ICC EVALUATION SERVICE®

www.icc-es.org | (800) 423-6587 | (562) 699-0543 *A Subsidiary of the International Code Council®*

ICC-ES Evaluation Report
ESR-4190

Reissued March 2021
Revised September 2021
This report is subject to renewal March 2022.

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

REPORT HOLDER:

GRIPPLE INC.

EVALUATION SUBJECT:

GRIPPLE SPIDER WOOD FORM INSERT (SX-WF) AND GRIPPLE SPIDER METAL DECK INSERT (SX-MD) INSERT RECEIVERS, AND SPIDER-SWIVEL TOGGLE (SXT_G) AND SPIDER THREADED ROD ADAPTER (SX-ADP) INSERT ELEMENTS IN CRACKED AND UNCRACKED CONCRETE

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018, 2015 and 2012 *International Building Code*® (IBC)
- 2018, 2015 and 2012 *International Residential Code*® (IRC)

For evaluation for compliance with codes adopted by Los Angeles Department of Building and Safety (LADBS), see ESR-4190 LABC and LARC Supplement.

For evaluation for compliance with codes adopted by the California Office of Statewide Health Planning and Development (OSHPD) and Division of State Architects (DSA), see ESR-4190 CBC and CRC Supplement.

Property evaluated:

Structural

2.0 USES

The Gripple Spider Wood Form (Regular and Low Profile) or Spider Metal Deck (Regular and Low Profile) insert receivers, and Spider-Swivel Toggle or Spider Threaded Rod Adapter insert elements, respectively, are used as an insert assembly to attach architectural, mechanical, electrical and similar systems that are not part of the primary load bearing or lateral-force resisting systems of the structural (i.e. non-structural components) to resist static, wind, and seismic (Seismic Design Categories A through F) vertical tension loads in cracked and uncracked normal-weight concrete lightweight concrete having a specified compressive strength, f'_c, of 2,500 psi to 6,500 psi (17.2 MPa to 44.8 MPa), and the soffit of cracked and uncracked normal-weight concrete, lightweight concrete and sand light-weight concrete on steel deck having a specified compressive strength, f'_c, of 3,000 psi to 6,500 psi (20.7 MPa to 44.8 MPa).

Reference to "insert receivers" in this report refers to the Gripple Spider Wood Form or Spider Metal Deck used in concrete; reference to "insert elements" refers to the Gripple Spider-Swivel Toggle or Spider Threaded Rod Adapter; reference to "insert assembly" in this report refers to the installed insert receivers in concrete with insert elements.

The insert assembly is an alternative to cast-in anchors described in Section 1901.3 of the 2018 and 2015 IBC, and Section 1908 and 1909 of the 2012 IBC. The insert anchor system may also be used where an engineered design is submitted in accordance with Section R301.1.3 of the IRC.

3.0 DESCRIPTION

3.1 Insert Assembly: The Gripple insert assembly consists of an insert receiver and an insert element.

3.2 Insert Receivers:

3.2.1 REGULAR PROFILE SPIDER WOOD FORM (SX-WF) / LOW PROFILE SPIDER WOOD FORM (SX-WF-LP): The SX-WF as illustrated in Figures 1A and 1B and SX-WF-LP as illustrated in Figures 3A and 3B consist of an injection molded Acrylonitrile Butadiene Styrene (ABS) plastic body, two galvanized carbon steel wire ropes and two wood nails for attachment to the concrete wood form. The hole in the bottom allows attachment of the insert element (see Sections 3.3.1 and 3.3.2 of this report). The SX-WF-LP has a shallower effective embedment depth than the SX-WF, as it is intended for use in compact concrete slabs as illustrated in Figure 7B.

3.2.2 REGULAR PROFILE SPIDER METAL DECK (SX-MD) / LOW PROFILE SPIDER METAL DECK (SX-MD-LP): The SX-MD as illustrated in Figures 2A and 2B and SX-MD-LP as illustrated in Figures 4A and 4B consist of an injection molded Acrylonitrile Butadiene Styrene (ABS) plastic body, and two galvanized carbon steel wire ropes. The plastic body has a hole at the bottom with an extended tubular portion that extends beyond the bottom surface of the metal deck. The base of the spider body has two holes for

attachment to the metal deck using two #8 screws. The hole in the bottom allows attachment of the insert element (see Section 3.3.1 and 3.3.2). The SX-MD-LP has a shallower effective embedment depth than the SX-MD as it is intended for use in compact composite slabs as illustrated in Figure 8F and G.

3.2.3 SPIDER SX-MD/SX-MD-LP SPANNING BRACKET: The SX-MD may be installed on the upper flute with a spanning bracket as shown in Figure 14. The spanning bracket is a $^3/_{16}$-inch (4.76 mm) thick carbon steel bracket which allows SX-MD/SX-MD-LP to be installed in between the upper flute level as illustrated in Figure 8C, 8D and 8G.

3.3 Steel Insert Elements:

3.3.1 SPIDER-SWIVEL TOGGLE (SXT_G): The SXT_G as illustrated in Figure 5A are zinc plated steel end fixings that are swaged on to an aircraft cable sling of a specified length. The swivel mechanism allows attachment of the STG_G to the SPIDER insert receiver only. The SXT_G comes in four aircraft cable sizes – No. 2 (2 mm), No. 3 (3 mm), No. 4 (4.6 mm) and No. 5 (6 mm) designated as SXT2G, SXT3G, SXT4G and SXT5G, respectively. Each Spider-Swivel Toggle model number indicates respective cable size.

3.3.2 SPIDER THREADED ROD ADAPTER (SX-ADP): The SX-ADP as illustrated in Figures 5B and 5D are zinc plated steel end fixings that come with internal threads of size SX-ADP-3/8O, SX-ADP-3/8, SX-ADP-1/2, SX-ADP-5/8 and SX-ADP-3/4-inch (0.375, 0.50, 0.625 and 0.75 inch) and can be screwed on to threaded rods of respective sizes.

The SX-ADP-SEIS is a male threaded seismic adapter as illustrated in Figure 5C. It has a solid body which is externally threaded to $^3/_4$-inch UNC threads for a carbon steel nut to lock the adapter in place. A hanger rod (by others) can be attached to SX-ADP-SEIS using a $^3/_4$-inch-diameter (19.05 mm) threaded rod coupler (by others) made from the same material used as a vertical seismic hanger or a diagonal bracket (by others) can be attached to SX-ADP-SEIS for use in a diagonal seismic bracing application. A typical installation using this adapter as a vertical seismic hanger is illustrated in Figure 12A or as a diagonal seismic bracing is illustrated in Figure 12B.

3.3.3 Threaded Steel Rods: Threaded steel rods (all-thread) must be threaded into the SX-ADP only. Values given in Tables 4, 5 and 6 are applicable to insert assembly with threaded rods made to ASTM A36, ASTM F1554 Gr. 105, ASTM A193 or other equivalent steel grade. Carbon steel threaded rods must be furnished with a minimum 5.1 µm (0.0002 inch) zinc plating.

3.4 Concrete:

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

3.5 Steel Deck Panels:

Steel deck panels must be in accordance with the configuration in Figures 8A, through 8G and have a minimum base steel thickness of 22 gage [0.0299 inch (0.759 mm)]. Steel must comply with ASTM A653/A653M SS Grade 50 minimum and have a minimum yield strength of 50,000 psi (345 MPa).

4.0 DESIGN AND INSTALLATION

4.1 Strength Design:

4.1.1 General: Design strength of anchors complying with the 2018 and 2015 IBC as well as Section R301.1.3 of the 2018 and 2015 IRC, must be determined in accordance with ACI 318-14 Chapter 17 and this report.

Design strength of anchors complying with the 2012 IBC as well as Section R301.1.3 of the 2012 IRC, must be determined in accordance with ACI 318-11 Appendix D and this report.

Strength reduction factors, ϕ, have been multiplied by the design strength in Tables 4, 5, 7, 8 and 9 for load combinations calculated in accordance with Section 1605.2 of the IBC, Section 5.3 of ACI 318-14, or Section 9.2 of ACI 318-11, as applicable. Strength reduction factors, ϕ, have been multiplied by the design strength in Tables 4 and 5 for load combinations calculated in accordance with ACI 318-11 Appendix C.

4.1.2 Requirements for Static Insert Assembly in Tension: The insert assembly nominal static strength in tension, ϕN_n, given in Tables 4, 5, 7 and 8 of this report has been multiplied by the strength reduction factor, ϕ.

4.1.3 Requirements for Seismic Design: The insert assembly nominal seismic strength in tension, ϕN_n, given in Tables 4, 5, 7, 8 and 9 of this report has been multiplied by the strength reduction factor, ϕ.

4.1.4 Requirements for Member Thickness, Edge Distance and Spacing: The requirements for minimum member thickness, minimum edge distance and minimum spacing as given in Table 1 of this report must apply.

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 1605.3 of the IBC, must be established as follows:

$$T_{allowable,ASD} = \phi N_n / \alpha \quad \text{(Eq. 4-1)}$$

where

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

ϕN_n = Lowest design strength of the insert assembly in tension as given in Tables 4 and 5, and Section 4.1 of this report (lbf or kN).

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.

4.3 Installation:

4.3.1 Insert Receivers:

4.3.2 SPIDER WOOD FORM (SX-WF and SX-WF-LP): The installation parameters are provided in Table 1. The insert receiver must be positioned on the wood formwork ensuring that the spider's belly and nails are in contact. The nails must receive impact from a sufficient force in order to drive them fully into the wood until the plastic belly sits flush against the form, as illustrated in Figure 9. Refer to Figure 9 for step by step installation instructions.

4.3.3 SPIDER METAL DECK (SX-MD and SX-MD-LP): The installation parameters are provided in Table 1. The insert receivers are installed into a predrilled hole cut into the metal deck. The insert receiver must be positioned on the metal deck flute ensuring that the SX-WF or SX-WF-LP, plastic tube and screws are in contact with the metal deck. The plastic tube is pushed through the hole drilled in the metal deck. The screws must be fastened with sufficient torque in order to fully drive them into the metal deck until the rubber head and plastic tube sit flush against the metal deck, as illustrated in Figure 10. Refer to Figure 10 for step by step installation instructions.

4.3.4 Insert Elements:

4.3.5 SPIDER-SWIVEL TOGGLE: The installation parameters of the SXT_G are provided in Table 2 and Figure 5A Following the concrete pour, the exposed screws / nails shall remain. The SXT_G toggle head must be aligned vertically before it can be installed into the SX-WF or SX-MD. The SXT_G toggle must be pushed into the hole of the SX-WF or SX-MD and then forced against the underside of the plastic head to rotate the toggle's head for engagement. A downward force should be applied to the cable/rod in order to prove that the SXT_G has been engaged correctly, as illustrated in Figure 13. The cable sling and Gripple fastener can be used to suspend various non-structural components as specified by the registered design professional. Gripple Fastener products are beyond the scope of this report.

4.3.6 SPIDER THREADED ROD ADAPTER: The installation parameters of the SX-ADP are provided in Table 3 and Figure 11. Following the concrete pour, the exposed screws / nails shall remain. SX-ADP can be installed on threaded steel rods of size corresponding to the size of SX-ADP as illustrated in Figures 5B, and 5D. The SX-ADP toggle head must be aligned vertically before it can be installed into the SX-WF or SX-MD. The SX-ADP toggle must be pushed into the hole of the SX-WF or SX-MD and then forced against the underside of the plastic head to rotate the toggle's head for engagement. A downward force should be applied to the rod in order to prove that the SX-ADP has been engaged correctly, as illustrated in Figure 11. Threaded rods can be used to suspend various non-structural components as specified by the registered design professional.

4.3.7 SPIDER SEISMIC ADAPTER: The installation parameters of the SX-ADP-SEIS are provided in Table 3 and Figures 12A and 12B. Following the concrete pour, the exposed screws / nails shall remain. SX-ADP-SEIS can be installed with threaded steel rod or seismic bracket as illustrated in Figures 6A and 6B, respectively. The SX-ADP-SEIS toggle head must be aligned vertically before it can be installed into the SX-WF or SX-MD. The SX-ADP-SEIS toggle must be pushed into the hole of the SX-WF or SX-MD and then forced against the underside of the plastic head to rotate the toggle's head for engagement. A downward force should be applied to the rod in order to prove that the SX-ADP-SEIS has been engaged correctly, as illustrated in Figure 12A for vertical seismic hanger or Figure 12B for diagonal seismic bracing applciation.

4.4 Special Inspection:

Periodic special inspection is required in accordance with Section 1705.1.1 and Table 1705.3 of the 2018, 2015 or 2012 IBC, as applicable. The special inspector must make periodic inspections during installation of the insert receiver to verify insert receiver type, concrete type, concrete compressive strength, insert receiver spacing, edge distances, concrete member thickness, insert elements fully engaged into insert receiver, 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."

5.0 CONDITIONS OF USE

The Gripple SX-WF, SX-WF-LP, SX-MD and SX-MD-LP insert receivers, and SXT_G, SX-ADP and steel threaded rod insert elements described in this report comply with, or are a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Insert assemblies are limited to dry interior locations.

5.2 Insert assemblies must be installed in accordance with the manufacturer's printed installation instructions (MPII) and this report. In case of conflict, this report governs.

5.3 Insert receivers must be limited to use in cracked and uncracked normal-weight and lightweight concrete having a specified compressive strength, f'_c, of 2,500 psi to 6,500 psi (17.2 MPa to 44.8 MPa).

5.4 Insert receivers must be limited to use in the soffit of cracked and uncracked normal-weight concrete, lightweight concrete and sand lightweight concrete on steel deck having a specified compressive strength, f'_c, of 3,000 psi to 6,500 psi (20.7 MPa to 44.8 MPa).

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

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

5.7 Insert receiver spacing and edge distance as well as minimum member thickness must be in accordance with Table 1 of this report.

5.8 Since an ICC-ES acceptance criteria for evaluating data to determine the performance of the insert assembly 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.

5.9 Insert assemblies may be used to resist short-term loading due to wind or seismic forces in locations designated as Seismic Design Categories A, B, C, D, E and F of the IBC, subject to the conditions of this report.

5.10 Where not otherwise prohibited in the code, insert assembly are permitted for use with fire-resistance-rated construction.

5.11 Insert assemblies are to resist vertical downward tension loads only, except when the spider seismic adapter, SX-ADP-SEIS, is used. Lateral loads, including seismic lateral loads, except when the spider seismic adapter, SX-ADP-SEIS, is used, must be transferred by other means and is outside the scope of this report.

5.12 The diagonal bracket (by others) must be attached directly below the spider insert and in full contact with the concrete / metal deck for diagonal seismic bracing applications. The design of the diagonal bracket is beyond the scope of this report.

5.13 Use of insert assemblies is limited to supporting non-structural components.

5.14 Calculations and details, justifying the use of the products is in compliance with the applicable code and the evaluation report, must be submitted to the code official for approval. The calculations and details must include additional lateral bracing to provide a complete load path as part of the component design. The calculations and details must be prepared by a registered design professional where required by the statutes of the jurisdiction which the project is to be constructed.

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

5.16 Insert assemblies 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 Cast-in Insert Assemblies in Concrete (AC502), dated June 2020.

6.2 Quality-control documentation.

7.0 IDENTIFICATION

7.1 The Gripple Spider Wood Form (SX-WF and SX-WF-LP) and Gripple Spider Metal Deck (SX-MD and SX-MD-LP) insert receivers, and Spider-Swivel Toggle (SXT_G) and Spider Threaded Rod Adapter (SX-ADP) insert elements are identified by packaging labeled with the manufacturer's name (Gripple Inc.), insert receiver name, steel insert element name, lot number and evaluation report number (ESR-4190).

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

GRIPPLE INC.
1611 EMILY LANE
AURORA, ILLINOIS 60502
(630) 406-0600
www.gripple.com
usinfo@gripple.com

TABLE 1—GRIPPLE SPIDER SX-WF AND SX-MD CAST-IN INSERT RECEIVERS INSTALLATION INFORMATION

DESIGN INFORMATION	SYMBOL	UNITS	INSERT RECEIVER			
			SX-WF	SX-WF-LP	SX-MD	SX-MD-LP
Minimum concrete member thickness	h_{min}	in. (mm)	4 (101.6)	3 (76.2)	4[1] (101.6)	3 3/4[2] (95.25)
Overall height of insert receiver	H_{insert}	in. (mm)	2.5 (63.5)	2.0 (50.8)	2.5 (63.5)	2.0 (50.8)
Overall length x width of insert receiver	D_{insert}	in. (mm)	3 1/4 x 2 1/4 (82.55 x 57.15)	3 1/4 x 2 1/4 (82.55 x 57.15)	3 1/4 x 2 1/4 (82.55 x 57.15)	3 1/4 x 2 1/4 (82.55 x 57.15)
Effective embedment	h_{ef}	in. (mm)	2.5 (63.5)	2.0 (50.8)	2.5 (63.5)	2.0 (50.8)
Minimum insert receiver clear edge distance	C_{min}	in. (mm)	5.0 (127)	4.0 (101.6)	1.125[3] (28.68)	0.875[4] (22.23)
Minimum insert receiver clear spacing	s_{min}	in. (mm)	10 (254)	8 (203.2)	10 (254)	8 (203.2)
Length of insert receiver tube	l_{tube}	in. (mm)	NA	NA	½ (12.7)	½ (12.7)

For **SI:** 1 inch = 25.4 mm. For **pound-inch** units: 1 mm = 0.03937 inch.

[1]Total member thickness of concrete with metal deck, see Figures 8A, 8B, 8C, 8D and 8E.

[2]Total member thickness of concrete with metal deck, see Figure 8F and 8G.

[3]See Figures 8A, 8B and 8E for edge distance illustrated at bottom flute.

[4]See Figure 8F for edge distance illustrated at bottom flute.

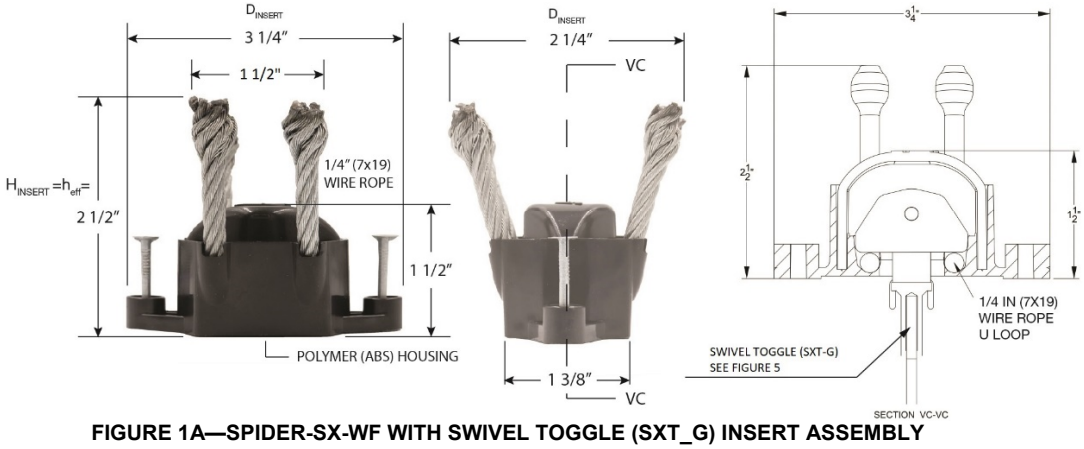


FIGURE 1A—SPIDER-SX-WF WITH SWIVEL TOGGLE (SXT_G) INSERT ASSEMBLY

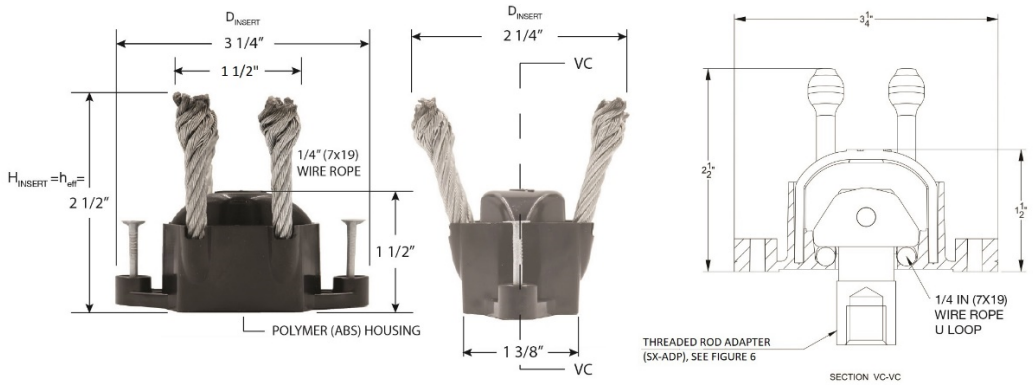


FIGURE 1B—SPIDER SX-WF WITH THREADED ROD ADAPTER (SX-ADP) INSERT ASSEMBLY

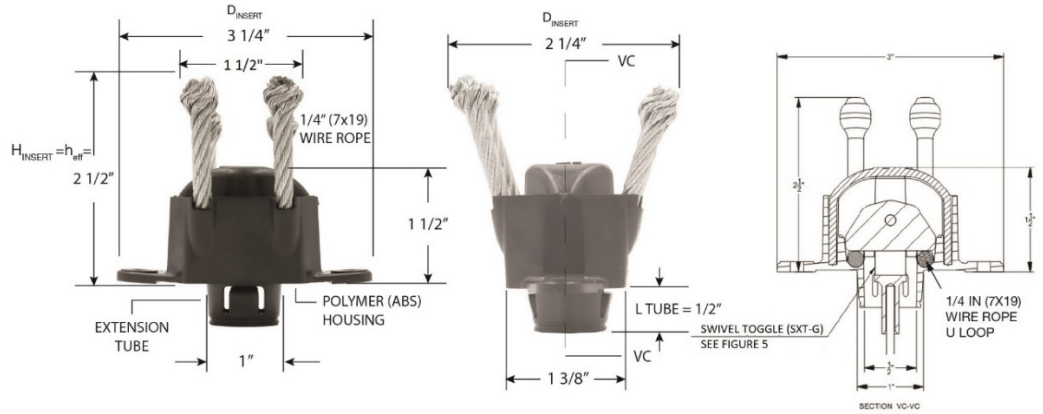


FIGURE 2A—SPIDER SX-MD WITH SWIVEL TOGGLE (SXT_G) INSERT ASSEMBLY

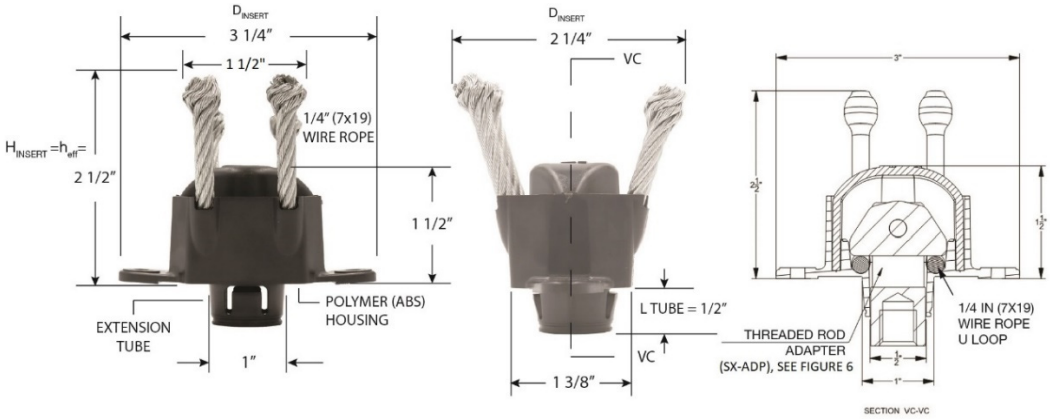


FIGURE 2B—SPIDER SX-MD WITH THREADED ROD ADAPTER (SX-ADP) INSERT ASSEMBLY

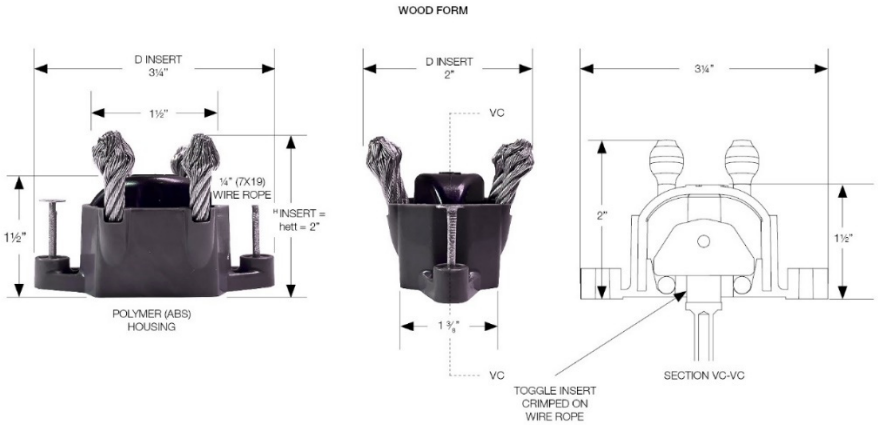


FIGURE 3A—LOW PROFILE SPIDER SX-WF-LP WITH SWIVEL TOGGLE (SXT_G) INSERT ASSEMBLY

FIGURE 3B—LOW PROFILE SPIDER SX-WF-LP WITH THREADED ROD ADAPTER (SX-ADP) INSERT ASSEMBLY

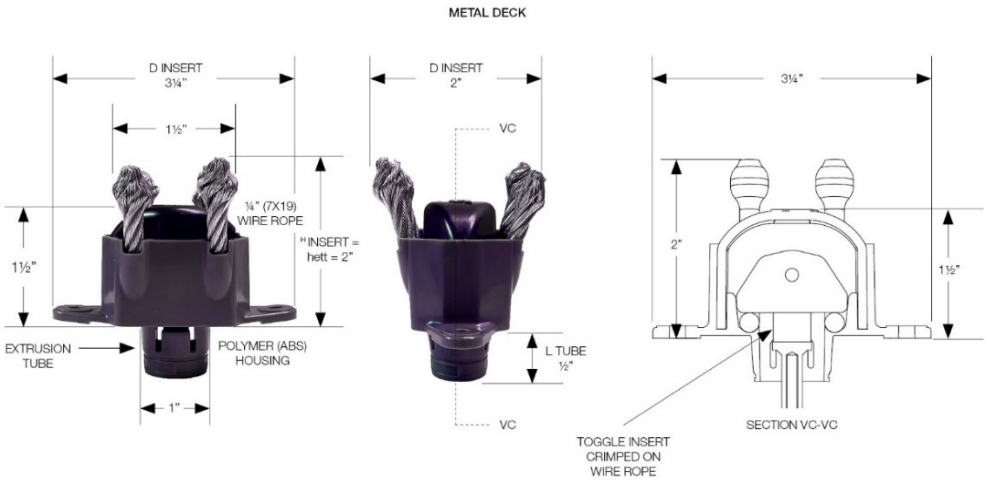


FIGURE 4A—LOW PROFILE SPIDER SX-MD-LP WITH SWIVEL TOGGLE (SXT_G) INSERT ASSEMBLY

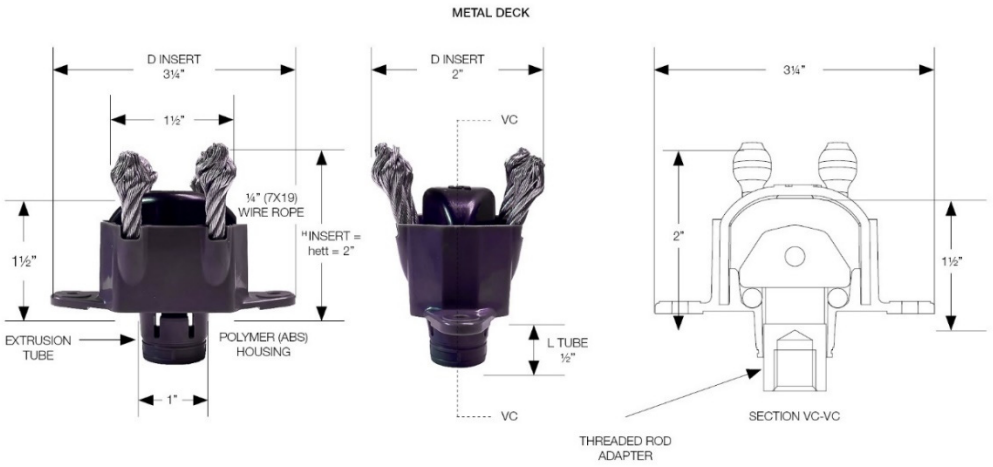


FIGURE 4B—LOW PROFILE SPIDER SX-MD-LP WITH THREADED ROD ADAPTER (SX-ADP) INSERT ASSEMBLY

TABLE 2—GRIPPLE INSERT ELEMENTS SPIDER-SWIVEL TOGGLE (SXT_G) INSTALLATION INFORMATION

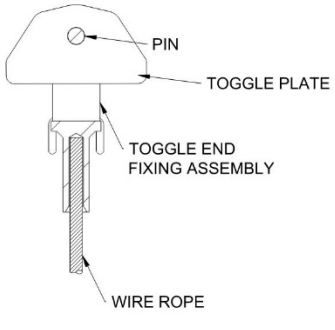
DESIGN INFORMATION	SYMBOL	UNITS	INSERT ELEMENT			
			SXT2G	SXT3G	SXT4G	SXT5G
Wire gage	w_{gage}	- (SI)	No. 2 2 mm	No. 3 3 mm	No. 4 4 mm	No. 5 5 mm
Wire length	w_{length}	in. (cm)	60, 120, 180, 240 or 360 (152, 305, 457, 611 or 914)			

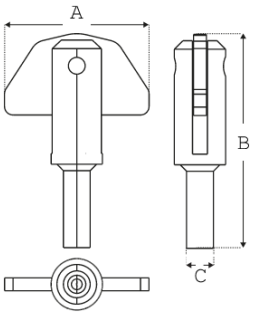
For **SI:** 1 inch = 25.4 mm. For **pound-inch** units: 1 mm = 0.03937 inch.

TABLE 3—GRIPPLE INSERT ELEMENTS SPIDER THREADED ROD ADAPTER (SX-ADP) INSTALLATION INFORMATION

DESIGN INFORMATION	SYMBOL	UNITS	INSERT ELEMENT				
			SX-ADP-3/8O SX-ADP-3/8	SX-ADP-1/2	SX-ADP-5/8	SX-ADP-3/4	SX-ADP-SEIS
Thread size	d_{thread}	in. (mm)	0.375 (9.5)	0.5 (12.7)	0.625 (15.875)	0.75 (19.05)	0.75 (19.05)
Thread length	ℓ_{thread}	in. (mm)	0.6 (15.25)	0.65 (16.51)	0.85 (21.60)	0.95 (24.13)	1.75 (44.45)

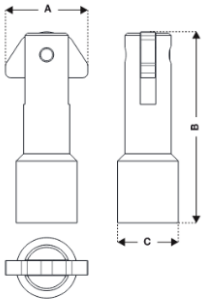
For **SI:** 1 inch = 25.4 mm. For **pound-inch** units: 1 mm = 0.03937 inch.





Toggle	A	B	C
No. 2	1.33"	1.91"	0.47"
No. 3	1.33"	1.91"	0.47"
No. 4	1.33"	2.30"	0.47"
No. 5	1.33"	2.30"	0.47"

FIGURE 5A—SPIDER-SWIVEL TOGGLE INSERT (SXT_G)



Rod Adaptor	A	B	C
3/8"	1.3"	2.04"	0.55"
1/2"	1.3"	1.97"	0.75"
5/8"	1.3"	2.85"	0.87"
3/4"	1.3"	3.09"	0.98"

FIGURE 5B—SPIDER INTERNAL THREADED ROD ADAPTOR (SX-ADP-3/8O AND SX-ADP-_)

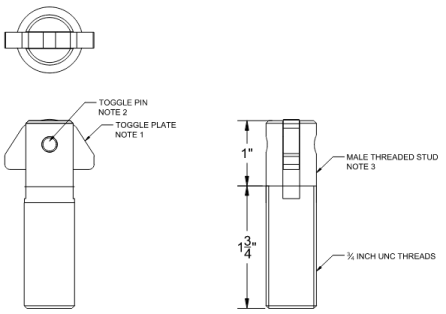


FIGURE 5C—SPIDER 3/4 INCH SEISMIC ADAPTER (SX-ADP-SEIS)

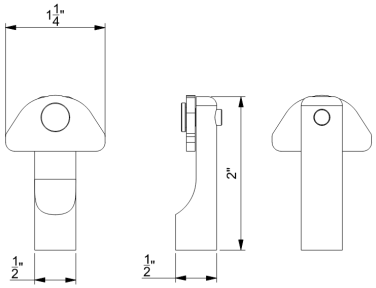


FIGURE 5D—SPIDER 3/8 INCH OPTIONAL INTERNAL THREADED ROD ADAPTOR (SX-ADP-3/8)

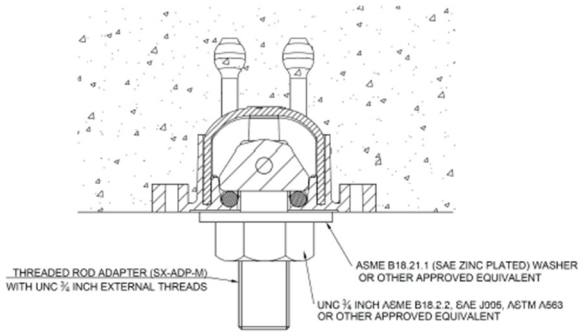


FIGURE 6A—SPIDER INSERT ASSEMBLY WITH (SX-ADP-SEIS) FOR VERTICAL SEISMIC APPLICATION

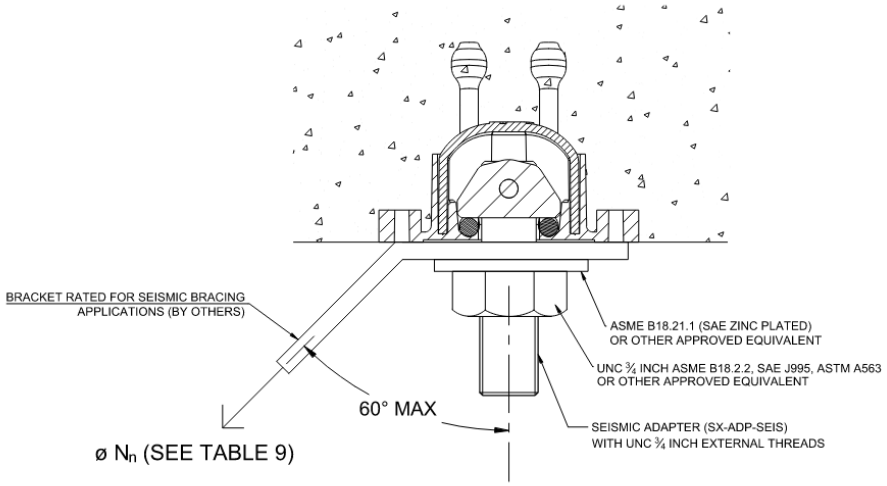


FIGURE 6B—SPIDER INSERT ASSEMBLY WITH (SX-ADP-SEIS) FOR SEISMIC BRACING APPLICATION

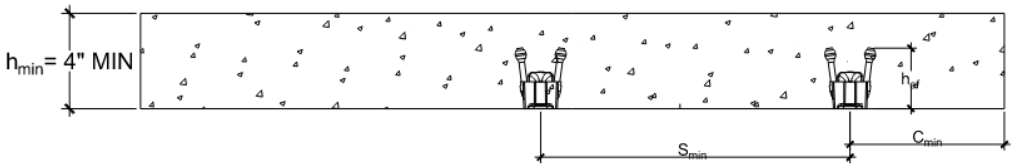


FIGURE 7A—SPIDER SX-WF INSERT IN CONCRETE SLAB

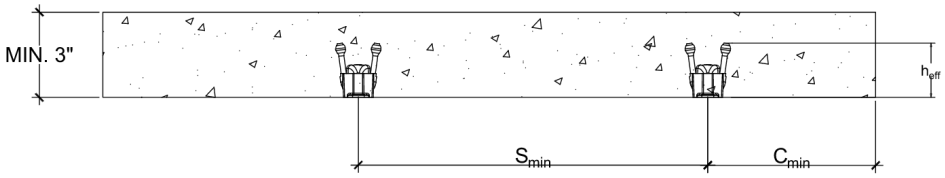


FIGURE 7B—SPIDER SX-WF-LP INSERT IN CONCRETE SLAB

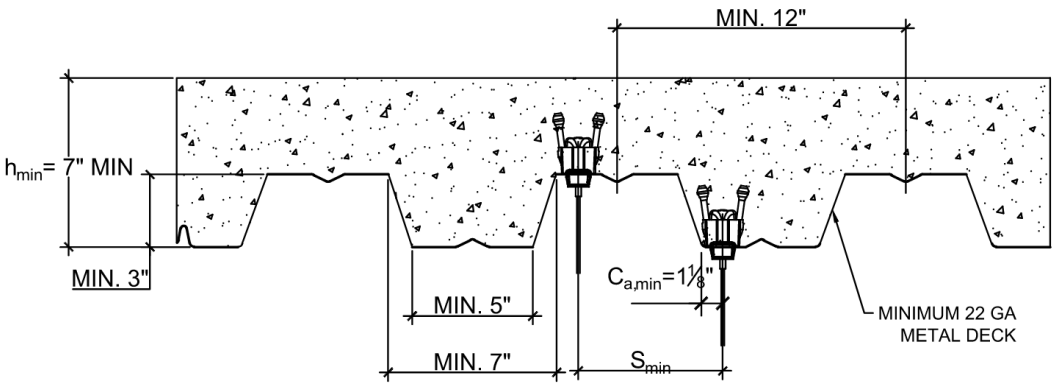


FIGURE 8A—SPIDER SX-MD INSERT IN CONCRETE ON METAL DECK

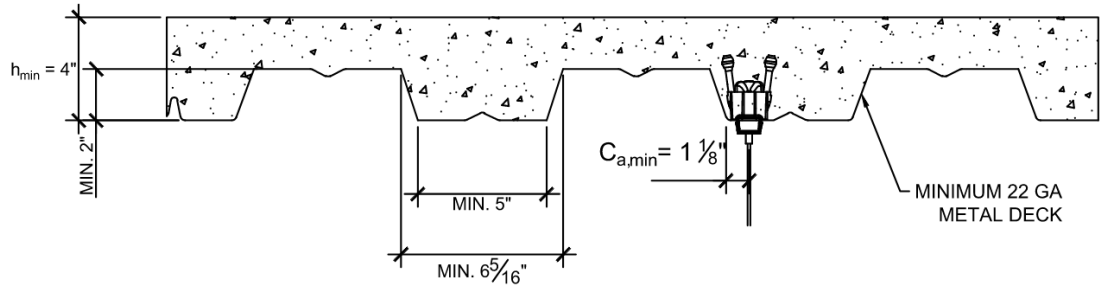


FIGURE 8B—SPIDER SX-MD INSERT IN CONCRETE ON METAL DECK (LOWER FLUTE)

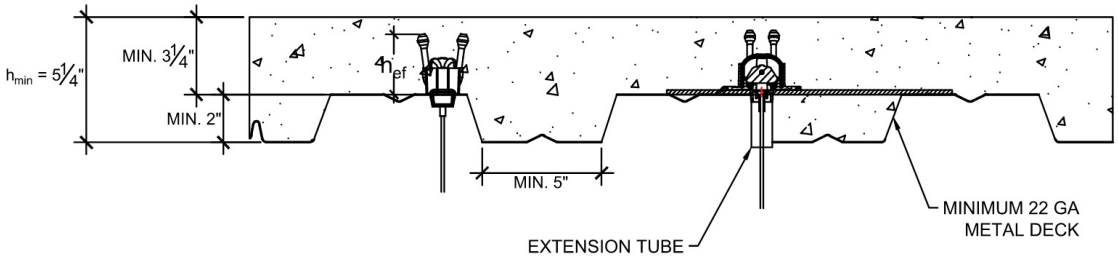


FIGURE 8C—SPIDER SX-MD INSERT IN CONCRETE ON METAL DECK (UPPER FLUTE)

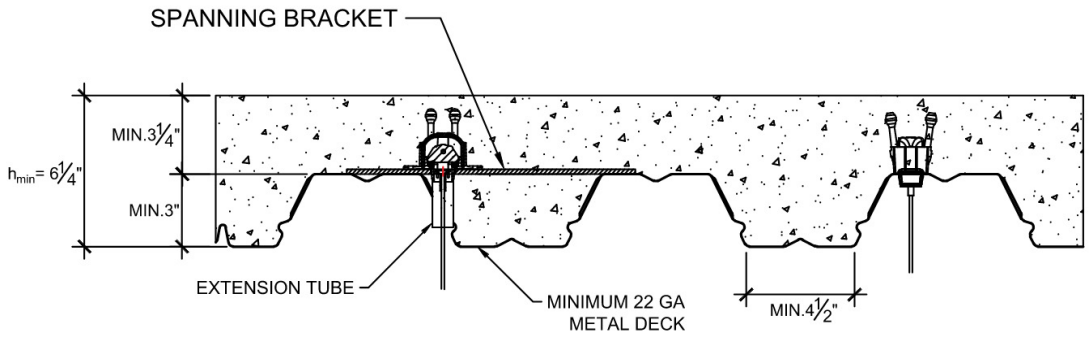


FIGURE 8D—SPIDER SX-MD INSERT IN CONCRETE ON METAL DECK (UPPER FLUTE)

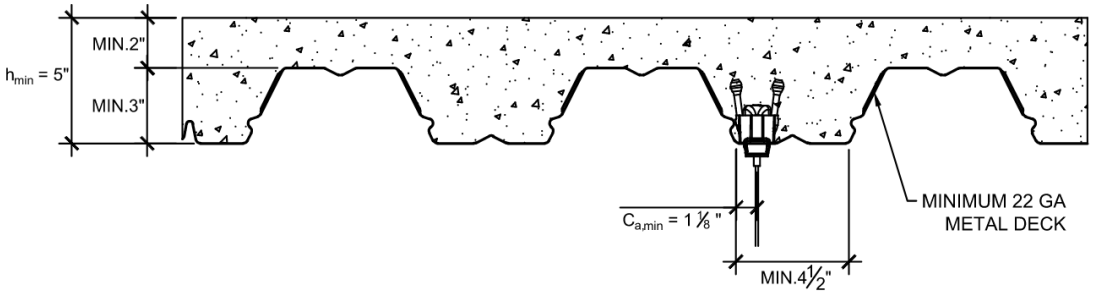


FIGURE 8E—SPIDER SX-MD INSERT IN CONCRETE ON METAL DECK (LOWER FLUTE)

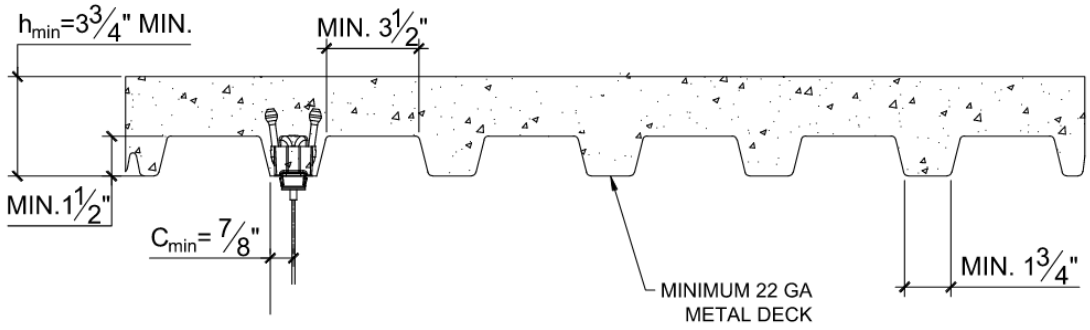


FIGURE 8F—SPIDER SX-MD-LP INSERT IN CONCRETE ON METAL DECK (LOWER FLUTE)

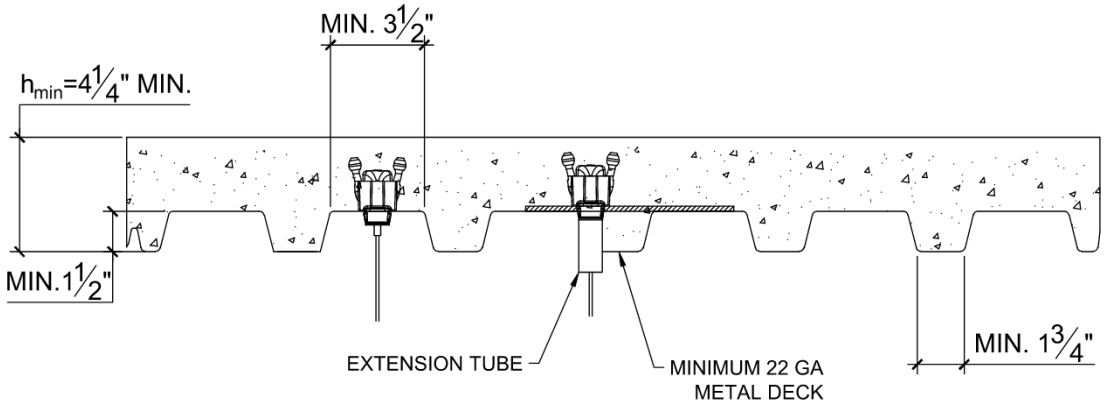


FIGURE 8G—SPIDER SX-MD-LP INSERT IN CONCRETE ON METAL DECK (UPPER FLUTE)

TABLE 4—SPIDER SX-WF INSERT ASSEMBLY DESIGN INFORMATION IN CONCRETE[3,4,5,7]

INSERT RECEIVER	CONCRETE		ϕN_n, TENSION DESIGN STRENGTH IN WOOD DECK, lb			
			SXT2G	SXT3G	SXT4G	SXT5G
SPIDER INSERT (SX-WF)	Low Strength[1]	Uncracked	295	740	1,870	2,680
		Cracked[6]	295	740	1,870	2,680
	High Strength[2]	Uncracked	295	740	1,870	2,680
		Cracked[6]	295	740	1,870	2,680
	CONCRETE		**ϕN_n, TENSION DESIGN STRENGTH IN WOOD DECK, lb**			
			SX-ADP-3/8O SX-ADP-3/8	**SX-ADP-1/2**	**SX-ADP-5/8**	**SX-ADP-3/4 SX-ADP-SEIS**
	Low Strength[1]	Uncracked	1,510	3,405	3,405	3,405
		Cracked[6]	1,510	3,090	3,090	3,090
	High Strength[2]	Uncracked	1,510	4,165	4,165	4,165
		Cracked[6]	1,510	4,325	4,325	4,325

For SI: 1 inch = 25.4 mm, 1 pound = 0.00445 kN, 1 in^2 = 645.2 mm^2. For pound-inch unit: 1 mm = 0.03937 inches.

[1]Concrete compressive strength, f'_c = 2,500 psi minimum normal-weight concrete for SX-WF.
[2]Concrete compressive strength, f'_c = 6,000 psi minimum normal-weight concrete for SX-WF.
[3]The insert assembly nominal static strength in tension, ϕN_n, has been multiplied by the strength reduction factor, ϕ.
[4]Strength shown in the table are for the insert assembly in tension only.
[5]Values are for Condition B where supplementary reinforcement in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3 is not provided.
[6]Values are applicable for Seismic Design Categories C, D, E and F application.
[7]Edge distance and spacing meets the requirements in Table 1.

TABLE 5—SPIDER SX-MD INSERT ASSEMBLY DESIGN INFORMATION IN CONCRETE[1,2,3,4,6]

INSERT RECEIVER	CONCRETE OVER METAL DECK			ϕN_n, TENSION DESIGN STRENGTH IN METAL DECK, lb			
				SXT2G	SXT3G	SXT4G	SXT5G
SPIDER INSERT (SX-MD)	Figure 8A	f'c = 3,000 psi	Uncracked	295	740	1,870	2,380
			Cracked[5]	295	740	1,680	1,680
	Figure 8B, 8C, 8D, 8E	f'c = 3,000 psi	Uncracked	295	740	1,870	2,075
			Cracked[5]	295	740	1,575	1,575
	CONCRETE OVER METAL DECK			**ϕN_n, TENSION DESIGN STRENGTH IN METAL DECK, lb**			
				SX-ADP-3/8O SX-ADP-3/8	**SX-ADP-1/2**	**SX-ADP-5/8**	**SX-ADP-3/4 SX-ADP-SEIS**
	Figure 8A	f'c = 3,000 psi	Uncracked	1,510	2,380	2,380	2,380
			Cracked[5]	1,510	1,680	1,680	1,680
	Figure 8B, 8C, 8D, 8E	f'c = 3,000 psi	Uncracked	1,510	2,075	2,075	2,075
			Cracked[5]	1,510	1,575	1,575	1,575

For SI: 1 inch = 25.4 mm, 1 pound = 0.00445 kN, 1 in^2 = 645.2 mm^2. For pound-inch unit: 1 mm = 0.03937 inches.

[1]Concrete compressive strength, f'_c = 3,000 psi minimum sand lightweight, light-weight or normal-weight concrete for SX-MD.
[2]The insert assembly nominal static strength in tension, ϕN_n, has been multiplied by the strength reduction factor, ϕ.
[3]Strength shown in the table are for the insert assembly in tension only.
[4]Values are for Condition B where supplementary reinforcement in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3 is not provided.
[5]Values are applicable for Seismic Design Categories C, D, E and F application
[6]Edge distance and spacing meets the requirements in Table 1.

TABLE 6—EXAMPLE ASD ALLOWABLE TENSION DESIGN VALUES (lbs) FOR SPIDER SX-WF AND SX-MD INSERT ASSEMBLIES FOR ILLUSTRATIVE PURPOSES[1,2,3,4,5,6]

INSERT RECEIVER	CONCRETE			ALLOWABLE TENSION IN WOOD DECK, lb			
				SXT2G	SXT3G	SXT4G	SXT5G
SPIDER INSERT (SX-WF)	Low Strength		Cracked	210	530	1,335	1,915
				SX-ADP-3/8	SX-ADP-1/2	SX-ADP-5/8	SX-ADP-3/4 SX-ADP-SEIS
				1,080	2,205	2,205	2,205
INSERT RECEIVER	**CONCRETE OVER METAL DECK**			**ALLOWABLE TENSION IN METAL DECK, lb**			
				SXT2G	**SXT3G**	**SXT4G**	**SXT5G**
SPIDER INSERT (SX-MD)	Figure 8A	f'c = 3,000 psi	Cracked	210	530	1,200	1,200
				SX-ADP-3/8	SX-ADP-1/2	SX-ADP-5/8	SX-ADP-3/4 SX-ADP-SEIS
				1,080	1,200	1,200	1,200

For SI: 1 inch = 25.4 mm, 1 pound = 0.00445 kN, 1 in^2 = 645.2 mm^2. For pound-inch unit: 1 mm = 0.03937 inches.

[1]Concrete compressive strength, f'_c = 2,500 psi minimum normal-weight concrete for SX-WF, f'_c = 3,000 psi minimum sand lightweight concrete for SX-MD, cracked concrete.
[2]Load combinations from ACI 318-14 5.3 or ACI 318-11 Section 9.2, as applicable.
[3]100% dead load, controlling load combination 1.4D.
[4]Calculation of the weighted average for α = 1*1.4 = 1.40.
[5]Edge distance and spacing meets the requirements in Table 1.
[6]Values are for Condition B where supplementary reinforcement in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3 is not provided.

TABLE 7—SPIDER SX-WF-LP INSERT ASSEMBLY DESIGN INFORMATION IN CONCRETE[2,3,4,6]

INSERT RECEIVER	CONCRETE[1]	ϕN_n, TENSION DESIGN STRENGTH IN WOOD DECK, lb			
		SXT2G	SXT3G	SXT4G	SXT5G
SPIDER INSERT (SX-WF-LP)	Uncracked	295	740	1,870	2,365
	Cracked[5]	295	740	1,621	1,621
	CONCRETE[1]	**ϕN_n, TENSION DESIGN STRENGTH IN WOOD DECK, lb**			
		SX-ADP-3/8O SX-ADP-3/8	SX-ADP-1/2	SX-ADP-5/8	SX-ADP-3/4 SX-ADP-SEIS
	Uncracked	1,510	2,365	2,365	2,365
	Cracked[5]	1,510	1,621	1,621	1,621

For SI: 1 inch = 25.4 mm, 1 pound = 0.00445 kN, 1 in^2 = 645.2 mm^2. For pound-inch unit: 1 mm = 0.03937 inches.

[1]Concrete compressive strength, f'_c = 2,500 psi minimum normal-weight concrete for SX-WF-LP.
[2]The insert assembly nominal static strength in tension, ϕN_n, has been multiplied by the strength reduction factor, ϕ.
[3]Strength shown in the table are for the insert assembly in tension only.
[4]Values are for Condition B where supplementary reinforcement in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3 is not provided.
[5]Values are applicable for Seismic Design Categories C, D, E and F application.
[6]Edge distance and spacing meets the requirements in Table 1.

TABLE 8—SPIDER SX-MD-LP INSERT ASSEMBLY DESIGN INFORMATION IN CONCRETE[1,2,3,4,6]

INSERT RECEIVER	CONCRETE OVER METAL DECK, FIGURE 8F and 8G		ϕN_n, TENSION DESIGN STRENGTH IN METAL DECK, lb			
			SXT2G	SXT3G	SXT4G	SXT5G
SPIDER INSERT (SX-MD-LP)	f'c = 3,000 psi	Uncracked	295	740	1,395	1,395
		Cracked[5]	295	740	1,215	1,215
	CONCRETE OVER METAL DECK		**ϕN_n, TENSION DESIGN STRENGTH IN METAL DECK, lb**			
			SX-ADP-3/8O SX-ADP-3/8	SX-ADP-1/2	SX-ADP-5/8	SX-ADP-3/4 SX-ADP-SEIS
	f'c = 3,000 psi	Uncracked	1,395	1,395	1,395	1,395
		Cracked[5]	1,215	1,215	1,215	1,215

For SI: 1 inch = 25.4 mm, 1 pound = 0.00445 kN, 1 in^2 = 645.2 mm^2. For pound-inch unit: 1 mm = 0.03937 inches.

[1]Concrete compressive strength, f'_c = 3,000 psi minimum sand lightweight, light-weight or normal-weight concrete for SX-MD-LP.
[2]The insert assembly nominal static strength in tension, ϕN_n, has been multiplied by the strength reduction factor, ϕ.
[3]Strength shown in the table are for the insert assembly in tension only.
[4]Values are for Condition B where supplementary reinforcement in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3 is not provided.
[5]Values are applicable for Seismic Design Categories C, D, E and F application
[6]Edge distance and spacing meets the requirements in Table 1.

TABLE 9—SPIDER AS DIAGONAL SEISMIC BRACING[1,2,3,4,6]

INSERT RECEIVER	SUBSTRATE TYPE		ϕN_n, DIAGONAL ANCHOR STRENGTH, lb
			SX-ADP-SEIS
SPIDER INSERT (SX-WF)	Concrete. Figure 7A (f'c = 2,500 psi)	Uncracked/ Cracked[5]	1155
SPIDER INSERT (SX-MD)	Concrete Over Metal Deck, Figure 8B, 8C, 8D, 8E (f'c = 3,000 psi)	Uncracked/ Cracked[5]	985

For SI: 1 inch = 25.4 mm, 1 pound = 0.00445 kN, 1 in^2 = 645.2 mm^2. For pound-inch unit: 1 mm = 0.03937 inches.

[1]Concrete compressive strength, f'_c = 2,500 psi minimum normal-weight concrete for SX-WF and f'_c = 3,000 psi minimum sand lightweight, light-weight or normal-weight concrete for SX-MD.
[2]The insert assembly nominal static strength in tension, ϕN_n, has been multiplied by the strength reduction factor, ϕ.
[3]Strength shown in the table are for the insert assembly in tension and compression.
[4]Values are for Condition B where supplementary reinforcement in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3 is not provided.
[5]Values are applicable for Seismic Design Categories C, D, E and F application
[6]Edge distance and spacing meets the requirements in Table 1.

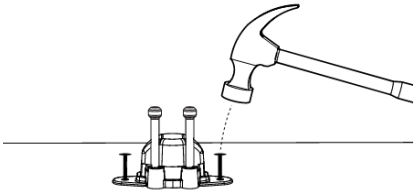
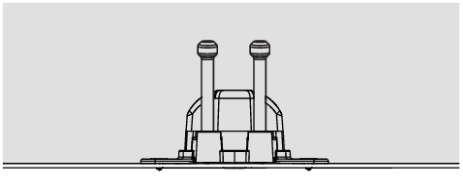
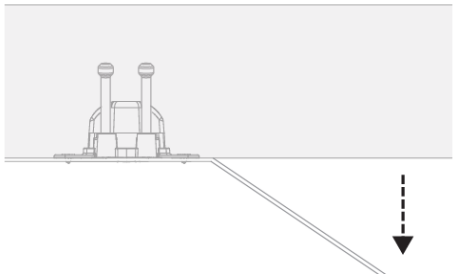
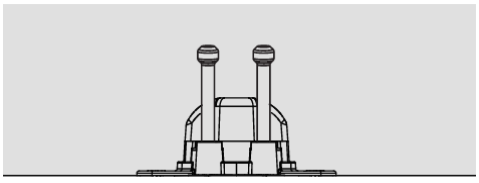
INSTALLATION STEPS		ILLUSTRATION
1	Attach the Gripple Spider Insert to the wood form using nails. You can also use Gripple Spider installation tool to position and secure the spider.	
2	Pour concrete and cure it till it achieves required minimum compressive strength as specified within this report	
3	Remove the wood form	
4	Spider will be ready for further installation of Swivel Toggles (SXT_G) or Threaded rod adapter (SX-ADP)	

FIGURE 9—GRIPPLE SPIDER INSERT (SX-WF AND SX-WF-LP) INSTALLATION INSTRUCTIONS

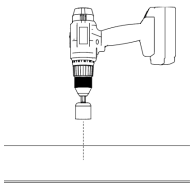
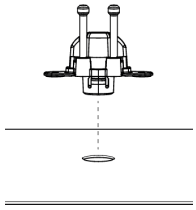
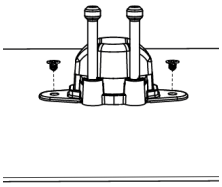
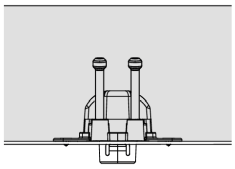
	INSTALLATION STEPS	ILLUSTRATION
1	Drill 1 inch diameter hole in the Metal Deck in accordance with the installation location illustrated in Figure 7	
2	Insert Gripple Spider SX-MD through this hole	
3	Secure the Spider insert to the deck using two #8 screws	
4	Pour the concrete and let it cure to the required minimum compressive strength as recommended in this report. Spider will be ready for further installation of Swivel Toggle (SXT_G) or Threaded rod adapter (SX-ADP)	

FIGURE 10—GRIPPLE SPIDER INSERT (SX-MD AND SX-MD-LP) INSTALLATION INSTRUCTIONS

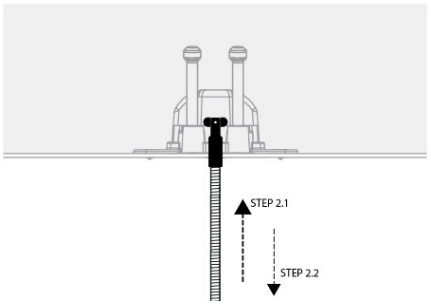
	INSTALLATION STEPS	ILLUSTRATION
1	Simply screw the threaded rod on to the Gripple threaded rod adapter SX-ADP.	
2	2.1 Insert Male Threaded Rod Adapter (SX-ADP-SEIS) into Spider Insert with upward force with the toggle parallel to the nails/screws 2.2 Pull Rod Adapter down with force 2-3 times to ensure it is set in the spider 2.2A If Rod Adapter does not set, reinsert it into the spider & rotate a quarter turn in the locking direction of the rod (the direction in which you will rotate the rod to lock it with rod adapter or a nut), and pull downwards 2-3 times to ensure it sets. - Do not rotate the rod in its unlocking direction, it may cause the rod to loosen from the rod adapter. - Always pull downward firmly to ensure rod adapter is properly set before completing installation. 2.3 Try to turn the rod again in its locking direction to ensure it is fully tightened into the rod adapter.	

FIGURE 11—THREADED ROD ADAPTER (SX-ADP)

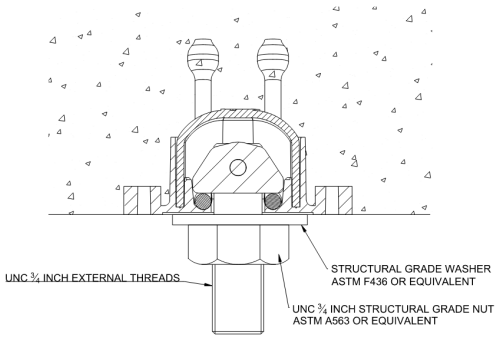
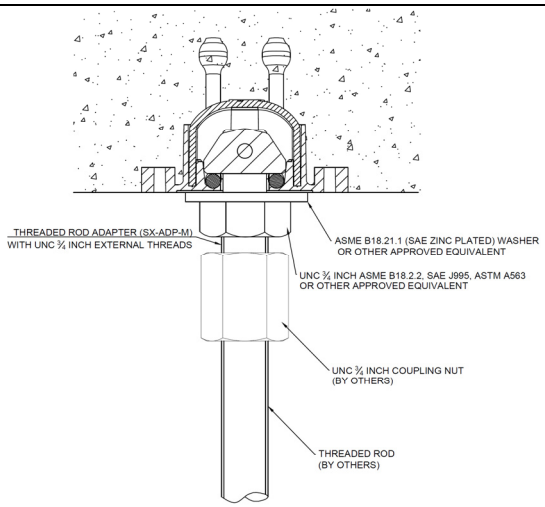
	INSTALLATION STEPS	ILLUSTRATION
1	1.1 Insert Rod Adapter into Spider Insert with upward force with the toggle parallel to the nails/screws 1.2 Pull Rod Adapter down with force 2-3 times to ensure it is set in the spider 1.3 If Rod Adapter does not set, reinsert it into the spider & rotate a quarter turn in any direction, and pull downwards 2-3 times to ensure it sets. - Always pull downward firmly to ensure rod adapter is properly set before completing installation. 1.4 Lock the adapter in its position by using a structural grade ¾ inch nut and washer as shown in the figure.	
2	Connect the threaded rod to the Gripple male threaded rod adapter SX-ADP-SEIS, using a structural grade carbon steel coupling nut.	

FIGURE 12A—SEISMIC ADAPTER (SX-ADP-SEIS) INSTALLATION

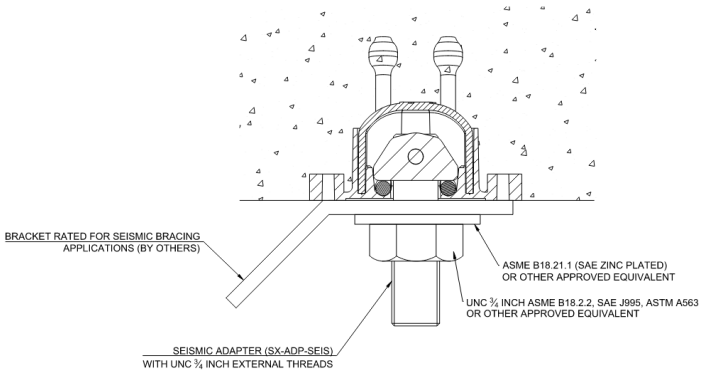
	INSTALLATION STEPS	ILLUSTRATION
1	1.1 Insert Rod Adapter into Spider Insert with upward force with the toggle parallel to the nails/screws. 1.2 Pull Rod Adapter down with force 2-3 times to ensure it is set in the spider. 1.3 If Rod Adapter does not set, reinsert it into the spider & rotate a quarter turn in any direction, and pull downwards 2-3 times to ensure it sets. - Always pull downward firmly to ensure rod adapter is properly set before completing installation. 1.4 Insert seismic brace attachment bracket (by others) into the adapter. Set the bracket in full contact with concrete / deck. 1.5 Lock the adapter in its position by using a structural grade ¾ inch nut and washer as shown in the figure.	

FIGURE 12B—SEISMIC ADAPTER (SX-ADP-SEIS) INSTALLATION FOR SEISMIC APPLICATION

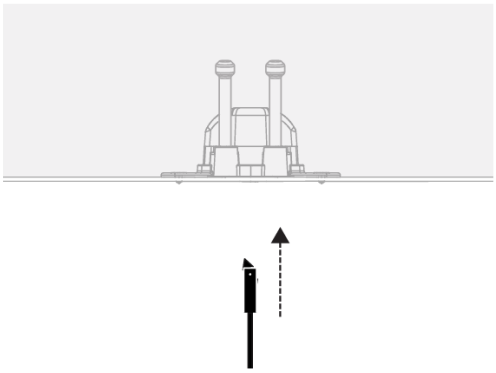
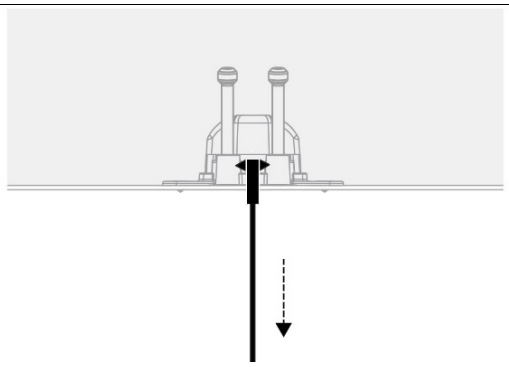
INSTALLATION STEPS		ILLUSTRATION
1	Insert Gripple wire rope swivel toggle insider the spider body and press until the toggle is set insider the body.	
2	Apply downward force to ensure that toggle is set within the body of the spider	

FIGURE 13—SWIVEL TOGGLE (SXT_G) INSTALLATION

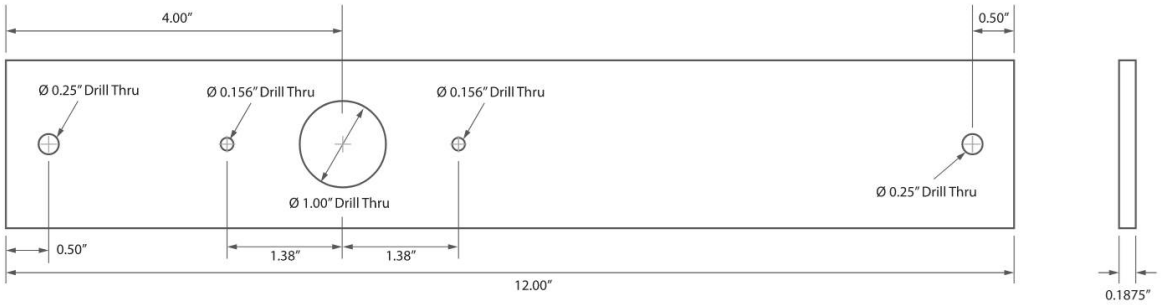


FIGURE 14—SPIDER SX-MD SPANNING BRACKET

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

REPORT HOLDER:

GRIPPLE INC.

EVALUATION SUBJECT:

GRIPPLE SPIDER WOOD FORM INSERT (SX-WF) AND GRIPPLE SPIDER METAL DECK INSERT (SX-MD) INSERT RECEIVERS, AND SPIDER-SWIVEL TOGGLE (SXT_G) AND SPIDER THREADED ROD ADAPTER (SX-ADP) INSERT ELEMENTS IN CRACKED AND UNCRACKED CONCRETE

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the Gripple Spider Insert Assembly for wood form and steel deck in cracked and uncracked concrete, described in ICC-ES evaluation report ESR-4190, has 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:

- 2020 *City of Los Angeles Building Code* (LABC)
- 2020 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The Gripple Spider Insert Assembly for wood form and steel deck in cracked and uncracked concrete, described in Sections 2.0 through 7.0 of the evaluation report ESR-4190, complies with LABC Chapter 19, and LARC, and are subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The Gripple Spider Insert Assembly described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report ESR-4190.
- The design, installation, conditions of use and labeling of the Gripple Spider Insert Assembly for wood form and steel deck are in accordance with the 2018 *International Building Code®* (IBC) provisions noted in the evaluation report ESR-4190.
- 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 March 2021 and revised September 2021.

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

REPORT HOLDER:

GRIPPLE INC.

EVALUATION SUBJECT:

GRIPPLE SPIDER WOOD FORM INSERT (SX-WF) AND GRIPPLE SPIDER METAL DECK INSERT (SX-MD) INSERT RECEIVERS, AND SPIDER-SWIVEL TOGGLE (SXT_G) AND SPIDER THREADED ROD ADAPTER (SX-ADP) INSERT ELEMENTS IN CRACKED AND UNCRACKED CONCRETE

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the Gripple Spider Wood Form (Regular and Low Profile) or Spider Metal Deck (Regular and Low Profile) insert receivers, and Spider-Swivel Toggle or Spider Threaded Rod Adapter insert elements, described in ICC-ES evaluation report ESR-4190, have also been evaluated for compliance with the codes noted below.

Applicable code edition*(s)*:

- 2019 *California Building Code* (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) and Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2019 *California Residential Code* (CRC)

2.0 CONCLUSIONS

2.1 CBC:

The Gripple Spider Wood Form (Regular and Low Profile) or Spider Metal Deck (Regular and Low Profile) insert receivers, and Spider-Swivel Toggle or Spider Threaded Rod Adapter insert elements, described in Sections 2.0 through 7.0 of the evaluation report ESR-4190, comply with CBC Chapter 19, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapters 16 and 17.

2.1.1 OSHPD:

The Gripple Spider Wood Form (Regular and Low Profile) or Spider Metal Deck (Regular and Low Profile) insert receivers, and Spider-Swivel Toggle or Spider Threaded Rod Adapter insert elements, described in Sections 2.0 through 7.0 of the evaluation report ESR-4190, comply with CBC amended Sections Chapters 16, 17 and 19, and Chapters 16A, 17A and 19A, provided the design and installation are in accordance with the 2018 *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 1705.13.3.1 [OSHPD 1R, 2 and 5] and Section 1705A.12.4 [OSHPD 1 & 4] of the CBC, as applicable.

2.1.2 DSA:

The Gripple Spider Wood Form (Regular and Low Profile) or Spider Metal Deck (Regular and Low Profile) insert receivers, and Spider-Swivel Toggle or Spider Threaded Rod Adapter insert elements, described in Sections 2.0 through 7.0 of the evaluation report ESR-4190, comply with CBC amended Sections Chapters 16 and 19, and Chapters 16A, 17A and 19A, provided the design and installation are in accordance with the 2018 *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.12.4 [DSA-SS, DSA-SS/CC] of the CBC, as applicable.

2.2 CRC:

The Gripple Spider Wood Form (Regular and Low Profile) or Spider Metal Deck (Regular and Low Profile) insert receivers, and Spider-Swivel Toggle or Spider Threaded Rod Adapter insert elements, described in Sections 2.0 through 7.0 of the evaluation report ESR-4190, comply with CRC Section R301.1.3, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapters 16 and 17.

This supplement expires concurrently with the evaluation report, reissued March 2021 and revised September 2021.