical profile.

Shearflex® Standoff Screws are manufactured by:

Elco Construction Products
Stanley Black and Decker Company
1301 Kerr Drive
Decorah, Iowa 52101
(800) 435-7213
www.elcoconstruction.com
infoElco@infastech.com

5.0 IDENTIFICATION

Shipping containers for the Shearflex® Standoff Screws are identified by the Elco Construction Products name, trademark, part description, part drawing number, and evaluation report number (ER-366). The Shearflex® Standoff Screws shall contain the Nucor headstamp "N" as shown in Figure 1 of this report. The Shearflex® Standoff Screws identification may also include the IAPMO Uniform Evaluation Service Mark of Conformity, either of which may also be used as shown below:

6.0 SUBSTANTIATING DATA


6.2 Test reports submitted are from laboratories in compliance with ISO/IEC 17025.

7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research completed by IAPMO Uniform Evaluation Service on the Shearflex® Standoff Screw to assess their conformance to the codes shown in Section 1.0 of this report and serves as documentation of the product’s certification.

For additional information about this evaluation report please visit www.uniform-es.org or email us at info@uniform-es.org
**TABLE 1**

<table>
<thead>
<tr>
<th>Screw Designation</th>
<th>Thread Diameter (in.)</th>
<th>Screw Length (in.)</th>
<th>Steel Deck Panel</th>
<th>Q&lt;sub&gt;n&lt;/sub&gt;, Nominal Shear Strength (lbs) / S&lt;sub&gt;n&lt;/sub&gt;, Nominal Slip Capacity (in.)</th>
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<tr>
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<td>Vulcraft - SC, NE, TX 1.0C&lt;sup&gt;®&lt;/sup&gt;</td>
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<td>Shearflex® Standoff Screw</td>
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<td>Vulcraft 1.5C Inverted, 1.5B, 1.5BI, 1.5PLB™, 1.5VL, 1.5VLI, 1.5PLVLI™, and 1.5VLP Verco PLB™, HSBB™, PLB™ FORMLOK, B FORMLOK™</td>
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</table>

1) Minimum $f'_c = 3$ ksi.
2) The nominal shear strengths and nominal slip capacities shown in Table 1 of this report are based on testing of the Shearflex® in lightweight concrete. Normal weight concrete will provide equivalent or greater nominal shear strengths.
3) $Q_n$ and $S_n$ values for structural support thicknesses between those shown in the above table may be determined via linear interpolation.
4) $Q_n$ values shown are based on a maximum of one Shearflex® Standoff Screw per steel deck rib with the fastener installed at the center of the steel deck rib.
5) When $Q_n$ values shown above are utilized in the design of composite steel joists, $\phi$ shall be as stipulated per the SJI 200-2015 or SJI-CJ-2010.
6) As manufactured by Vulcraft South Carolina, Vulcraft Nebraska, or Vulcraft Texas.
7) As manufactured by Vulcraft Alabama, Vulcraft New York, or Vulcraft Indiana.
CALIFORNIA SUPPLEMENT

VULCRAFT NATIONAL ACCOUNTS
6230 Shiloh Road, Suite 140
Alpharetta, Georgia 30005
(888) 375-9787; (678) 965-6667
www.nucor.com

SHEARFLEX® STANDOFF SCREW

CSI Section:

- 05 00 00 Metals
- 05 05 23 Metal Fastenings
- 05 21 00 Steel Joist Framing
- 05 26 00 Composite Joist Assemblies
- 05 31 00 Steel Decking

1.0 SCOPE OF EVALUATION

1.1 Compliance with the following codes

- 2019 California Building Code (CBC)

2.0 RECOGNITION

The Shearflex® Standoff Screw evaluated in IAPMO UES ER-366 and this supplement complies with the CBC, subject to the additional requirements in Section 3.0 of this supplement.

3.0 ADDITIONAL REQUIREMENTS

3.1 Special Inspections are required in accordance with CBC Sections 1705.2 and 1705A.2, Steel Construction; and CBC Sections 1705.3 and 1705A.3, Concrete Construction.

3.2 Structural Observation is required in accordance with CBC Sections 1704.6 and 1704A.6, as applicable.

3.3 Concrete tests and materials shall comply with CBC Sections 1903, 1909.2, 1903A, and 1910A, as applicable.

3.4 As applicable for Department of Health Care Access and Information--HCAi (formerly OSHPD) and DSA projects, in accordance with CBC Section 2210A.1.1.2, the minimum base steel thickness of the steel deck shall be 0.0359 inches (0.9 mm), except under DSA only, for single-story open structures, where the steel deck is not used as a diaphragm and there are no suspended hangers or bracing for nonstructural components attached to the deck.

3.5 This supplement expires concurrently with ER-0366.

For additional information about this evaluation report please visit www.uniform-es.org or email us at info@uniform-es.org