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This report also contains:

- City of LA Supplement
- CA Supplement w/ DSA and OSHPD

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DIVISION: 03 00 00—CONCRETE **Section: 03 15 19—Cast-in Concrete Anchors** **Section: 03 16 00—Concrete Anchors**	**REPORT HOLDER:** **TOMARCO CONTRACTOR SPECIALTIES, INC. dba ISAT dba CEAS** **ADDITIONAL LISTEE:** **CEAS**	**EVALUATION SUBJECT:** **ISAT "BLUE BANGER HANGER" HEADED, CAST-IN- PLACE DECK INSERTS: POURED-IN-PLACE (PIP), SDI STEEL DECK INSERTS (SDI & SDI-2), IN CRACKED AND UNCRACKED CONCRETE; ISAT "PUSH ROD HANGERS" HEADED, CAST-IN-PLACE DECK INSERTS: PUSH ROD POURED-IN-PLACE (PRPIP) AND PUSH ROD STEEL DECK INSERTS (PRSDI & PRSDI-2) IN CRACKED AND UNCRACKED CONCRETE**	

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2024, 2021, 2018, and 2015 *International Building Code*® (IBC)
- 2024, 2021, 2018, and 2015 *International Residential Code*® (IRC)

Main references of this report are for the 2024 IBC and IRC. See Table 7 and Table 8 for applicable sections of the code for previous IBC and IRC edition.

Property evaluated:

- Structural

2.0 USES

The ISAT PIP and PRPIP concrete inserts are used to resist static, wind, and seismic tension and shear loads in cracked and uncracked normal-weight concrete and sand-lightweight concrete having a specified compressive strength, f'_c, of 3,000 psi to 10,000 psi (20.7 MPa to 68.9 MPa).

The ISAT SDI, SDI-2, PRSDI and PRSDI-2 steel deck concrete inserts are used to resist static, wind, and seismic tension and shear loads in the soffit of cracked and uncracked normal-weight concrete and sand-lightweight concrete on metal deck having a specified compressive strength, f'_c, of 3,000 psi to 10,000 psi (20.7 MPa to 68.9 MPa).

There are four models for the PIP inserts: PIPM38, PIP143812, PIP381258, and PIP5834. The PIPM38 is used with a threaded rod size of $^3/_8$ inch; the PIP143812 is used with a threaded rod size of $^1/_4$ inch, $^3/_8$ inch,

or ½ inch; the PIP381258 is used with a threaded rod size of 3/8 inch, ½ inch, or 5/8 inch; and the PIP5834 is used with a threaded rod size of 5/8 inch or ¾ inch.

There are three models for the SDI inserts: SDI143812, SDI381258, and SDI5834. The SDI143812 is used with a threaded rod size of ¼ inch, 3/8 inch, or ½ inch; the SDI381258 is used with a threaded rod size of 3/8 inch, ½ inch, or 5/8 inch; and the SDI5834 is used with a threaded rod size of 5/8 inch or ¾ inch.

There are three models for the SDI-2 inserts: SDI143812-2, SDI381258-2, and SDI5834-2. The SDI143812-2 is used with a threaded rod size of ¼ inch, 3/8 inch, or ½ inch; the SDI381258-2 is used with a threaded rod size of 3/8 inch, ½ inch, or 5/8 inch; and the SDI5834-2 is used with a threaded rod size of 5/8 inch or ¾ inch.

The PRPIP3812 insert is used with a threaded rod size of 3/8 inch and 1/2 inch. The threaded rod is installed by either directly pushing into the concrete insert or pushing into the concrete insert then tightening.

The PRSDI3812 insert is used with a threaded rod size of 3/8 inch and 1/2 inch. The threaded rod is installed by either directly pushing into the concrete insert or pushing into the concrete insert then tightening.

The PRSDI3812-2 insert is used with a threaded rod size of 3/8 inch and 1/2 inch. The threaded rod is installed by either directly pushing into the concrete insert or pushing into the concrete insert then tightening.

For any application that includes shear loads, the largest size of threaded rod specified for each insert must be used.

Reference to “inserts” in this report refers to the manufactured specialty anchorage products (PIPs, SDIs, SDI-2s, PRPIP3812, PRSDI3812, and PRSDI3812-2) used in concrete; reference to “anchors” in this report refers to the installed inserts in concrete with threaded rods.

The inserts are alternatives to cast-in anchors described in Section 1901.3 of the 2024 IBC. The anchors may be used where an engineered design is submitted in accordance with Section R301.1.3 of the IRC.

3.0 DESCRIPTION

3.1 PIP, SDI, SDI-2, PRPIP3812, PRSDI3812, and PRPIP3812-2 Inserts:

The PIP inserts are cast-in concrete inserts. The insert consists of a steel internally threaded headed insert (anchor body), an outer plastic sleeve, and nails used to attach the insert to the inside surface of concrete formwork. The PIP inserts are illustrated in Figures 1A and 1C. The internally threaded insert is manufactured from carbon steel GB/T 6478 Grade U40088 (ML08A1), GB/T 700 Grade Q195, or JIS G3507-1 Grade SWRCH8A. The PIP inserts have a minimum 5.1 µm (0.0002-inch) zinc plating. The plastic sleeve is fabricated from high-impact Type J340 PP (polypropylene) or equivalent. The plastic sleeve thickness is a maximum of 0.053 inch (1.35 mm).

The SDI inserts are cast-in concrete inserts. The insert consists of a steel internally threaded headed insert (anchor body), an outer spring, a plastic sleeve, and a washer (base plate). The SDI insert is illustrated in Figure 3A. The internally threaded insert and washer are manufactured from carbon steel GB/T 6478 Grade U40088 (ML08A1), GB/T 700 Grade Q195, or JIS G3507-1 Grade SWRCH8A. The SDI inserts have a minimum 5.1 µm (0.0002-inch) zinc plating. The spring is manufactured from #72A or JISG3521-91 spring steel. The plastic sleeve is fabricated from high-impact Type J340 PP (polypropylene) or equivalent.

The SDI-2 inserts are cast-in concrete inserts. The insert consists of a steel internally threaded headed insert (anchor body), an outer plastic sleeve, and self-drilling screws used to attach the insert to the metal decking. The SDI-2 insert is illustrated in Figure 2A. The internally threaded insert and washer are manufactured from carbon steel GB/T 6478 Grade U40088 (ML08A1), GB/T 700 Grade Q195, or JIS G3507-1 Grade SWRCH8A. The SDI-2 inserts have a minimum 5.1 µm (0.0002-inch) zinc plating. The plastic sleeve is fabricated from high-impact Type J340 PP (polypropylene) or equivalent.

The PRPIP3812 inserts are cast-in concrete inserts. The insert consists of a steel internally threaded headed insert (anchor body), an outer plastic sleeve, and nails used to attach the insert to the inside surface of concrete formwork. The PRPIP3812 insert is illustrated in Figure 1B. The internally threaded insert is manufactured from carbon steel GB/T 6478 Grade ML08A1, ASTM A29 Grade 1010, or JIS G3507-1 Grade SWRCH8A. The PRPIP3812 inserts have a minimum 5.1 µm (0.0002-inch) zinc plating. The plastic sleeve is fabricated from high-impact Type J340 PP (polypropylene) or equivalent.

The PRSDI3812 inserts are cast-in concrete inserts. The insert consists of a steel internally threaded headed insert (anchor body), an outer spring, a plastic sleeve, and a washer (base plate). The PRSDI3812 insert is illustrated in Figure 3B. The internally threaded insert is manufactured from carbon steel GB/T 6478 Grade ML08A1, ASTM A29 Grade 1010, or JIS G3507-1 Grade SWRCH8A. The PRSDI3812 inserts have a minimum 5.1 µm (0.0002-inch) zinc plating. The spring is manufactured from ASTM A29 Grade 1070, JIS G3506 Grade SWRH72A, or GB/T 1222 Grade 70 spring steel. The plastic sleeve is fabricated from high-impact Type J340 PP (polypropylene) or equivalent.

The PRSDI3812-2 inserts are cast-in concrete inserts. The insert consists of a steel internally threaded headed insert (anchor body), an outer plastic sleeve, and self-drilling screws used to attach the insert to the metal decking. The PRSDI3812-2 insert is illustrated in Figure 2B. The internally threaded insert is manufactured from carbon steel GB/T 6478 Grade ML08A1, ASTM A29 Grade 1010, or JIS G3507-1 Grade SWRCH8A. The ISAT-PRSDI3812 inserts have a minimum 5.1 µm (0.0002-inch) zinc plating. The plastic sleeve is fabricated from high-impact Type J340 PP (polypropylene) or equivalent.

The anchor assembly is comprised of a PIP, SDI, SDI-2, PRPIP3812, PRSDI3812 or PRSDI3812-2 insert with a threaded rod. For PRPIP3812, PRSDI3812, and PRSDI3812-2 inserts, the anchor assembly may include an ASTM A307 Grade A (or materially equivalent) threaded rod with an optional factory crimped engagement marker at one end to indicate proper installation. The PIP and PRPIP3812 inserts are installed on the inside surface of wood formwork and the nails driven into the form until the insert base sits flush on the form. The SDI and PRSDI3812 inserts are installed in a predrilled hole in the topside of the metal deck, and impacted with sufficient force to compress the spring and drive the flared plastic fins completely through the hole. The SDI-2 and PRSDI3812-2 inserts are installed in a predrilled hole in the topside of the metal deck, and the self-drilling screws are driven into the metal deck until the insert base sits flush on the decking. Concrete can then be cast over the insert.

3.2 Concrete:

Normal-weight and sand-lightweight concrete must conform to Sections 1903 and 1905 of the IBC.

3.3 Steel Deck Panels:

For SDI-2 and PRSDI-2 inserts, steel deck panels must be in accordance with the configuration in Figures 4A, 4B, 4C or 5A, 5B, 5C, 5D, or 5E and have a minimum base steel thickness of 20 gage [0.035 inch (0.899 mm)]. Steel must comply with ASTM A653/A653M SS Grade 50 and have a minimum yield strength of 50,000 psi (345 MPa).

For SDI and PRSDI, steel deck panels must be in accordance with the configuration in Figures 6A, 6B, 6C, 6D and have a minimum base steel thickness of 20 gage [0.0299 inch (0.759 mm)]. Steel must comply with ASTM A653/A653 SS Grade 50 and have a minimum yield strength of 50,000 psi (345 MPa).

4.0 DESIGN AND INSTALLATION

4.1 Strength Design:

For any application that includes shear loads, the largest size of threaded rod specified for each insert must be used, that is: $^1/_2$-inch threaded rod only for PIP143812-2, SDI143812, SDI143812-2, PRPIP3812, and PRSDI3812; $^5/_8$-inch threaded rod only for PIP381258-2, SDI381258 and SDI381258-2; and ¾-inch threaded rod only for PIP5834-2, SDI5834 and SDI5834-2. Smaller diameter threaded rods are permitted to resist tension loads only.

4.1.1 General: Design strength of anchors complying with the 2024 IBC, as well as Section R301.1.3 of the 2024 IRC must be determined in accordance with ACI 318-19 Chapter 17 and this report.

Design parameters provided in Tables 1, 2, 3, 4, 5, and 6 of this report are based on the 2024 IBC (ACI 318-19), unless noted otherwise in Sections 4.1.1 through 4.1.12. The strength design of anchors must comply with ACI 318-19 17.5.1.2 except as required in ACI 318-19 17.10.

Strength reduction factors, ϕ, as given in ACI 318-19 17.5.3 for cast-in headed anchors, must be used for load combinations calculated in accordance with Section 1605.1 of the 2024 IBC and Section 5.3 of ACI 318-19. The value of f'_c used in the calculations must be limited to a maximum of 10,000 psi (68.9 MPa), in accordance with ACI 318-19 17.3.1.

The pullout strength in tension is not decisive for design and does not need to be evaluated.

4.1.2 Requirements for Static Steel Strength in Tension: The nominal static steel strength in tension, N_{sa}, of a single anchor must be calculated in accordance with ACI 318-19 17.6.1.2 for the threaded rod, not to exceed the values of $N_{sa,insert}$ in Tables 1, 2 , 3, 4, 5 and 6 of this report. Strength reduction factors, ϕ corresponding to non-ductile steel shall be used when $\phi N_{sa,insert}$ controls the design strength for PIP and SDI, and SDI-2 inserts, except for the PIPM38 insert. Strength reduction factors, ϕ corresponding to ductile steel shall be used when $\phi N_{sa,insert}$ controls the design strength for PIPM38, PRPIP3812, PRSDI3812 and PRSDI3812-2 inserts. When the threaded rod strength controls, the strength reduction factor, ϕ, corresponding to the threaded rod shall be used.

4.1.3 Requirements for Static Concrete Breakout Strength in Tension: For the PIP, SDI, SDI-2, PRPIP3812, PRSDI3812, PRSDI3812-2 anchors, the nominal concrete breakout strength of a single anchor or group of anchors in tension, N_{cb} or N_{cbg}, respectively, must be calculated in accordance with ACI 318-19 17.6.2 for cast-in bolts, with modifications as described in this section, and with Figures 1A, 1B, 1C, 2A, 2B, 3A and 3B of this report. The basic concrete breakout strength in tension, N_b, must be calculated in accordance

with ACI 318-19 17.6.2.2 using the values of h_{ef} given in Tables 1, 2, 3, 4, 5, and 6, and k_c = 24. The nominal concrete breakout strength in tension in regions where analysis indicates no cracking in accordance with ACI 318-19 17.6.2.5.1 must be calculated with $\Psi_{c,N}$ = 1.25. For the SDI, SDI-2, PRSDI3812 and PRSDI3812-2 inserts installed in the soffit of sand-lightweight or normal-weight concrete on steel deck, the contribution of the metal deck strength must be ignored and the calculations of A_{Nc} / A_{Nco} and $c_{a,min}$ (minimum edge distance) must be based on Figure 11.

4.1.4 Requirements for Static Side-Face Blowout Strength in Tension: For the PIP and PRPIP3812 anchors, the nominal side-face blowout strength of a headed insert, N_{sb}, must be calculated in accordance with ACI 318-19 17.6.4.1 for the cast-in headed insert, in cracked and uncracked concrete, as applicable.

For the SDI, SDI-2, PRSDI3812 and PRSDI3812-2 inserts installed in the soffit of sand-lightweight or normal-weight concrete on steel deck floor and roof assemblies as shown in Figures 4A, 4B, 4C, 5A, 5B, 5C, 5D, 5E, 6A, 6B, 6C, and 6D, calculation of the concrete side blowout strength is not required.

4.1.5 Requirements for Static Steel Strength in Shear: For any applications having a shear component, the largest size of threaded rod specified for each insert must be used.

For the PIP and PRPIP3812 anchors, the nominal steel strength in shear, V_{sa}, of a single insert is given in Tables 1 and 2, respectively, and must be used in lieu of the values derived by calculation from ACI 318-19 Eq. 17.7.1.2a or 17.7.1.2b.

For SDI-2, PRSDI-2, SDI and PRSDI3812 anchors, the nominal steel strength in shear, $V_{sa,deck,lower}$ and $V_{sa,deck,upper}$, of a single insert, at lower flute and upper flute, respectively, are given in Tables 3, 4, 5 and 6 of this report, respectively, and must be used in lieu of the values derived by calculation from ACI 318-19 Eq. 17.7.1.2a or 17.5.1.2b.

4.1.6 Requirements for Static Concrete Breakout Strength in Shear: For PIP and PRPIP3812 anchors, the nominal concrete breakout strength of a single anchor or group of anchors in shear, V_{cb} or V_{cbg}, respectively, must be calculated in accordance with ACI 318-19 17.7.2. The basic concrete breakout strength, V_b, must be calculated in accordance with ACI 318-19 17.7.2.2 based on the values provided in Tables 1 and 2, respectively. The value of ℓ_e used in ACI 318-19 Eq. 17.7.2.2.1a must be taken as no greater than the lesser of h_{ef} or $8d_a$.

For the SDI, SDI-2, PRSDI3812 and PRSDI3812-2 inserts installed in the soffit of sand-lightweight or normal-weight concrete on steel deck floor and roof assemblies, as shown in Figure 4A, 4B, 4C, 5A, 5B, 5C, 5D, 5E, 6A, 6B, 6C, and 6D, calculation of the concrete breakout strength in shear is not required.

4.1.7 Requirements for Static Concrete Pryout Strength in Shear: For PIP and PRPIP3812 anchors, the nominal concrete pryout strength of a single anchor or group of anchors, V_{cp} or V_{cpg}, respectively, must be calculated in accordance with ACI 318-19 17.7.3.

For the SDI-2, PRSDI-2, SDI and PRSDI3812 inserts installed in the soffit of sand-lightweight or normal-weight concrete over profile steel deck floor and roof assemblies, as shown in Figure 4A, 4B, 4C, 5A, 5B, 5C, 5D, 5E, 6A, 6B, 6C, and 6D, calculation of the concrete pry-out strength in accordance with ACI 318-19 17.7.3 is not required.

4.1.8 Requirements for Seismic Design:

4.1.8.1 General: For load combinations including seismic, the design must be performed in accordance with ACI 318-19 17.10. Modifications to ACI 318-19 17.10 shall be applied under Section 1905.7 of the 2024 IBC.

The nominal concrete breakout strength (for PIP, SDI, SDI-2, PRPIP3812, PRSDI3812 and PRSDI3812-2anchors) and nominal concrete side-face blowout strength (for PIP and PRPIP3812 anchors only) for anchors in tension, and the nominal concrete breakout strength and pryout strength (for PIP, PRPIP3812, and upper flute of SDI, SDI-2, PRSDI3812 and PRSDI3812-2 anchors) for anchors in shear, must be calculated in accordance with ACI 318-19 17.6 and 17.7. The anchors may be installed in Seismic Design Categories A through F of the IBC.

The anchors comply with ACI 318-19 2.3 as brittle steel elements and must be designed in accordance with ACI 318-19 17.10.5, 17.10.6, 17.10.7.

4.1.8.2 Seismic Tension: For PIP and PRPIP3812 anchors, the nominal steel strength in tension, N_{sa}, of a single anchor must be calculated in accordance with ACI 318-19 17.6.1 for the threaded rod, not to exceed the insert nominal steel strength, $N_{sa,insert,eq}$, provided in Tables 1 and 2, respectively; the nominal concrete breakout strength for anchors in tension must be calculated in accordance with ACI 318-19 17.6.2 as described in Section 4.1.3 of this report; the nominal concrete side-face blowout strength must be calculated in accordance with ACI 318-19 17.6.4.1 and 17.6.4.2 and Section 4.1.4 of this report.

For SDI-2, PRSDI-2, SDI and PRSDI3812 anchors, the nominal steel strength in tension, N_{sa}, of a single anchor must be calculated in accordance with ACI 318-19 17.6.1 for the threaded rod, not to exceed the insert nominal steel strength, $N_{sa,insert,eq}$, provided in Tables 3, 4, 5 and 6, respectively.

4.1.8.3 Seismic Shear: For PIP and PRPIP3812 anchors, the nominal concrete breakout strength and pryout strength in shear must be calculated in accordance with ACI 318-19 17.7.2 and 17.7.3 as described in Sections 4.1.6 and 4.1.7 of this report. In accordance with ACI 318-19 17.7.1.2 the appropriate value for nominal steel strength for seismic loads, $V_{sa,eq}$, described in Table 1 and Table 2, respectively, must be used in lieu of V_{sa}, as applicable.

For SDI-2, PRSDI-2, SDI and PRSDI3812 anchors, the nominal concrete breakout strength and pryout strength in shear calculations in accordance with ACI 318-19 17.7.2 and 17.7.3 as described in Sections 4.1.6 and 4.1.7 of this report, are not required. In accordance with ACI 318-19 17.7.1.2 the appropriate value for nominal steel strength for seismic loads, $V_{sa,deck,lower,eq}$ or $V_{sa,deck,upper,eq}$, described in Tables 3, 4, 5, and 6, respectively, for lower flute or upper flute, respectively, must be used in lieu of V_{sa} as applicable.

4.1.9 Requirements for Interaction of Tensile and Shear Forces: For anchors or groups of anchors that are subject to the effects of combined tension and shear forces, the influence of bending on tension values when loaded in shear must be considered. The design engineer must verify the validity of the interaction equation in ACI 318-19 17.8.

4.1.10 Requirements for Minimum Member Thickness, Minimum Anchor Spacing and Minimum Edge Distance: Requirements on headed cast-in specialty anchor edge distance, spacing, member thickness, and concrete strength must be in accordance with the requirements in ACI 318 as applicable for cast-in bolts.

For SDI-2, PRSDI-2, SDI and PRSDI3812 inserts installed in the soffit of sand-lightweight or normal-weight concrete over profile steel deck floor and roof assemblies, the anchors must be installed in accordance with Figures 4A, 4B, 4C, 5A, 5B, 5C, 5D, 5E, 6A, 6B, 6C, and 6D, and shall have a minimum axial spacing along the flute equal to $3h_{ef}$.

4.1.11 Requirements for Critical Edge Distance: Calculation of the critical edge distance, c_{ac}, is not required since the modification factor $\psi_{cp,N}$ = 1.0 for cast-in anchors in accordance with ACI 318-19 17.6.2.6.2.

4.1.12 Sand-lightweight Concrete: For ACI 318-19, when the PIP and PRPIP3812 anchors are used in sand-lightweight concrete, the modification factor λ_a or λ, respectively, for concrete breakout strength must be taken as 0.85 according to ACI 318-19 17.2.4.

For SDI-2, PRSDI-2, SDI and PRSDI3812 inserts installed in the soffit of sand-lightweight concrete-filled steel deck and floor and roof assemblies, this reduction is not required. Values are presented in Tables 3, 4, 5, and 6, respectively, and installation details are shown in Figures 4A, 4B, 4C, 5A, 5B, 5C, 5D, 5E, 6A, 6B, 6C, and 6D.

4.2 Allowable Stress Design (ASD):

4.2.1 General: Design values for use with allowable stress design (working stress design) load combinations calculated in accordance with Section 1605.1 of the 2024 IBC must be established as follows:

$$T_{allowable,ASD} = \frac{\phi N_n}{\alpha}$$

$$V_{allowable,ASD} = \frac{\phi V_n}{\alpha}$$

where:

$T_{allowable,ASD}$ = Allowable tension load (lbf or kN).

$V_{allowable,ASD}$ = Allowable shear load (lbf or kN).

ϕN_n = Lowest design strength of an anchor or anchor group in tension as determined in accordance with ACI 318-19 Chapter 17 and 2024 IBC Section 1905.7 and Section 4.1 of this report, as applicable (lbf or N).

ϕV_n = Lowest design strength of an anchor or anchor group in shear as determined in accordance with ACI 318-19 Chapter 17 and 2024 IBC Section 1905.7 and Section 4.1 of this report, as applicable (lbf or N).

α = Conversion factor calculated as a weighted average of the load factors for the controlling load combination. In addition, α must include all applicable factors to account for non-ductile failure modes and required over-strength.

The requirements for member thickness, edge distance and spacing, described in this report, must apply.

4.2.2 Interaction of Tensile and Shear Forces: For anchors or groups of anchors that are subject to the effects of combined tension and shear forces, the influence of bending on tension values when loaded in shear must be considered. The design engineer must verify the validity of the interaction equation in ACI 318-19 17.8 as follows:

For shear loads $V_{applied} \leq 0.2V_{allowable,ASD}$, the full allowable load in tension must be permitted.

For tension loads $T_{applied} \leq 0.2T_{allowable,ASD}$, the full allowable load in shear must be permitted.

For all other cases:

$$\frac{T_{applied}}{T_{allowable,ASD}} + \frac{V_{applied}}{V_{allowable,ASD}} \leq 1.2 \qquad \text{(Eq-1)}$$

4.3 Installation:

For the PIP inserts, installation parameters are provided in Table 1 and Figure 7A. PIP inserts must be positioned on wood formwork with all three nails in contact with the form. The head of the PIP must be impacted with sufficient force to drive nails all the way into the wood until the plastic base sits flush and tight against the form. From beneath the deck, following the concrete pour and wood form removal, exposed nails must be broken away and an all-thread rod must be screwed into the internal threads of the PIP. The rod must be tightened until fully seated in the insert which will result in a minimum thread engagement equal to one rod diameter.

For the PRPIP3812 insert, installation parameters are provided in Table 2 and Figure 7B. PRPIP inserts must be positioned on wood formwork with all three nails in contact with the form. The head of the PRPIP3812 must be impacted with sufficient force to drive nails all the way into the wood until the plastic base sits flush and tight against the form. From beneath the deck, following the concrete pour and wood form removal, exposed nails must be broken away and install the all-threaded rod into the internal threads of the PRPIP3812. Push the threaded rod into the PRPIP3812 insert until the end of the threaded rod contacts the bottom of the steel barrel. Refer to Figure 10 for the required threaded rod engagement into the PRPIP3812 insert for proper installation. When applicable, the optional engagement marker on the threaded rod will seat flush with the bottom of the insert indicating proper threaded rod engagement. For seismic restraint anchorage, use a ½-inch diameter threaded rod, insert threaded rod into the PRPIP3812 until the end of the threaded rod contacts the bottom of the steel barrel. Optionally, after the threaded rod is inserted in the concrete insert, it can be further tightened. Mount seismic bracket on exposed rod and flush with the underside of the deck, then install a hex nut hand tight plus ½ turn (minimum).

For the SDI-2 inserts, installation parameters are provided in Table 3 and in Figures 4A, 4B, 4C, 5A, 5B, 5C, 5D, 5E and Figure 8A. A hole must be made in the metal deck using a step-drill, hole saw, or deck punch in accordance with the following hole diameters: SDI143812-2 ($^{7}/_{8}$-inch diameter), SDI381258-2 ($1^{3}/_{16}$-inch diameter), and SDI5834-2 ($1^{1}/_{4}$-inch diameter). The SDI-2 must be placed in the hole, and the two (2) self-drilling screws are driven into the metal deck until the insert base sits flush on the decking. Before or after SDI-2 insertion in deck, a threaded rod must be inserted through the plastic thread protector nozzle until contact is made with the inner steel barrel. The threaded rod must then be screwed into the SDI-2 internal threads. The rod must be tightened until fully seated in the insert, which will result in a thread engagement equal to a minimum of one rod diameter. SDI-2 inserts are permitted to be installed in either the upper or lower flute of the metal deck. For installation in the lower flute where the flute width is 4 ½ inches, the maximum offset from the flute centerline to the SDI-2 or PRSDI-2 centerline must be no greater than $1^{1}/_{4}$ inches. When the flute width is greater than 4 ½ inches the maximum distance to the edge of the flute to the SDI-2 centerline must be no less than 1 inch. The SDI-2 inserts are suitable for installation anywhere across the plane of the upper flute. When the SDI-2 is located above the bottom flute or side flute a Flute Span Bracket (Part # ISAT FSB-X) shall be used to secure the SDI-2 in place and set it at the upper flute elevation. For seismic restraint anchorage, from beneath deck, trim away plastic nozzle flush with the metal deck. Using the largest size of threaded rod specified for each SDI insert, thread the threaded rod into the SDI until the end of the threaded rod contacts the bottom of the steel barrel. Mount seismic bracket on exposed rod and flush with the underside of the deck, then install a hex nut hand tight plus ½ turn (minimum).

For the PRSDI3812-2 insert, installation parameters are provided in Table 4 and in Figures 4A, 4B, 4C, 5A, 5B, 5C, 5D, 5E and Figure 8B. A 11/4-inch diameter hole must be made in the metal deck using a step-drill, hole saw, or deck punch. The PRSDI3812-2 must be placed in the hole, and the two (2) self-drilling screws are driven into the metal deck until the insert base sits flush on the decking. Before or after PRSDI3812 insertion in deck, insert threaded rod through finned plastic nozzle until the end of the threaded rod contacts the bottom of the steel barrel. Refer to Figure 10 for the required threaded rod engagement into the PRSDI3812-2 insert for proper installation. When applicable, the optional engagement marker on the threaded rod will seat flush with the bottom of the insert indicating proper threaded rod engagement. For seismic restraint anchorage, from beneath deck, trim away plastic nozzle flush with the metal deck. Use a ½-inch diameter threaded rod, insert threaded rod into the PRSDI3812-2 until the end of the threaded rod contacts the bottom of the steel barrel, then fully tighten the threaded rod. Mount seismic bracket on exposed rod and flush with the underside of the deck, then install a hex nut hand tight plus ½ turn (minimum).

For the SDI inserts, installation parameters are provided in Table 5 and in Figures 6A, 6B, 6C, 6D and 9A. A hole must be made in the metal deck using a step-drill, hole saw, or deck punch in accordance with the following hole diameters: SDI143812 ($^{7}/_{8}$-inch diameter), SDI381258 ($1^{3}/_{16}$-inch diameter), and SDI5834 ($1^{1}/_{4}$-inch diameter). The SDI must be placed in the hole, then the head of the insert must be impacted with sufficient force to compress the outer spring and drive the flared plastic fins completely through the hole in the metal deck. The SDI metal base plate may be screwed to the deck for additional stability (optional). Before or after SDI insertion in deck, a threaded rod must be inserted through the plastic thread protector nozzle until contact is made with the inner steel barrel. The threaded rod must then be screwed into the SDI internal threads. The rod must be tightened until fully seated in the insert, which will result in a thread engagement equal to a minimum of one rod diameter. SDI inserts are permitted to be installed in either the upper or lower flute of the metal deck. For installation in the lower flute, the maximum offset from the flute centerline to the SDI centerline must be no greater than $1^{1}/_{4}$ inches. The SDI inserts are suitable for installation anywhere across the plane of the upper flute. When the SDI is located above the bottom flute or side flute a Flute Span Bracket (Part # ISAT FSB-X) shall be used to secure the SDI in place and set it at the upper flute elevation. For seismic restraint anchorage, from beneath deck, trim away plastic nozzle flush projecting ¾-inch long metal barrel of the SDI. Using the largest size of threaded rod specified for each SDI insert, thread the threaded rod into the SDI until the end of the threaded rod contacts the bottom of the steel barrel. Mount seismic bracket on exposed rod and flush with the underside of the deck, then install a hex nut hand tight plus ½ turn (minimum).

For the PRSDI3812 insert, installation parameters are provided in Table 6 and in Figures 6A, 6B, 6C, 6D, and 9B. A $1^{1}/_{4}$-inch diameter hole must be made in the metal deck using a step-drill, hole saw, or deck punch. The PRSDI3812 must be placed in the hole, then the head of the insert must be impacted with sufficient force to compress the outer spring and drive the flared plastic fins completely through the hole in the metal deck. The PRSDI3812 metal base plate may be screwed to the deck for additional stability (optional). Before or after PRSDI3812 insertion in deck, insert threaded rod through finned plastic nozzle until the end of the threaded rod contacts the bottom of the steel barrel. Refer to Figure 10 for the required threaded rod engagement into the PRSDI3812 insert for proper installation. When applicable, the optional engagement marker on the threaded rod will seat flush with the bottom of the insert indicating proper threaded rod engagement. For seismic restraint anchorage, from beneath deck, trim away plastic nozzle flush with projecting ¾-inch long metal barrel of PRSDI3812. Use a ½-inch diameter threaded rod, insert threaded rod into the PRSDI3812 until the end of the threaded rod contacts the bottom of the steel barrel, then fully tighten the threaded rod. Mount seismic bracket on exposed rod and flush with the underside of the deck, then install a hex nut hand tight plus ½ turn (minimum).

Installation of PIP, PRPIP3812, SDI-2, PRSDI3812-2, SDI, and PRSDI3812 inserts must be in accordance with this evaluation report and the manufacturer's published installation instruction (MPII) depicted in Figures 7A, 7B, 8A, 8B, 9A, and 9B. In the event of a conflict between this report and the MPII, this report governs.

4.4 Special Inspection:

Periodic special inspection is required in accordance with Section 1705.1.1 and Table 1705.3 of the 2024 IBC. For each type of headed cast-in specialty insert system, the manufacturer must submit inspection procedures to verify proper usage.

The special inspector must make periodic inspections during installation of the headed cast-in specialty inserts to verify insert type, insert dimensions, concrete type, concrete compressive strength, insert spacing, edge distances, concrete member thickness, insert embedment, threaded rod fully seated into insert, and adherence to the manufacturer's printed installation instructions. The special inspector must be present as often as required in accordance with the "statement of special inspection." Under the IBC, additional requirements as set forth in Sections 1705, 1706 and 1707 must be observed, where applicable.

5.0 CONDITIONS OF USE:

The PIP, SDI, SDI-2, PRPIP3812, PRSDI3812, and PRSDI3812-2 concrete specialty anchors described in this report are acceptable alternatives to what is specified in the codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Specialty inserts are limited to dry interior locations.

5.2 Specialty insert sizes, dimensions, minimum embedment depths, and other installation parameters are as set forth in this report.

5.3 Specialty inserts must be installed in accordance with the manufacturer's published instructions and this report. In case of conflict, this report governs.

5.4 Specialty inserts must be limited to use in cracked and uncracked normal-weight concrete and sand-lightweight concrete having a specified compressive strength, f'_c, of 3,000 psi to 10,000 psi (20.7 MPa to 68.9 MPa) for the PIP and PRPIP3812 inserts, and in cracked and uncracked normal-weight or sand-

lightweight concrete over metal deck having a minimum specified compressive strength, $f'c$, of 3,000 psi (20.7 MPa) for the SDI, SDI-2 and PRSDI3812, and PRSDI3812-2 inserts.

5.5 The values of $f'c$ used for calculation purposes must not exceed 10,000 psi (68.9 MPa).

5.6 The concrete shall have achieved its minimum design strength prior to loading of the specialty inserts.

5.7 Strength design values must be established in accordance with Section 4.1 of this report.

5.8 Allowable design values are established in accordance with Section 4.2.

5.9 Specialty insert spacing and edge distance as well as minimum member thickness must comply with ACI 318-19 17.9 for cast-in-place headed anchors.

5.10 Prior to installation, calculations and details demonstrating compliance with this report must be submitted to the code official. The calculations and details must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.11 Performance and serviceability of deflection sensitive attachments and equipment shall be addressed, when threaded rod axial deflection exists, by installing a hex nut and washer at the interface of the concrete insert and threaded rod.

5.12 Since an ICC-ES acceptance criteria for evaluating data to determine the performance of the specialty inserts subjected to fatigue or shock loading is unavailable at this time, the use of these inserts under such conditions is beyond the scope of this report.

5.13 Specialty inserts may be installed in regions of concrete where analysis indicates cracking may occur ($f_t > f_r$), subject to the conditions of this report.

5.14 Specialty inserts may be used to resist short-term loading due to wind or seismic forces in locations designated as Seismic Design Categories A through F of the IBC, subject to the conditions of this report.

5.15 Where not otherwise prohibited in the code, PIP, SDI, SDI-2, PRPIP3812, PRSDI3812, and PRSDI3812-2 inserts are permitted for use with fire-resistance-rated construction provided that at least one of the following conditions is fulfilled:

- Headed cast-in specialty inserts that support a fire-resistance-rated envelope or a fire-resistance-rated membrane are protected by approved fire-resistance-rated materials, or have been evaluated for resistance to fire exposure in accordance with recognized standards.
- Headed cast-in specialty inserts are used to resist wind or seismic forces only.
- Headed cast-in specialty inserts are used to support nonstructural elements.

5.16 Use of zinc-coated carbon steel anchors is limited to dry, interior locations.

5.17 Special inspection must be provided in accordance with Section 4.4.

5.18 Specialty inserts are manufactured under an approved quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Headed Cast-in Specialty Inserts in Concrete AC446 (24), published April 2025.

6.2 Quality control documentation.

7.0 IDENTIFICATION

7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-3599) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.

7.2 In addition, the inserts are identified in the field by packaging labeled with the manufacturer's contact information, insert name, and insert size. The inserts have the letters PIP, SDI, SDI-2, PRPIP3812, PRSDI3812, or PRSDI3812-2 and the specific part number size embossed atop the head of the insert, and these are visible for verification.

7.3 The report holder's contact information is the following:

TOMARCO CONTRACTOR SPECIALTIES, INC.
dba ISAT dba CEAS
14848 NORTHAM STREET
LA MIRADA, CALIFORNIA 90638
(714) 994-6353
www.isatts.com
emutuc@iastts.com

7.4 The Additional Listee's contact information is the following:

CEAS
14848 NORTHAM STREET
LA MIRADA, CALIFORNIA 90638
(877) 466-2327

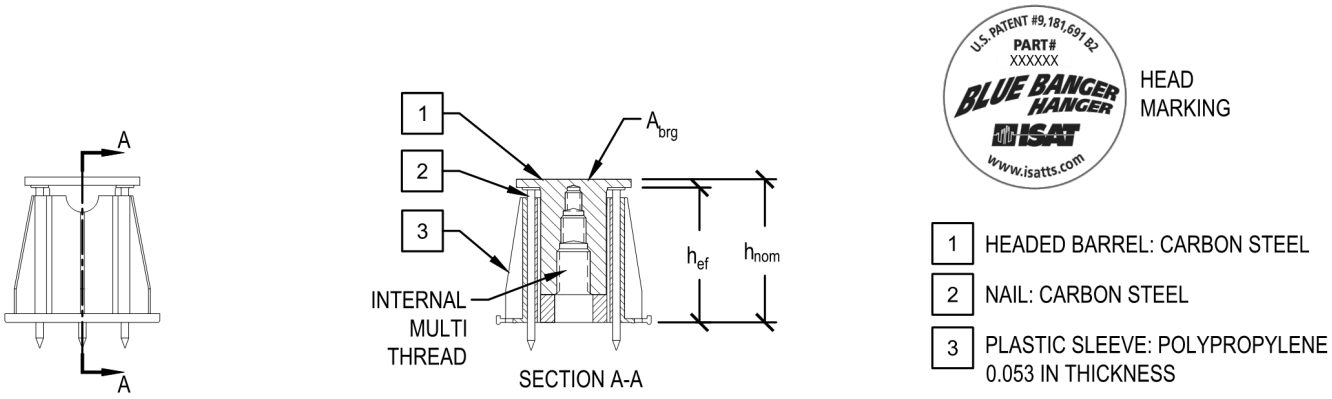


FIGURE 1A—PIP CAST-IN-PLACE INSERTS FOR FORM POUR CONCRETE

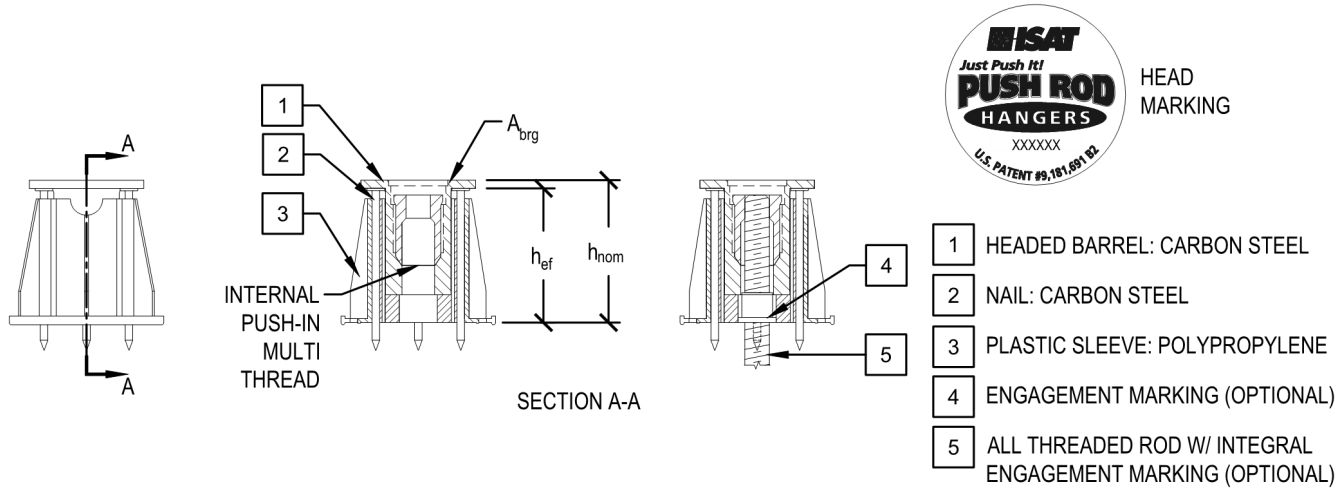


FIGURE 1B—ISAT-PRPIP3812 CAST-IN-PLACE INSERTS FOR FORM POUR CONCRETE

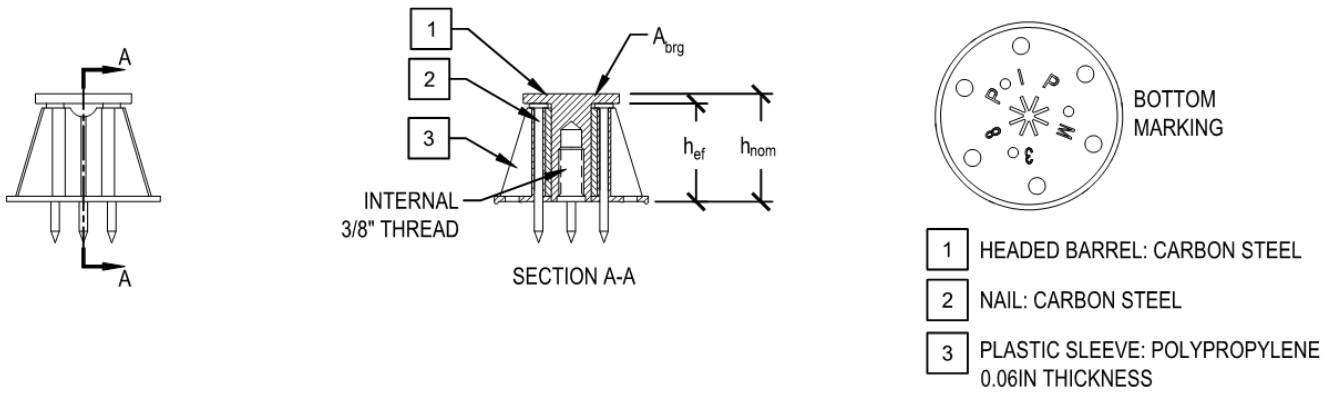


FIGURE 1C—PIPM38 CAST-IN-PLACE INSERTS FOR FORM POUR CONCRETE

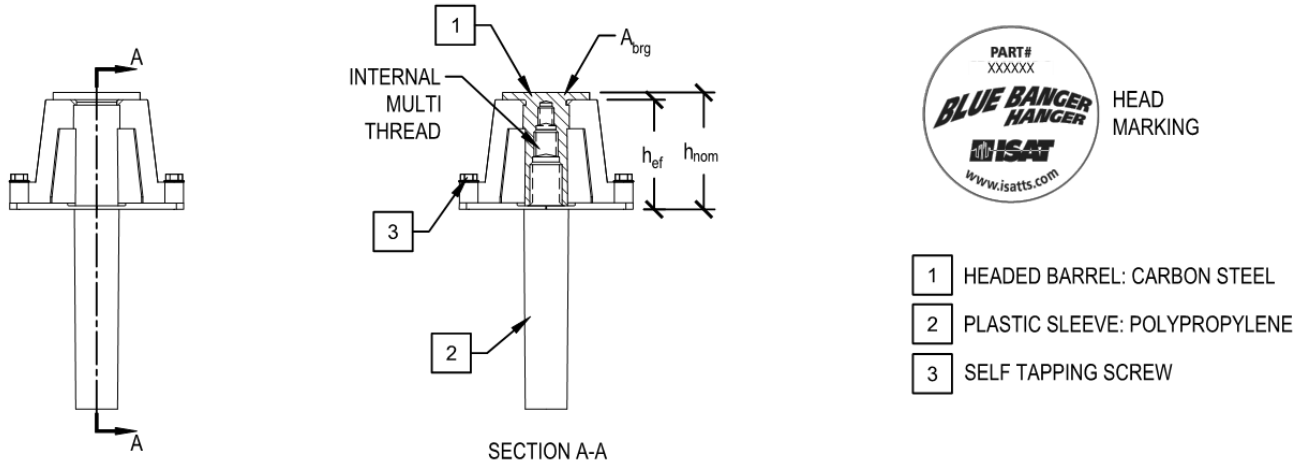


FIGURE 2A—SDI-2 CAST-IN-PLACE INSERTS FOR CONCRETE OVER METAL DECKS

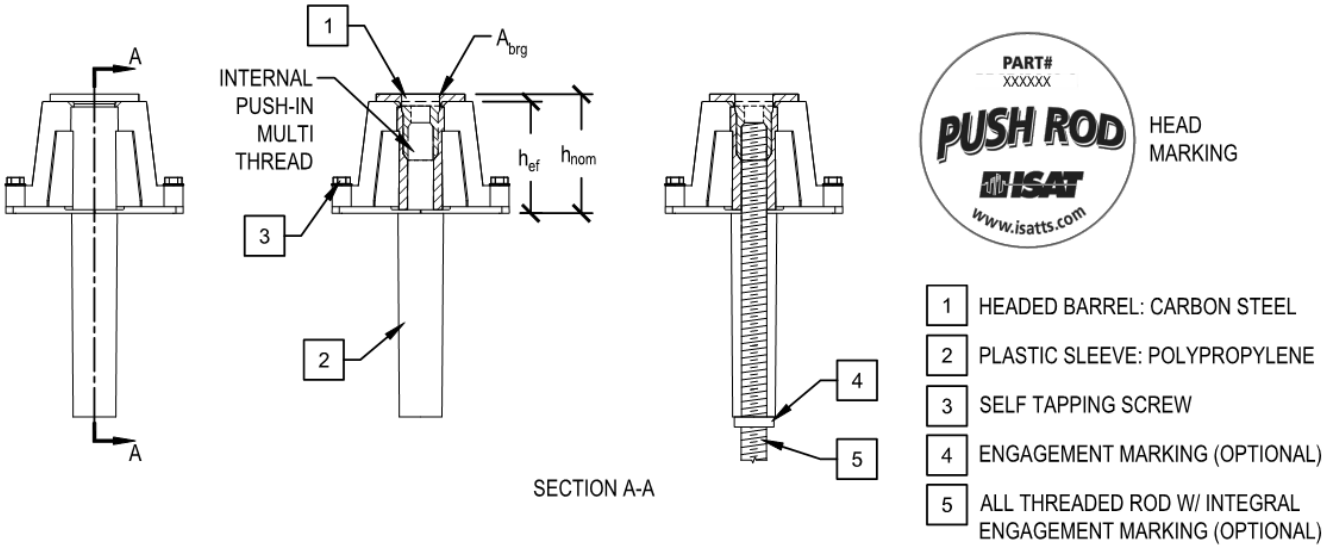


FIGURE 2B—PR-SDI3812-2 CAST-IN-PLACE INSERTS FOR CONCRETE OVER METAL DECKS

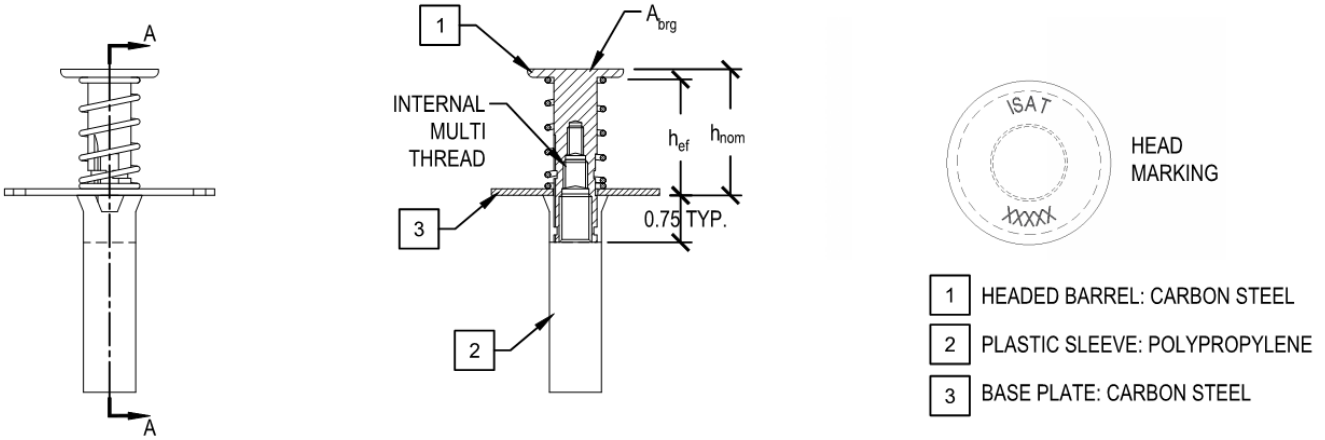


FIGURE 3A—SDI CAST-IN-PLACE INSERTS FOR CONCRETE OVER METAL DECKS

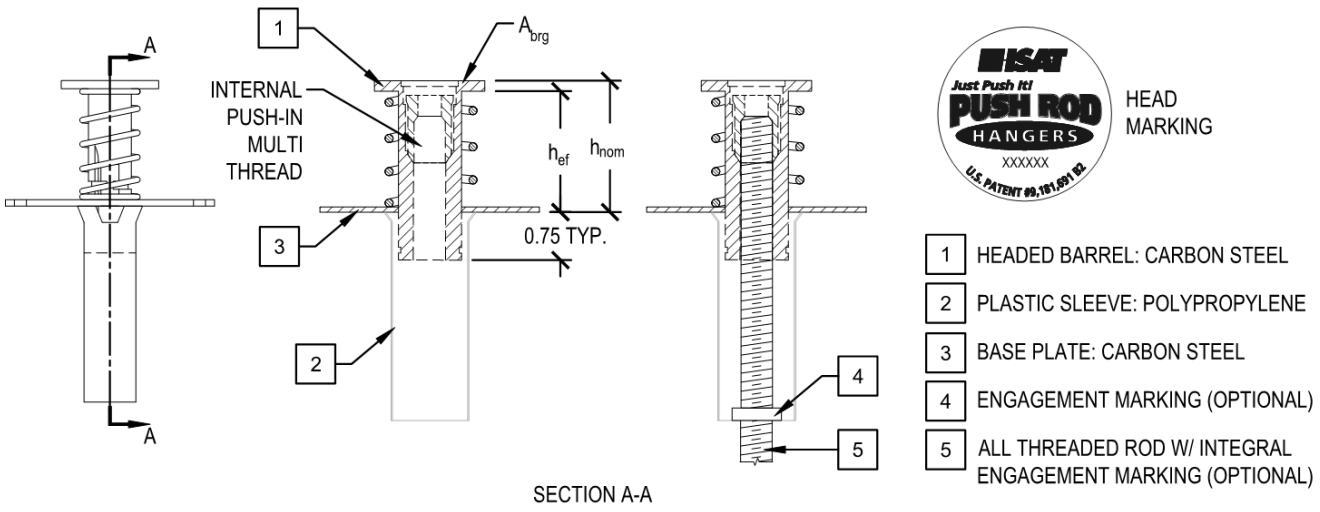
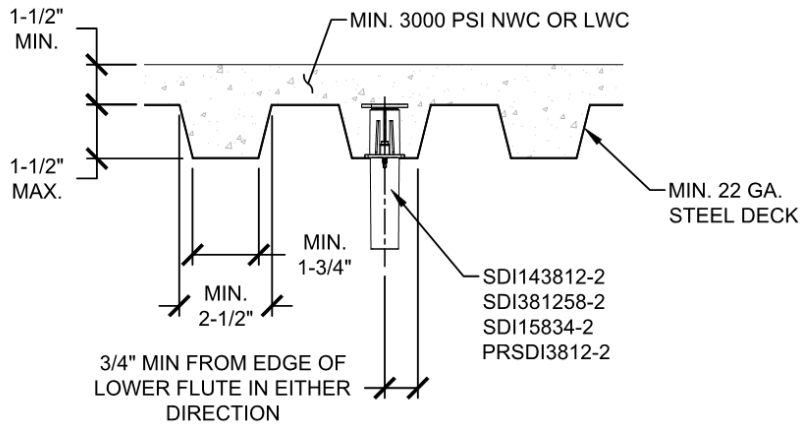
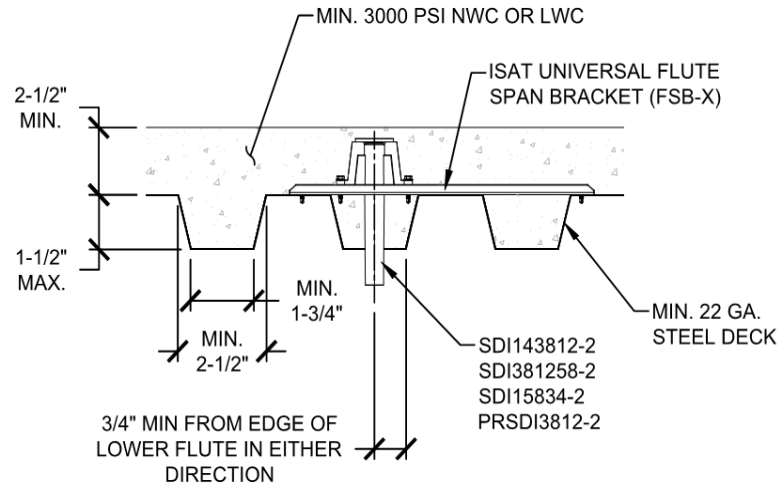


FIGURE 3B—ISAT-PRSDI3812 CAST-IN-PLACE INSERTS FOR CONCRETE OVER METAL DECKS



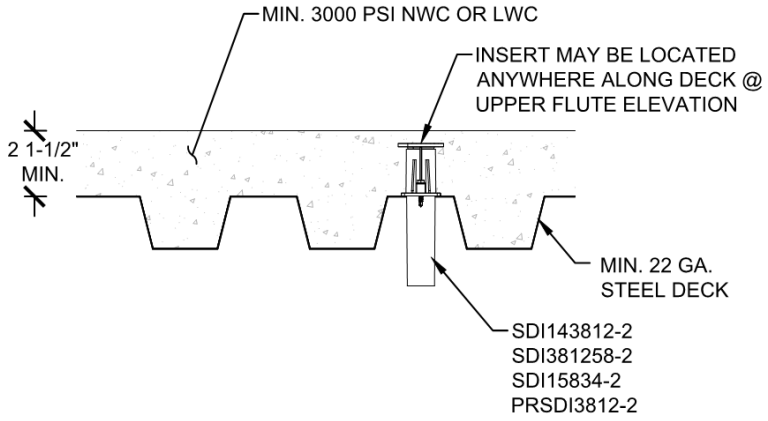
[1]Axial spacing for inserts along the lower flute length shall be $3h_{ef}$ *minimum.*

FIGURE 4A - SDI-2 AND PRSDI3812-2 INSERTS INSTALLATION IN THE SOFFIT OF CONCRETE FILLED METAL DECK FLOOR AND ROOF ASSEMBLIES OVER LOWER FLUTE (B-DECK)[1]



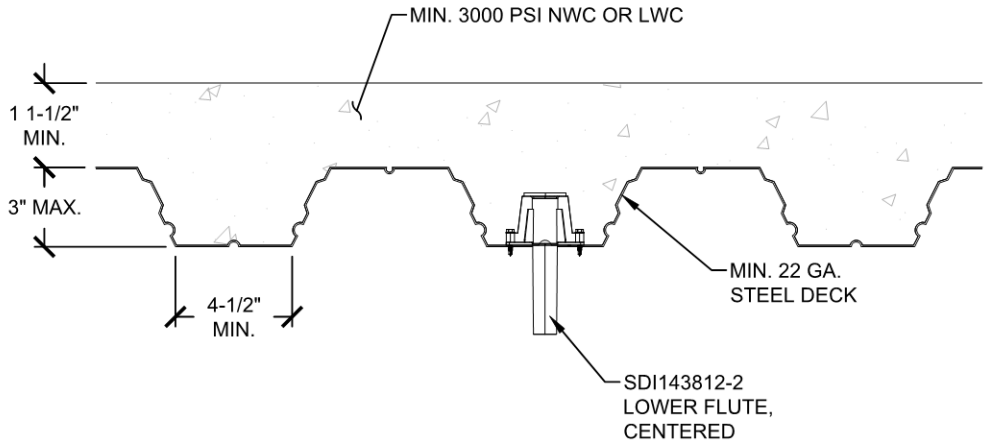
[1]Inserts installed in upper flutes are not subject to metal pan deck dimension limitations or minimum gauge (tension only) limitations
[2]Axial spacing for inserts along the upper flute length over the upper flute shall be $4d_a$ *minimum*
[3]Axial spacing for inserts along the upper flute length over the lower flute shall be $3h_{ef}$ *minimum.*

FIGURE 4B - SDI-2 AND PRSDI3812-2 INSERTS INSTALLATION IN THE SOFFIT OF CONCRETE FILLED METAL DECK FLOOR AND ROOF ASSEMBLIES OVER LOWER FLUTE (B-DECK) - ELEVATED[1,2,3]



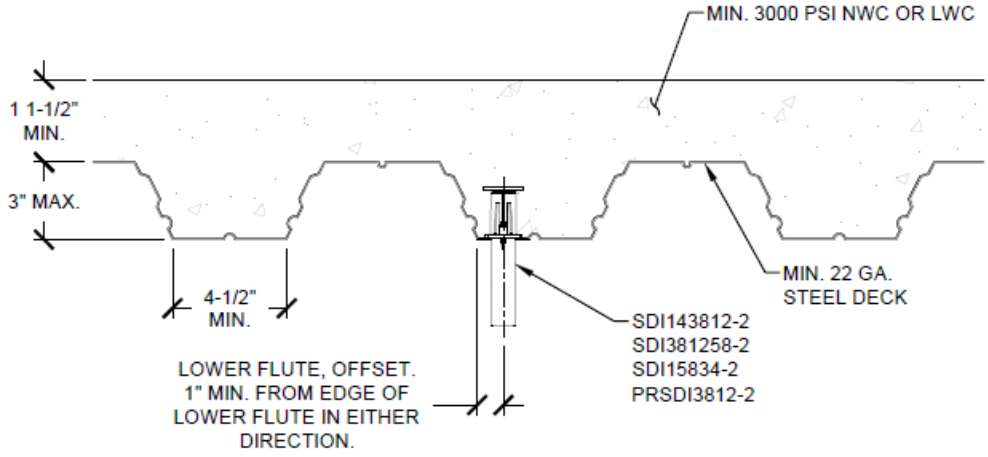
[1]Inserts installed in upper flutes are not subject to metal pan deck dimension limitations or minimum gauge (tension only) limitations
[2]Axial spacing for inserts along the upper flute length shall be $4d_a$ minimum.

FIGURE 4C - SDI-2 AND PRSDI3812-2 INSERTS INSTALLATION IN THE SOFFIT OF CONCRETE FILLED METAL DECK FLOOR AND ROOF ASSEMBLIES OVER UPPER FLUTE (B-DECK) [1,2]



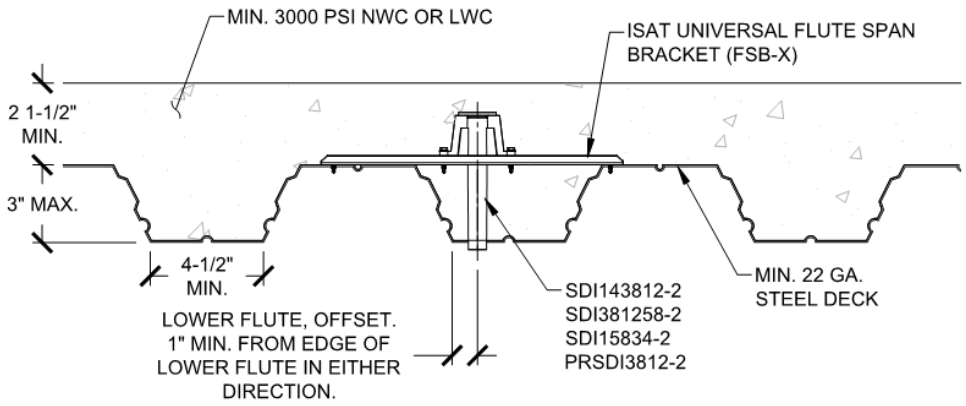
[1]Axial spacing for inserts along the lower flute length shall be $3h_{ef}$ *minimum.*

FIGURE 5A - SDI-2 INSERT INSTALLATION IN THE SOFFIT OF CONCRETE FILLED METAL DECK FLOOR AND ROOF ASSEMBLIES ABOVE LOWER FLUTE (W-DECK) - CENTERED[1]



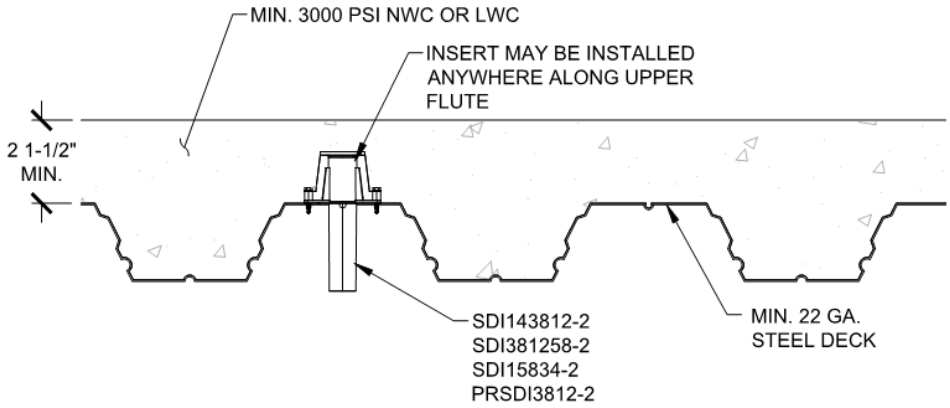
[1]Axial spacing for inserts along the lower flute length shall be $3h_{ef}$ *minimum.*

FIGURE 5B - SDI-2 AND PRSDI3812-2 INSERTS INSTALLATION IN THE SOFFIT OF CONCRETE FILLED METAL DECK FLOOR AND ROOF ASSEMBLIES ABOVE LOWER FLUTE (W-DECK) - OFFSET[1]



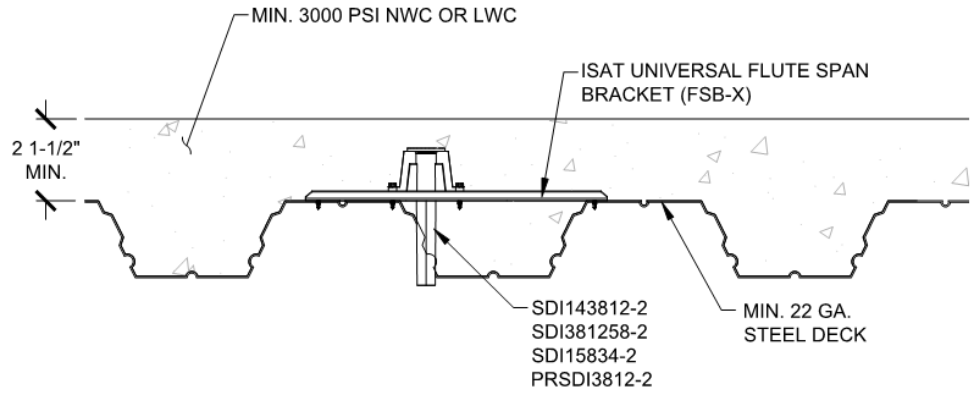
[1]Inserts installed in upper flutes are not subject to metal pan deck dimension limitations or minimum gauge (tension only) limitations
[2]Axial spacing for inserts along the upper flute length over the upper flute shall be $4d_a$ minimum
[3]Axial spacing for inserts along the upper flute length over the lower flute shall be $3h_{ef}$ *minimum.*

FIGURE 5C - SDI-2 AND PRSDI3812-2 INSERTS INSTALLATION IN THE SOFFIT OF CONCRETE FILLED METAL DECK FLOOR AND ROOF ASSEMBLIES ABOVE LOWER FLUTE (W-DECK) - ELEVATED[1,2,3]



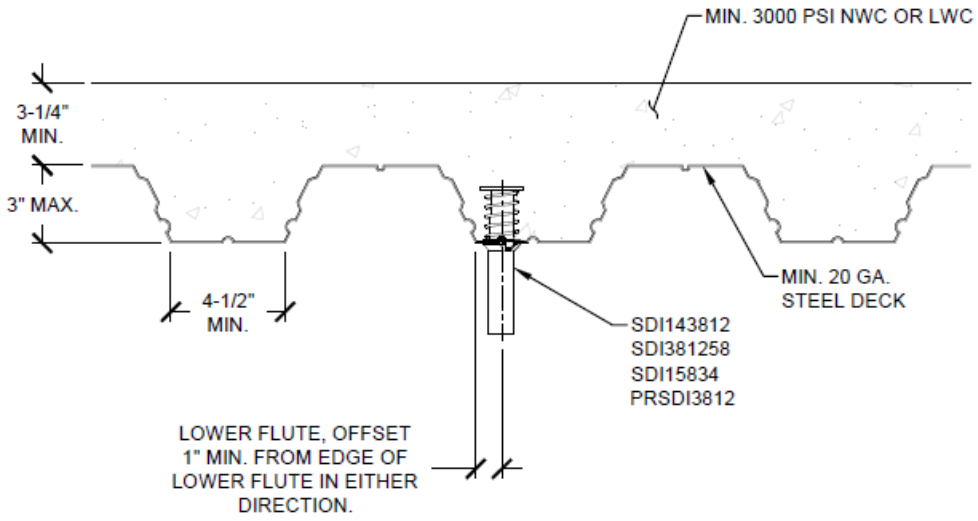
[1]Inserts installed in upper flutes are not subject to metal pan deck dimension limitations or minimum gauge (tension only) limitations
[2]Axial spacing for inserts along the upper flute length shall be $4d_a$ minimum.

FIGURE 5D - SDI-2 AND PRSDI3812-2 INSERTS INSTALLATION IN THE SOFFIT OF CONCRETE FILLED METAL DECK FLOOR AND ROOF ASSEMBLIES ABOVE UPPER FLUTE (W-DECK) [1,2]



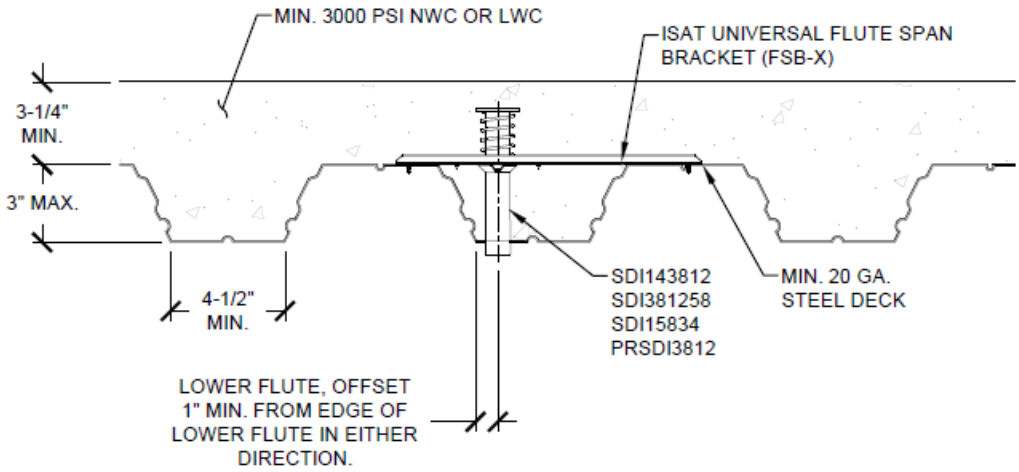
[1]Inserts installed in upper flutes are not subject to metal pan deck dimension limitations or minimum gauge (tension only) limitations
[2]Axial spacing for inserts along the upper flute length shall be $3h_{ef}$ *minimum.*

FIGURE 5E - SDI-2 AND PRSDI3812-2 INSERTS INSTALLATION IN THE SOFFIT OF CONCRETE FILLED METAL DECK FLOOR AND ROOF ASSEMBLIES ABOVE UPPER FLUTE (W-DECK) - INCLINE [1,2]



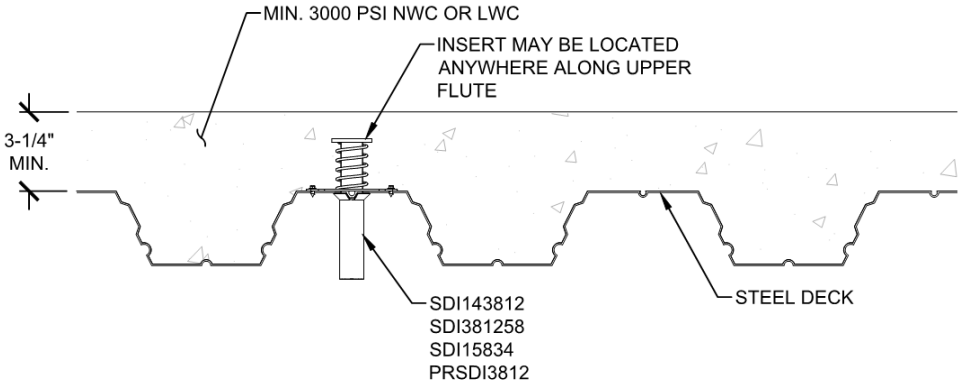
[1]Axial spacing for inserts along the lower flute length shall be $3h_{ef}$ *minimum.*

FIGURE 6A - SDI AND PRSDI3812 INSERTS INSTALLATION IN THE SOFFIT OF CONCRETE FILLED METAL DECK FLOOR AND ROOFASSEMBLIES ABOVE LOWER FLUTE (W-DECK) – OFFSET



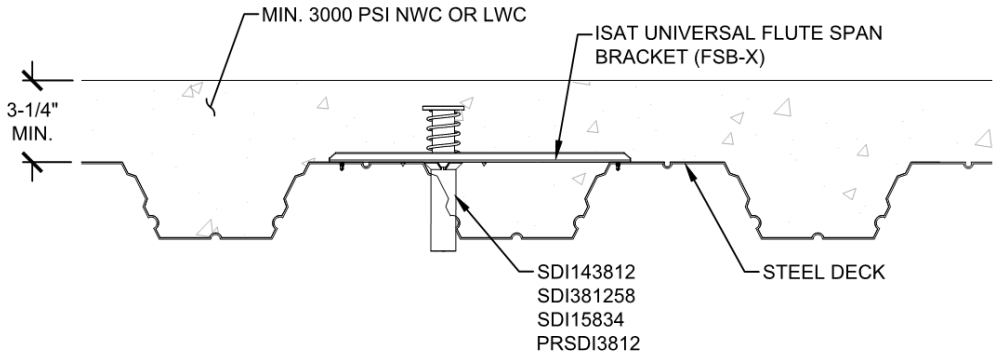
[1]Inserts installed in upper flutes are not subject to metal pan deck dimension limitations or minimum gauge (tension only) limitations
[2]Axial spacing for inserts along the upper flute length shall be $4d_a$ minimum

FIGURE 6B - SDI AND PRSDI3812 INSERTS INSTALLATION IN THE SOFFIT OF CONCRETE FILLED METAL DECK FLOOR AND ROOFASSEMBLIES ABOVE LOWER FLUTE (W-DECK) – ELEVATED



[1]Inserts installed in upper flutes are not subject to metal pan deck dimension limitations or minimum gauge (tension only) limitations
[2]Axial spacing for inserts along the upper flute length shall be $4d_a$ minimum

FIGURE 6C - SDI AND PRSDI3812 INSERTS INSTALLATION IN THE SOFFIT OF CONCRETE FILLED METAL DECK FLOOR AND ROOF ASSEMBLIES ABOVE UPPER FLUTE (W-DECK)



[1]Inserts installed in upper flutes are not subject to metal pan deck dimension limitations or minimum gauge (tension only) limitations
[2]Axial spacing for inserts along the upper flute length shall be $4d_a$ minimum

FIGURE 6D - SDI AND PRSDI3812 INSERTS INSTALLATION IN THE SOFFIT OF CONCRETE FILLED METAL DECK FLOOR AND ROOF ASSEMBLIES ABOVE UPPER FLUTE (W-DECK) - INCLINE

TABLE 1—PIP ANCHOR DESIGN INFORMATION[1,2,3,4,5,6,7,8]

DESIGN INFORMATION		SYMBOL	UNITS	PIPM38	PIP143812-2			PIP381258-2			PIP5834-2	
Nominal All Threaded Rod diameter		-	in.	3/8	1/4	3/8	1/2	3/8	1/2	3/8	5/8	3/4
Insert O.D.		d_a	in. (mm)	0.510 (12.95)	0.811 (20.6)			1.000 (25.4)			1.102 (28.0)	
Effective embedment depth		h_{ef}	in. (mm)	1.27 (32.3)	1.875 (47.6)			1.954 (49.6)			1.875 (47.6)	
Insert steel characterization		-	-	Ductile	Non-ductile			Non-ductile			Non-ductile	
Modification factor for tension strength in uncracked concrete		$\Psi_{C,N}$	-	1.25	1.25			1.25			1.25	
Figures 1A and 1C	Nominal tension strength of single insert in tension as governed by steel strength	$N_{sa,insert}$	lb (kN)	3,020 (13.4)	3,565 (15.9)	5,625 (25.0)	8,415 (37.4)	9,090 (40.4)	5,020 (22.3)	16,755 (74.5)	18,620 (82.8)	18,685 (83.1)
	Nominal seismic tension strength of single insert in tension as governed by steel strength	$N_{sa,insert,eq}$	lb (kN)	3,020 (13.4)	3,565 (15.9)	5,625 (25.0)	8,415 (37.4)	9,090 (40.4)	5,020 (22.3)	16,755 (74.5)	18,620 (82.8)	18,685 (83.1)
	Nominal steel shear strength of single insert	V_{sa}	lb (kN)	2,415 (10.7)	N/A[9]	N/A[9]	6,810 (30.3)	N/A[9]	N/A[9]	8,210 (36.5)	N/A[9]	8,760 (39.0)
	Nominal steel shear strength of single insert for seismic loading	$V_{sa,eq}$	lb (kN)	2,415 (10.7)	N/A[9]	N/A[9]	6,810 (30.3)	N/A[9]	N/A[9]	8,210 (36.5)	N/A[9]	8,760 (39.0)

For **SI:** 1 inch = 25.4 mm, 1 pound = 4.45 N, 1 psi = 0.006895 MPa. For pound-inch unit: 1 mm = 0.03937 inches.
[1]Concrete must be normal weight or sand-lightweight concrete with *f'c* of 3,000 psi minimum. Installation must comply with Sections 4.1.10 and 4.3, and Figure 7A of this report.
[2]Only the largest size of threaded rod specified for each insert must be used for applications resisting shear loads.
[3]Design of headed cast-in specialty inserts shall be in accordance with the provisions of ACI 318-19 Chapter 17 for cast-in headed anchors. The value of $\mathbf{k_c}$ shall be in accordance with the value for cast-in anchors in ACI 318-19 17.6.2.2.
[4]Strength reduction factors shall be taken from ACI 318-19 17.5.3 for cast-in headed anchors.
[5]Strength reduction factor for load combinations of ACI 318-19 5.3 governed by steel strength shall be taken as 0.65 for tension and 0.60 for shear.
[6]The concrete tension strength of headed cast-in specialty inserts shall be calculated in accordance with ACI 318-19 Chapter 17.
[7]Insert OD is the outside diameter of the plastic sleeve.
[8]The strengths shown in the table are for inserts only. Design professional is responsible for checking threaded rod strength in tension, shear, and combined tension and shear, as applicable.
[9] N/A = Not Applicable for shear applications.

TABLE 2—ISAT-PRPIP3812 ANCHOR DESIGN INFORMATION[1,2,3,4,5,6,7,8]

DESIGN INFORMATION		SYMBOL	UNITS	ISAT-PRPIP3812	
Nominal All Threaded Rod diameter (in.) and Installation Condition		-	in.	$^3/_8$	$^1/_2$
Insert O.D.		d_a	in. (mm)	1.120 (28.4)	
Insert effective embedment depth		h_{ef}	in. (mm)	1.954 (49.6)	
Insert steel characterization		-	-	Non-ductile	
Modification factor for tension strength in uncracked concrete		$\Psi_{C,N}$	-	1.25	
Figure 1B	Nominal tension strength of single insert in tension as governed by steel strength	$N_{sa,insert}$	lb (kN)	3,910 (17.4)	7,220 (32.1)
	Nominal seismic tension strength of single insert in tension as governed by steel strength	$N_{sa,insert,eq}$	lb (kN)	3,910 (17.4)	7,220 (32.1)
	Nominal steel shear strength of single insert	V_{sa}	lb (kN)	N/A[9]	4,370 (19.4)
	Nominal steel shear strength of single insert for seismic loading	$V_{sa,eq}$	lb (KN)	N/A[9]	4,370 (19.4)

For **SI:** 1 inch = 25.4 mm, 1 pound = 4.45 N, 1 psi = 0.006895 MPa. For pound-inch unit: 1 mm = 0.03937 inches.

[1]Concrete must be normal weight concrete with *f'c* of 3,000 psi minimum. Installation must comply with Sections 4.1.10 and 4.3, and Figure 7B of this report.

[2]Only the largest size of threaded rod specified for each insert must be used for applications resisting shear loads.

[3]Design of headed cast-in specialty inserts shall be in accordance with the provisions of ACI 318-19 Chapter 17 for cast-in headed anchors. The value of $\mathbf{k_c}$ shall be in accordance with the value for cast-in anchors in ACI 318-19 17.6.2.2.

[4]Strength reduction factors shall be taken from ACI 318-19 17.5.3 for cast-in headed anchors.

[5]Strength reduction factors shall be taken from ACI 318-19 17.5.3 for steel elements. Strength reduction factor for load combinations of ACI 318-19 5.3 governed by steel strength of ductile steel elements shall be taken as 0.75 for tension and 0.65 for shear.

[6]The concrete tension strength of headed cast-in specialty inserts shall be calculated in accordance with ACI 318-19 Chapter 17.

[7]Insert OD is the outside diameter of the plastic sleeve.

[8]The strengths shown in the table are limited to ISAT-PRPIP3812 inserts with ASTM A307 Grade A threaded rods (or materially equivalent). Design professional is responsible for checking threaded rod strength in tension, shear, and combined tension and shear, as applicable.

[9] N/A = Not Applicable for shear applications.

TABLE 3—SDI-2 ANCHOR DESIGN INFORMATION[1,2,3,4,5,6,8,9]

DESIGN INFORMATION		SYMBOL	UNITS	SDI143812[9]			SDI381258			SDI5834	
Nominal All Threaded Rod diameter		-	in.	1/4	3/8	1/2	3/8	1/2	5/8	5/8	3/4
Insert O.D.[7]		d_a	in. (mm)	0.811 (20.6)			1.000 (25.4)			1.102 (28.0)	
Effective embedment depth		h_{ef}	in. (mm)	1.874 (47.6)			1.954 (49.6)			1.874 (47.6)	
Insert steel characterization		-	-	Non-ductile			Non-ductile			Non-ductile	
Modification factor for tension strength in uncracked concrete		$\Psi_{C,N}$	-	1.25			1.25			1.25	
Figures 4A, 4B, 4C, 5A, 5B, 5C, 5D, 5E	Nominal tension strength of single insert in tension as governed by steel strength	$N_{sa,insert}$	lb (kN)	3,565 (15.9)	5,625 (25.0)	8,415 (37.4)	9,090 (40.4)	5,020 (22.3)	16,755 (74.5)	18,620 (82.8)	18,685 (83.1)
	Nominal seismic tension strength of single insert in tension as governed by steel strength	$N_{sa,insert,eq}$	lb (kN)	3,565 (15.9)	5,625 (25.0)	8,415 (37.4)	9,090 (40.4)	5,020 (22.3)	16,755 (74.5)	18,620 (82.8)	18,685 (83.1)
Figure 4A, 4B	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, lower flute	$V_{sa,deck,lower}$	*lb (kN)*	N/A[9]	N/A[9]	4,575 (20.3)	N/A[9]	N/A[9]	4,133 (18.4)	N/A[9]	4,806 (21.4)
	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, for seismic loading, lower flute	$V_{sa,deck,lower,eq}$	*lb (kN)*	N/A[9]	N/A[9]	4,575 (20.3)	N/A[9]	N/A[9]	4,133 (18.4)	N/A[9]	4,806 (21.4)
Figure 4C	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, upper flute	$V_{sa,deck,upper}$	*lb (kN)*	N/A[9]	N/A[9]	5,218 (23.2)	N/A[9]	N/A[9]	9,96 (40.5)	N/A[9]	6,92 (27.1)
	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, for seismic loading, upper flute	$V_{sa,deck,upper,eq}$	*lb (kN)*	N/A[9]	N/A[9]	5,218 (23.2)	N/A[9]	N/A[9]	9,96 (40.5)	N/A[9]	6,92 (27.1)
Figure 5A	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, lower flute	$V_{sa,deck,lower}$	lb (kN)	N/A[9]	N/A[9]	4,142 (18.4)	N/A[9]	N/A[9]	N/A[9]	N/A[9]	N/A[9]
	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, for seismic loading, lower flute	$V_{sa,deck,lower,eq}$	lb (kN)	N/A[9]	N/A[9]	4,142 (18.5)	N/A[9]	N/A[9]	N/A[9]	N/A[9]	N/A[9]
Figures 5B & 5C	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, lower flute	$V_{sa,deck,lower}$	lb (kN)	N/A[9]	N/A[9]	3,043 (13.5)	N/A[9]	N/A[9]	3,502 (15.6)	N/A[9]	4,452 (19.8)
	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, for seismic loading, lower flute	$V_{sa,deck,lower,eq}$	lb (kN)	N/A[9]	N/A[9]	3,043 (13.5)	N/A[9]	N/A[9]	3,152 (14.0)	N/A[9]	2,671 (11.9)
Figure 5D	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, upper flute	$V_{sa,deck,upper}$	lb (kN)	N/A[9]	N/A[9]	5,003 (22.3)	N/A[9]	N/A[9]	6,409 (28.5)	N/A[9]	5,973 (26.6)
	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, for seismic loading, upper flute	$V_{sa,deck,upper,eq}$	lb (kN)	N/A[9]	N/A[9]	5,003 (22.3)	N/A[9]	N/A[9]	6,409 (28.5)	N/A[9]	5,973 (26.6)

For **SI:** 1 inch = 25.4 mm, 1 pound = 4.45 N, 1 psi = 0.006895 MPa. For pound-inch unit: 1 mm = 0.03937 inches.

[1]Concrete must be normal weight or sand-lightweight concrete with *f'c* of 3,000 psi minimum. Installation must comply with Sections 4.1.10 and 4.3, and Figure 8A of this report.
[2]Only the largest size of the threaded rod specified for each insert must be used for applications resisting shear loads.
[3]Design of headed cast-in specialty inserts shall be in accordance with the provisions of ACI 318-19 Chapter 17 for cast-in headed anchors. The value of k_c shall be in accordance with the value for cast-in anchors in ACI 318-19 17.6.2.2.
[4]Strength reduction factors shall be taken from ACI 318-19 17.5.3 for cast-in headed anchors.
[5]Strength reduction factor for load combinations of ACI 318-19 Section 5.3, governed by steel strength shall be taken as 0.65 for tension and 0.60 for shear.
[6]The concrete tension strength of headed cast-in specialty inserts in the soffit of concrete on metal deck assemblies shall be calculated in accordance with ACI 318-19 Chapter 17 and Figure 11 of this report.
[7]Insert OD is the outside diameter of the spring.
[8]The strengths shown in the table are for inserts only. Design professional is responsible for checking threaded rod strength in tension, shear, combined tension and shear, and with the influence of bending on tension values when loaded in shear, as applicable.
[9] N/A = Not Applicable for shear applications.

TABLE 4—ISAT-PRSDI3812-2 ANCHOR DESIGN INFORMATION[1,2,3,4,5,6,8,9]

DESIGN INFORMATION		SYMBOL	UNITS	ISAT-PRSDI3812	
Nominal All Threaded Rod diameter (inch) and Installation Condition		-	in.	$^3/_8$	½
Insert O.D.[7]		d_a	in. (mm)	1.120 (28.4)	
Effective embedment depth		h_{ef}	in. (mm)	1.954 (49.6)	
Insert steel characterization		-	-	Non-ductile	
Modification factor for insert tension strength in uncracked concrete		$\Psi_{C,N}$	-	1.25	
Figures 4A, 4B, 4C, 5A, 5B, 5C, 5D, 5E	Nominal tension strength of single insert in tension as governed by steel strength	$N_{sa,insert}$	lb (kN)	3,910 (17.4)	7,220 (32.1)
	Nominal seismic tension strength of single insert in tension as governed by steel strength	$N_{sa,insert,eq}$	lb (kN)	3,910 (17.4)	7,220 (32.1)
Figure 4A, 4B	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, lower flute	$V_{sa,deck,lower}$	*lb (kN)*	N/A[9]	3,207 (14.3)
	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, for seismic loading, lower flute	$V_{sa,deck,lower,eq}$	*lb (kN)*	N/A[9]	3,207 (14.3)
Figure 4C	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, upper flute	$V_{sa,deck,upper}$	*lb (kN)*	N/A[9]	5,423 (24.1)
	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, for seismic loading, upper flute	$V_{sa,deck,upper,eq}$	*lb (kN)*	N/A[9]	5,423 (24.1)
Figures 5B & 5C	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, lower flute	$V_{sa,deck,lower}$	lb (kN)	N/A[9]	2,976 (13.2)
	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, for seismic loading, lower flute	$V_{sa,deck,lower,eq}$	lb (kN)	N/A[9]	2,976 (13.2)
Figure 5D	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, upper flute	$V_{sa,deck,upper}$	lb (kN)	N/A[9]	4,860 (21.6)
	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, for seismic loading, upper flute	$V_{sa,deck,upper,eq}$	lb (kN)	N/A[9]	4,860 (21.6)

For **SI:** 1 inch = 25.4 mm, 1 pound = 4.45 N, 1 psi = 0.006895 MPa. For pound-inch unit: 1 mm = 0.03937 inches.

[1]Concrete must be normal weight or sand-lightweight concrete with *f'c* of 3,000 psi minimum. Installation must comply with Sections 4.1.10 and 4.3, and Figure 8B of this report.

[2]Only the largest size of the threaded rod specified for each insert must be used for applications resisting shear loads.

[3]Design of headed cast-in specialty inserts shall be in accordance with the provisions of ACI 318-19 Chapter 17 for cast-in headed anchors. The value of k_c shall be in accordance with the value for cast-in anchors in ACI 318-19 17.6.2.2.

[4]Strength reduction factors shall be taken from ACI 318-19 17.5.3 for cast-in headed anchors.

[5]Strength reduction factors shall be taken from ACI 318-19 17.5.3 for steel elements. Strength reduction factor for load combinations of ACI 318-19 Section 5.3, governed by steel strength of ductile steel elements shall be taken as 0.75 for tension and 0.65 for shear.

[6]The concrete tension strength of headed cast-in specialty inserts in the soffit of concrete on metal deck assemblies shall be calculated in accordance with ACI 318-19 Chapter 17 and Figure 11 of this report.

[7]Insert OD is the outside diameter of the spring.

[8]The strengths shown in the table are limited to ISAT-PRSDI3812 inserts with ASTM A307 Grade A (or materially equivalent). Design professional is responsible for checking threaded rod strength in tension, shear, combined tension and shear, and with the influence of bending on tension values when loaded in shear, as applicable.

[9] N/A = Not Applicable for shear applications.

TABLE 5—SDI ANCHOR DESIGN INFORMATION[1,2,3,4,5,6,8]

DESIGN INFORMATION		SYMBOL	UNITS	SDI143812[9]			SDI381258			SDI5834	
Nominal All Threaded Rod diameter		-	in.	1/4	3/8	1/2	3/8	1/2	5/8	5/8	3/4
Insert O.D.[7]		d_a	in. (mm)	0.940 (23.9)			1.160 (29.5)			1.290 (32.8)	
Effective embedment depth		h_{ef}	in. (mm)	1.980 (50.3)			1.980 (50.3)			1.980 (50.3)	
Insert steel characterization		-	-	Non-ductile			Non-ductile			Non-ductile	
Modification factor for tension strength in uncracked concrete		$\Psi_{C,N}$	-	1.25			1.25			1.25	
Figures 6A, 6B, 6C, & 6D	Nominal tension strength of single insert in tension as governed by steel strength	$N_{sa,insert}$	lb (kN)	2,325 (10.3)	8,655 (38.5)	10,085 (44.9)	5,655 (25.2)	9,136 (40.6)	16,655 (74.1)	18,730 (83.3)	14,200 (63.2)
	Nominal seismic tension strength of single insert in tension as governed by steel strength	$N_{sa,insert,eq}$	lb (kN)	2,325 (10.3)	8,655 (38.5)	10,085 (44.9)	5,655 (25.2)	9,136 (40.6)	16,655 (74.1)	18,730 (83.3)	14,200 (63.2)
Figures 6A & 6B	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, lower flute	$V_{sa,deck,lower}$	lb (kN)	N/A[10]	N/A[10]	3,105 (13.8)	N/A[10]	N/A[10]	2,610 (11.6)	N/A[10]	3,345 (14.9)
	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, upper flute	$V_{sa,deck,upper}$	lb (kN)	N/A[10]	N/A[10]	3,500 (15.6)	N/A[10]	N/A[10]	1,710 (7.6)	N/A[10]	5,565 (24.8)
Figure 6C	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, for seismic loading, lower flute	$V_{sa,deck,lower,eq}$	lb (kN)	N/A[10]	N/A[10]	3,105 (13.8)	N/A[10]	N/A[10]	2,610 (11.6)	N/A[10]	3,345 (14.9)
	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, for seismic loading, upper flute	$V_{sa,deck,upper,eq}$	lb (kN)	N/A[10]	N/A[10]	3,500 (15.6)	N/A[10]	N/A[10]	1,710 (7.6)	N/A[10]	5,565 (24.8)

For **SI:** 1 inch = 25.4 mm, 1 pound = 4.45 N, 1 psi = 0.006895 MPa. For pound-inch unit: 1 mm = 0.03937 inches.

[1]Concrete must be normal weight or lightweight concrete with *f'c* of 3,000 psi minimum. Installation must comply with Sections 4.1.10 and 4.3, and Figure 9A of this report.
[2]Only the largest size of the threaded rod specified for each insert must be used for applications resisting shear loads.
[3]Design of headed cast-in specialty inserts shall be in accordance with the provisions of ACI 318-19 Chapter 17 for cast-in headed anchors. The value of k_c shall be in accordance with the value for cast-in anchors in ACI 318-19 17.6.2.2.
[4]Strength reduction factors shall be taken from ACI 318-19 17.5.3 for cast-in headed anchors.
[5]Strength reduction factor for load combinations of ACI 318-19 5.3 governed by steel strength shall be taken as 0.65 for tension and 0.60 for shear.
[6]The concrete tension strength of headed cast-in specialty inserts in the soffit of concrete on metal deck assemblies shall be calculated in accordance with ACI 318-19 Chapter 17 and Figure 11.
[7]Insert OD is the outside diameter of the spring.
[8]The strengths shown in the table are for inserts only. Design professional is responsible for checking threaded rod strength in tension, shear, combined tension and shear, and with the influence of bending on tension values when loaded in shear, as applicable.
[9]Threaded rods used with the SDI143812 in tension shall have maximum tensile strengths, f_{uta} ,as follows: ½ -inch diameter 60,000 psi (415 MPa).
[10] N/A = Not Applicable for shear applications.

TABLE 6—ISAT-PRSDI3812 ANCHOR DESIGN INFORMATION[1,2,3,4,5,6,8]

DESIGN INFORMATION		SYMBOL	UNITS	ISAT-PRSDI3812	
Nominal All Threaded Rod diameter (inch) and Installation Condition		-	in.	$^3/_8$	½
Insert O.D.[7]		d_a	in. (mm)	1.243 (31.6)	
Effective embedment depth		h_{ef}	in. (mm)	1.980 (50.3)	
Insert steel characterization		-	-	Non-ductile	
Modification factor for insert tension strength in uncracked concrete		$\Psi_{C,N}$	-	1.25	
Figures 6A, 6B, 6C, & 6D	Nominal tension strength of single insert in tension as governed by steel strength	$N_{sa,insert}$	lb (kN)	2,275 (10.1)	7,930 (35.3)
	Nominal seismic tension strength of single insert in tension as governed by steel strength	$N_{sa,insert,eq}$	lb (kN)	2,275 (10.1)	7,930 (35.3)
Figures 6A, 6B	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, lower flute	$V_{sa,deck,lower}$	lb (kN)	N/A[9]	2,380 (10.6)
	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, for seismic loading, lower flute	$V_{sa,deck,lower,eq}$	lb (kN)	N/A[9]	2,380 (10.6)
Figure 6C	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, upper flute	$V_{sa,deck,upper}$	lb (kN)	N/A[9]	4,370 (19.4)
	Nominal steel shear strength of single insert in the soffit of concrete on metal deck, for seismic loading, upper flute	$V_{sa,deck,upper,eq}$	lb (kN)	N/A[9]	4,370 (19.4)

For **SI:** 1 inch = 25.4 mm, 1 pound = 4.45 N, 1 psi = 0.006895 MPa. For pound-inch unit: 1 mm = 0.03937 inches.

[1]Concrete must be normal weight or sand-lightweight concrete with *f'c* of 3,000 psi minimum. Installation must comply with Sections 4.1.10 and 4. 3, and Figure 9B of this report.
[2]Only the largest size of the threaded rod specified for each insert must be used for applications resisting shear loads.
[3]Design of headed cast-in specialty inserts shall be in accordance with the provisions of ACI 318-19 Chapter 17 for cast-in headed anchors. The value of k_c shall be in accordance with the value for cast-in anchors in ACI 318-19 17.6.2.2.
[4]Strength reduction factors shall be taken from ACI 318-19 17.5.3 for cast-in headed anchors.
[5]Strength reduction factors shall be taken from ACI 318-19 17.5.3 for steel elements. Strength reduction factor for load combinations of ACI 318-19 5.3 governed by steel strength of ductile steel elements shall be taken as 0.75 for tension and 0.65 for shear.
[6]The concrete tension strength of headed cast-in specialty inserts in the soffit of concrete on metal deck assemblies shall be calculated in accordance with ACI 318-19 Chapter 17 and Figure 11.
[7]Insert OD is the outside diameter of the spring.
[8]The strengths shown in the table are limited to ISAT-PRSDI3812 inserts with ASTM A307 Grade A (or materially equivalent). Design professional is responsible for checking threaded rod strength in tension, shear, combined tension and shear, and with the influence of bending on tension values when loaded in shear, as applicable.
[9] N/A = Not Applicable for shear applications.

TABLE 7— APPLICABLE SECTIONS OF THE IBC CODE UNDER EACH EDITION OF THE IBC

2024 IBC	2021 IBC	2018 IBC	2015 IBC
Section 1605.1		Section 1605.2 or 1605.3	
Section 1705.1.1			
Table 1705.3			
Section 1705			
Section 1706			
Section 1707			
Chapter 19			
Section 1901.3			
Section 1903			
Section 1905			
Section 1905.7	Section 1905.1.8		

TABLE 8— APPLICABLE SECTIONS OF ACI 318 UNDER EACH EDITION OF THE IBC

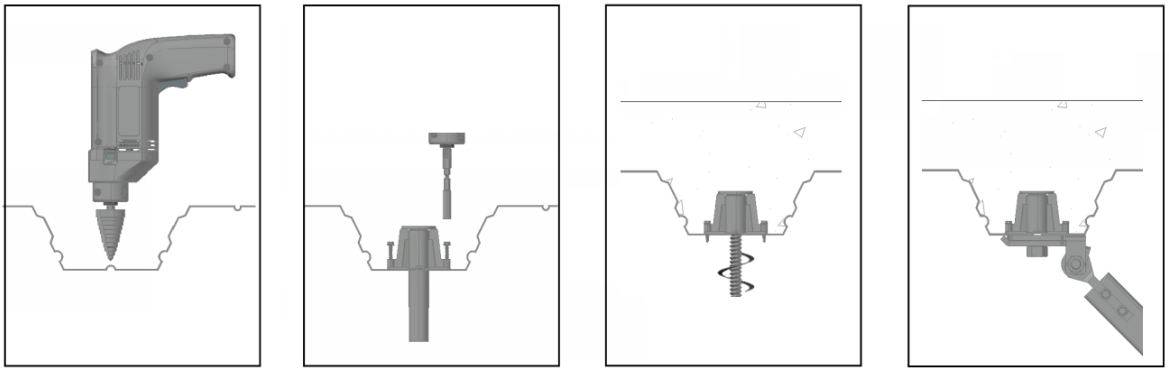
2024 IBC / 2021 IBC	2018 IBC / 2015 IBC
ACI 318-19	**ACI 318-14**
2.3	2.3
5.3	5.3
Chapter 17	Chapter 17
17.2.4	17.2.6
17.3.1	17.2.7
17.5.1.2	17.3.1
17.5.3	17.3.3
17.6.1	17.4.1
17.6.1.2	17.4.1.2
17.6.2	17.4.2
17.6.2.2	17.4.2.2
17.6.2.5	17.4.2.6
17.6.2.6.2	17.4.2.7
17.6.4.1	17.4.4.1
17.6.4.2	17.4.4.2
17.7.1.2	17.5.1.2
17.7.2	17.5.2
17.7.2.2	17.5.2.2
17.7.3	17.5.3
17.8	17.6
17.9	17.7
17.10	17.2.3

1. Position on wood form. Impact PIP driving nails all the way into wood until plastic base sits flush and tight against form.
2. After concrete pour and wood form removal, break away exposed nails.
3. Vertical Support Anchorage: Screw threaded rod into PIP and tighten rod until fully seated.
4. Seismic Restraint Anchorage: Using the largest rod diameter that the insert will accept, insert threaded rod fastener into threads of steel barrel. Tighten rod until fully seated. Mount seismic bracket on exposed rod and flush with underside of deck. Install hex nut hand tight plus ⅓ turn minimum.

FIGURE 7A—PIP INSTALLATION INSTRUCTIONS

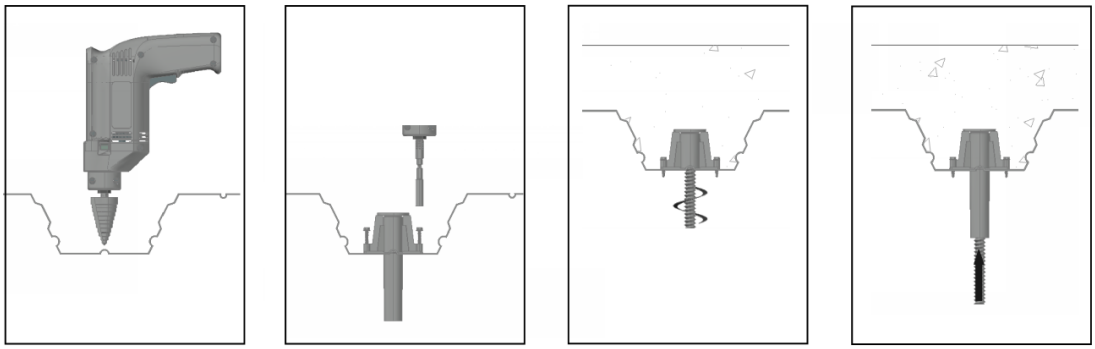
1. Position on wood form. Impact ISAT-PRPIP3812 (PRPIP3812) driving nails all the way into wood until plastic base sits flush and tight against form.
2. After concrete pour and wood form removal, break away exposed nails.
3. Vertical Support Anchorage: Push threaded rod into ISAT-PRPIP3812 (PRPIP3812) until the end of the threaded rod contacts the bottom of the steel barrel. Refer to Figure 8 for the required threaded rod engagement into the ISAT-PRPIP3812 (PRPIP3812) insert for proper installation. When applicable, the optional engagement marker on the threaded rod will seat flush with the bottom of the insert indicating proper threaded rod engagement.
4. Seismic Restraint Anchorage: Using ½" diameter threaded rod, insert threaded rod until the end of the threaded rod contacts the bottom of the steel barrel. Optionally, the threaded rod can be tightened into the ISAT-PRPIP3812 insert. Mount seismic bracket on exposed rod and flush with underside of deck. Install hex nut hand tight plus ⅓ turn minimum.

FIGURE 7B—ISAT-PRPIP3812 INSTALLATION INSTRUCTIONS



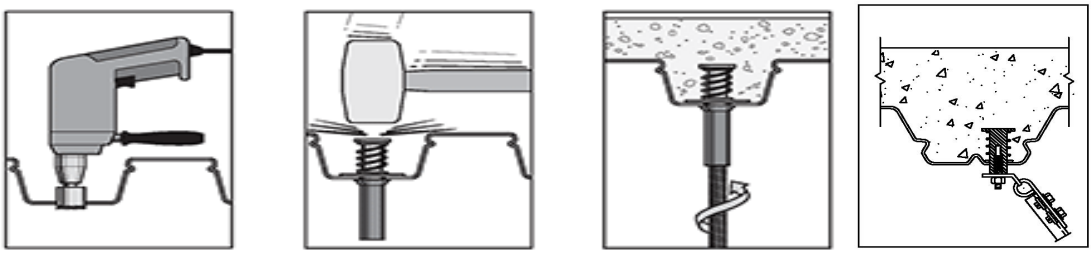
1. Make hole in metal deck of following diameter using step-driller, hole saw or deck punch: SDI143812-2 (7/8" dia.); SDI381258-2 (1 3/16" dia.); SDI5834-2 (1 1/4" dia.).
2. Position SDI-2 in hole. Drive attached self-drilling screws into metal deck until plastic base sits flush and tight against deck material.
3. Vertical Support Anchorage: Insert threaded rod through finned plastic nozzle until contact with steel barrel. Engage SDI-2 internal threads. Tighten rod until fully seated.
4. Seismic Restraint Anchorage: From beneath deck, trim away plastic nozzle flush bottom of metal decking. Using the largest rod diameter that the insert will accept, insert threaded rod fastener into threads of steel barrel. Tighten rod until fully seated. Mount seismic bracket on exposed rod. Install hex nut hand tight plus ½ turn minimum.

FIGURE 8A—SDI-2 INSTALLATION INSTRUCTIONS



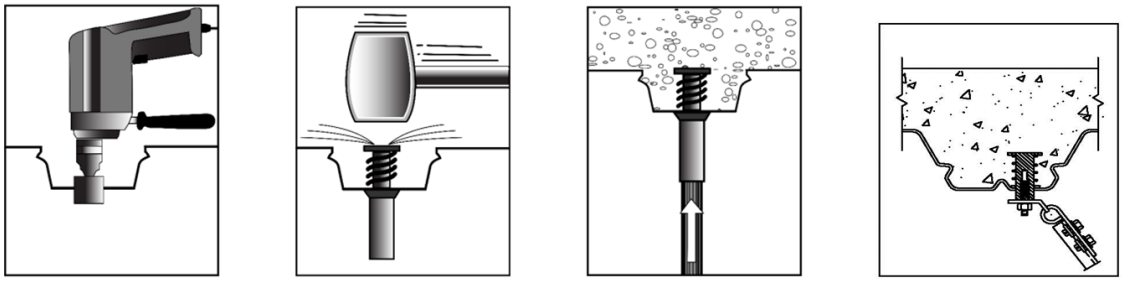
1. Make hole in metal deck of following diameter using step-driller, hole saw or deck punch: PRSDI3812-2 (1 ¼" dia.).
2. Position PRSDI3812-2 in hole. Drive attached self-drilling screws into metal deck until plastic base sits flush and tight against deck material.
3. Vertical Support Anchorage: Insert threaded rod through finned plastic nozzle until the end of the threaded rod contacts the bottom of the steel barrel. Refer to Figure 10 for the required threaded rod engagement into the PRSDI3812-2 insert for proper installation. When applicable, the optional engagement marker on the threaded rod will seat flush with the bottom of the insert indicating proper threaded rod engagement.
4. Seismic Restraint Anchorage: From beneath deck, trim away plastic nozzle flush with the bottom of the metal decking. Using ½" diameter threaded rod, insert threaded rod until the end of the threaded rod contacts the bottom of the steel barrel, then fully tighten the threaded rod. Mount seismic bracket on exposed rod. Install hex nut hand tight plus ½ turn minimum.

FIGURE 8B—ISAT-PRSDI3812-2 INSTALLATION INSTRUCTIONS



1. Make hole in metal deck of following diameter using step-driller, hole saw or deck punch: SDI143812 (7/8" dia.), SDI381258 (1 3/16" dia.), SDI5834 (1 ¼" dia.).
2. Position SDI in hole. Impact head with sufficient force to compress spring and drive flared plastic fins completely thru hole. Screw attach SDI metal base plate to deck for additional stability (optional).
3. Vertical Support Anchorage: Insert threaded rod through finned plastic nozzle until contact with steel barrel. Engage SDI internal threads. Tighten rod until fully seated.
4. Seismic Restraint Anchorage: From beneath deck, trim away plastic nozzle flush with projecting ¾" long metal barrel of SDI. Using the largest rod diameter that the insert will accept, insert threaded rod fastener into threads of steel barrel. Tighten rod until fully seated. Mount seismic bracket on exposed rod and up against insert barrel. Install hex nut hand tight plus ½ turn minimum.

FIGURE 9A—SDI INSTALLATION INSTRUCTIONS



1. Make hole in metal deck of following diameter using step-driller, hole saw or deck punch: ISAT-PRSDI3812 (1 ¼" dia.).
2. Position ISAT-PRSDI3812 (PRSDI3812) in hole. Impact head with sufficient force to compress spring and drive flared plastic fins completely thru hole. Screw attach PRSDI metal base plate to deck for additional stability (optional).
3. Vertical Support Anchorage: Insert threaded rod through finned plastic nozzle until the end of the threaded rod contacts the bottom of the steel barrel. Refer to Figure 10 for the required threaded rod engagement into the ISAT-PRSDI3812 (PRSDI3812) insert for proper installation. When applicable, the optional engagement marker on the threaded rod will seat flush with the bottom of the insert indicating proper threaded rod engagement.
4. Seismic Restraint Anchorage: From beneath deck, trim away plastic nozzle flush with projecting ¾" long metal barrel of ISAT-PRSDI3812 (PRSDI3812). Using ½" diameter threaded rod, insert threaded rod until the end of the threaded rod contacts the bottom of the steel barrel, then fully tighten the threaded rod. Mount seismic bracket on exposed rod and up against insert barrel. Install hex nut hand tight plus ½ turn minimum.

FIGURE 9B—ISAT-PRSDI3812 INSTALLATION INSTRUCTIONS

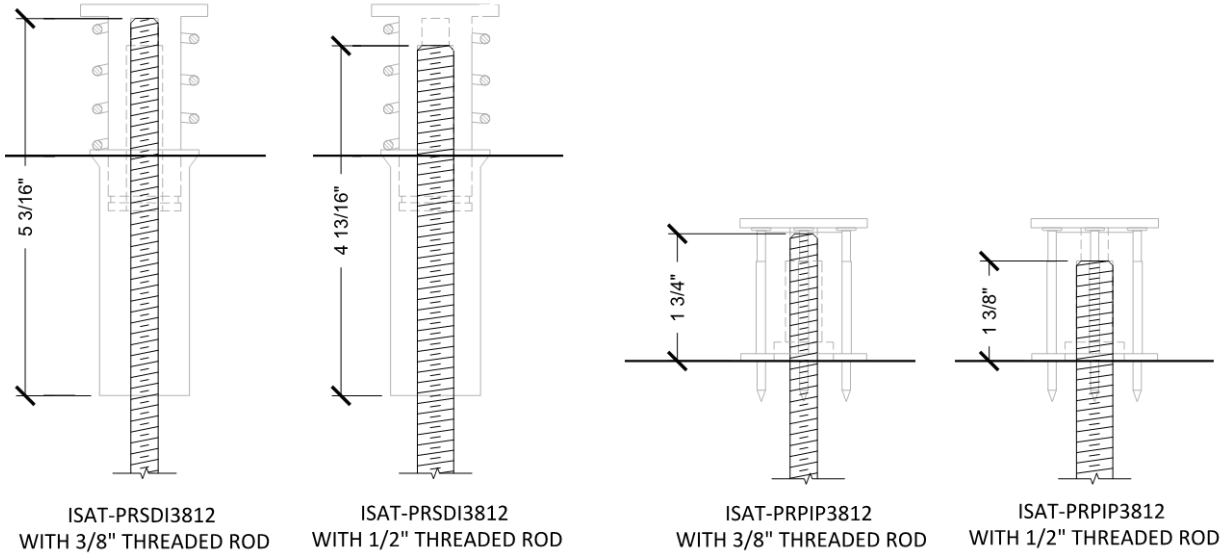


FIGURE 10 – REQUIRED THREADED ROD (ATR) ENGAGEMENT IN PUSH ROD INSERTS FOR PROPER INSTALATION

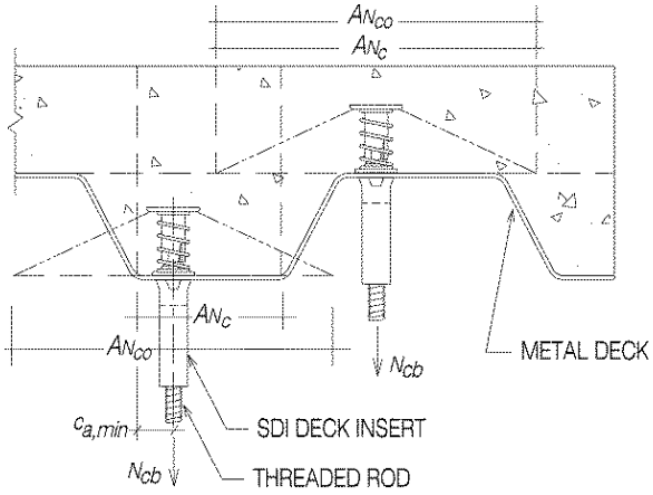


FIGURE 11—IDEALIZATION OF CONCRETE ON DECK FOR DETERMINATION OF CONCRETE BREAKOUT STRENGTH IN ACCORDANCE WITH ACI 318

ICC-ES Evaluation Report

ESR-3599 City of LA Supplement

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DIVISION: 03 00 00—CONCRETE
Section: 03 15 19—Cast-in Concrete Anchors
Section: 03 16 00—Concrete Anchors

REPORT HOLDER:

TOMARCO CONTRACTOR SPECIALTIES, INC. dba ISAT dba CEAS

EVALUATION SUBJECT:

ISAT "BLUE BANGER HANGER" HEADED, CAST-IN-PLACE DECK INSERTS: POURED-IN-PLACE (PIP) AND SDI STEEL DECK INSERTS (SDI & SDI-2) IN CRACKED AND UNCRACKED CONCRETE; ISAT "PUSH ROD HANGERS" HEADED, CAST-IN-PLACE DECK INSERTS: PUSH ROD POURED-IN-PLACE (PRPIP) AND PUSH ROD STEEL DECK INSERTS (PRSDI & PRSDI-2) IN CRACKED AND UNCRACKED CONCRETE

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the ISAT "Blue Banger Hanger" PIP, SDI, SDI-2, PRPIP3812, PRSDI3812 and PRSDI3812-s Headed Cast-In Specialty Inserts in cracked and uncracked concrete, described in ICC-ES evaluation report ESR-3599, 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 ISAT "Blue Banger Hanger" PIP, SDI, ISAT-PRPIP3812, and ISAT-PRSDI3812 Headed Cast-In Specialty Inserts in cracked and uncracked concrete, described in Sections 2.0 through 7.0 of the evaluation report ESR-3599, comply with LABC Chapter 19, and the LARC, and are subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The ISAT "Blue Banger Hanger" PIP, SDI, SDI-2, PRPIP3812, PRSDI3812 and PRSDI3812-2 Headed Cast-In Specialty Inserts described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report ESR-3599.
- The design, installation, conditions of use and identification of the ISAT "Blue Banger Hanger" PIP, SDI, SDI-2, PRPIP3812, PRSDI and PRSDI3812-2 Headed Cast-In Specialty Inserts are in accordance with the 2021 *International Building Code®* (IBC) provisions noted in the evaluation report ESR-3599.
- 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.
- The allowable and strength design values listed in the evaluation report and tables are for the connection of the headed cast-in specialty inserts to the concrete. The connection between the headed cast-in specialty inserts and the connected members shall be checked for capacity (which may govern).

This supplement expires concurrently with the evaluation report, reissued November 2024 and revised April 2025.

DIVISION:03 00 00—CONCRETE
Section: 03 15 19—Cast-in Concrete Anchors
Section: 03 16 00—Concrete Anchors

REPORT HOLDER:

TOMARCO CONTRACTOR SPECIALTIES, INC. dba ISAT dba CEAS

EVALUATION SUBJECT:

ISAT "BLUE BANGER HANGER" HEADED, CAST-IN-PLACE DECK INSERTS: POURED-IN-PLACE (PIP) AND STEEL DECK INSERTS (SDI & SDI-2) IN CRACKED AND UNCRACKED CONCRETE; ISAT "PUSH ROD HANGERS" HEADED, CAST-IN-PLACE DECK INSERTS: PUSH ROD POURED-IN-PLACE (PRPIP) AND PUSH ROD STEEL DECK INSERTS (PRSDI & PRSDI-2) IN CRACKED AND UNCRACKED CONCRETE

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that ISAT inserts, described in ICC-ES evaluation report ESR-3599, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2022 *California Building Code*® (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architects (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2022 *California Residential Code*® (CRC)

2.0 CONCLUSIONS

2.1 CBC:

The ISAT inserts, described in Sections 2.0 through 7.0 of the evaluation report ESR-3599, comply with CBC Chapter 19, provided the design and installation are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapters 16, 17 and 19 as applicable.

2.1.1 OSHPD:

The ISAT inserts, described in Sections 2.0 through 7.0 of the evaluation report ESR-3599, comply with CBC amended Sections in Chapters 16, 17 and 19, and Chapters 16A, 17A and 19A, provided the design and installation are in accordance with the 2021 *International Building Code*® (IBC), provisions noted in the evaluation report, as applicable, and the following additional requirements:

- Periodic special inspection is required, in accordance with Section 1705.1.1 and Table 1705.3 [OSHPD 1R, 2 and 5], or Section 1705A.1.1, and Table 1705A.3 [OSHPD 1 & 4] of the CBC, as applicable. In addition, special inspection is required for special seismic certification for designated seismic systems in accordance with amended Section 1705.13.4.1 [OSHPD 1R, 2 and 5] and Section 1705A.13.4 [OSHPD 1 & 4] of the CBC, as applicable.

2.1.2 DSA:

The ISAT inserts, described in Sections 2.0 through 7.0 of the evaluation report ESR-3599, comply with CBC amended Sections in Chapters 16 and 19, and Chapters 16A, 17A and 19A, provided the design and installation are in accordance with the 2021 *International Building Code*®(IBC), provisions noted in the evaluation report, as applicable, and the following additional requirements:

- Periodic special inspection is required, in accordance with Section 1705A.1.1 and Table 1705A.3 [DSA-SS, DSA-SS/CC] of the CBC. In addition, special inspection is required for special seismic certification for designated seismic systems in accordance with Section 1705A.13.4 [DSA-SS, DSA-SS/CC] of the CBC, as applicable.

2.2 CRC:

The ISAT inserts, described in Sections 2.0 through 7.0 of the evaluation report ESR-3599, comply with CRC Section R301.1.3, provided the design and installation are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapters 16 and 17, as applicable.

This supplement expires concurrently with the evaluation report, reissued November 2024 and revised April 2025.