



# ICC-ES Evaluation Report

## ESR-3477

Reissued November 2022

This report is subject to renewal November 2024.

**DIVISION: 05 00 00—METALS**  
**Section: 05 05 23—Metal Fastenings**

**REPORT HOLDER:**

**NEW MILLENNIUM BUILDING SYSTEMS, LLC**

**EVALUATION SUBJECT:**

**VERSA-WEDGE® STEEL DECK HANGERS**

**1.0 EVALUATION SCOPE**

**Compliance with the following code:**

2021\*, 2018, 2015, 2012, 2009 and 2006 *International Building Code*®

\*For evaluation for compliance with the anticipated requirements of the 2021 IBC.

**Property evaluated:**

Structural

**2.0 USES**

Versa-Wedge® hangers are used to suspend building components from the underside of New Millennium’s Versa-Dek® (re-entrant-type) steel deck panels recognized in [ESR-2657](#) and [ESR-2635](#), for both bare-deck and concrete-filled installations.

**3.0 DESCRIPTION**

The Versa-Wedge steel deck hanger system consists of a Versa-Wedge Clip (VWC) or Versa-Wedge Tube (VWT) hanger and the following components: threaded rod or hex bolt; hex nuts; steel washer; and steel rivets. Versa-Wedge hangers (VWC and VWT) are formed from steel per the approved quality documentation and are available in different sizes to accommodate different Versa-Dek steel deck panels. Minimum sizes of Versa-Wedge hanger system components must be in accordance with Figure 1. The steel rivets must be Celus® Tigerbolt® Structural Blind Rivets.

**4.0 DESIGN AND INSTALLATION**

**4.1 Design:**

Tension loads (gravity loads) and deflections (at allowable tension load) for Versa-Wedge hangers installed in the underside of re-entrant-type Versa-Dek steel deck panels are provided in Table 1 for concrete-filled floor decks and in Tables 2 and 3 for bare roof decks with and

without rivets, respectively. Tabular tension loads and deflections are applicable to one Versa-Wedge hanger installed at the mid-span of the steel deck panel and in either the center of the steel deck panel width or the flute immediately adjacent to center of the steel deck panel. Tension loads and deflections do not take into account effects of the threaded rod, hex bolt, steel washer, or hex nut. Tabular deflection values are of the Versa-Wedge hanger (VWC and VWT) relative to the steel deck panel at the allowable tension load. Maximum panel spans noted in Tables 1, 2 and 3 are measured from the centerline of panel bearing width.

Design of the threaded rod, hex bolt, steel washer, and hex nut must be completed by a registered design professional and design capacities must not be less than the design loads (when LRFD is used) or allowable loads (when ASD is used) in Tables 1 through 3. Analysis and design of the steel deck panels must consider uniform loads and point loads applied through the Versa-Wedge hanger system according to the installed condition and must not exceed the spans permitted under [ESR-2635](#) and [ESR-2657](#), as applicable.

**4.2 Installation:**

The Versa-Wedge steel deck hanger system must be installed in accordance with the manufacturer’s published installation instructions, into the underside of the steel deck panels, complying with and installed in accordance with [ESR-2657](#) and [ESR-2635](#), as applicable. The steel deck panels must not be installed at a slope greater than 5 percent.

For installation of the Versa-Wedge hanger system, a threaded rod or bolt is inserted into the hanger and secured with nuts that are finger-tight with at least one-half turn more. The hanger is inserted into the gap at the dovetail rib of the steel deck panel by rotating the hanger 90 degrees. The hanger is pulled down to seat into the steel deck panel rib. A washer is inserted and secured with a nut that is finger tight. The washer must be flush with the bottom flange of the steel deck panel and the hanger must be seated into the steel deck panel rib. When installation is in roof (bare) deck panels, in addition to the nut, the washer may be attached to the bottom flange of the deck panel with rivets (see Table 2). For assemblies using rivets, holes matching the rivet diameter (*d*) noted in Table 2 are predrilled into the steel deck and washer, leaving a minimum 1.5*d* edge distance. See Figures 2 and 3 for installation details of floor (concrete-filled) and roof (bare) deck applications, respectively.

**5.0 CONDITIONS OF USE**

The Versa-Wedge hanger systems described in this report comply with, or are suitable alternatives to what is specified in, the code indicated in Section 1.0 of this report, subject to the following conditions:

- 5.1 Installation must comply with this report, the IBC and the manufacturer’s published installation instructions. If there is a conflict, this report governs.
- 5.2 Calculations demonstrating that the applied loads are less than the design loads (when LRFD is used) or the allowable loads (when ASD is used) provided in this report must be submitted to the code official. Design of the connection of the hanger system to the suspended building component, must be determined in accordance with the IBC for each project, where required by code. The analysis and design calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.3 Use of the Versa-Wedge hanger system for earthquake load resistance is outside the scope of this report.
- 5.4 Installation of the Versa-Wedge hanger system is limited to dry, interior conditions.

**6.0 EVIDENCE SUBMITTED**

Data in accordance with the ICC-ES Acceptance Criteria for Fastening Systems for Use with Re-entrant-type Steel Deck Panel Profiles (AC379), dated June 2020.

**7.0 IDENTIFICATION**

7.1 VWC and VWT hangers are supplied in containers which bear the New Millennium Building Systems, LLC, name and address, the product name, and the evaluation report number (ESR-3477). Deck panels must be labeled in accordance with evaluation reports [ESR-2635](#) and [ESR-2657](#).

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

**NEW MILLENNIUM BUILDING SYSTEMS, LLC**  
**7575 WEST JEFFERSON BOULEVARD**  
**FORT WAYNE, INDIANA 46804**  
**(260) 969-3500**  
[www.newmill.com](http://www.newmill.com)

**TABLE 1—TENSION LOADS FOR VERSA-WEDGE HANGERS  
 INSTALLED IN RIBS OF CONCRETE-FILLED VERSA-DEK PANELS<sup>1</sup>**

VERSA-DEK STEEL DECK PANELS (See <a href="#">ESR-2635</a> and <a href="#">ESR-2657</a> )				MINIMUM CONCRETE REQUIREMENTS <sup>4</sup>		VERSA-WEDGE HANGERS				
Product Designation	Base Metal Thickness		Maximum Panel Span	Compressive Strength	Slab Thickness <sup>5</sup>	Product Designation	Nominal Tension Load, R <sub>n</sub>	Design Tension Load, φR <sub>n</sub>	Allowable Tension Load, R <sub>n</sub> /Ω	Deflection at Allowable Tension Load
	gage	inch					feet-inch	psi	inch	lbf
S, S Acoustical, LS, and LS Acoustical <sup>2</sup>	20	0.0358	12'-4"	3500	4.00	VWT-20-250 <sup>2</sup> VWT-20ES-250 <sup>3</sup>	1531	804	503	0.05
	18	0.0474	14'-9"				1594	878	549	0.03
	16	0.0598	14'-9"				1594	878	549	0.03
S ES, S ES Acoustical, LS ES, and LS ES Acoustical <sup>3</sup>	20	0.0358	15'-4"		6.00	VWT-20-375 <sup>2</sup> VWT-20ES-375 <sup>3</sup>	1576	827	517	0.03
	18	0.0474	18'-5"				1176	626	391	0.03
	16	0.0598	18'-5"				1176	626	391	0.03
Composite 3.5LS and Composite 3.5LS Acoustical	20	0.0358	18'-0"	3500	5.50	VWT-35-375 VWT-35-500	3263	1470	919	0.01
	18	0.0474	18'-0"				3263	1470	919	0.01
	16	0.0598	19'-7"				4507	2290	1431	0.02
	20	0.0358	20'-9"		7.25		2836	1130	706	0.01
	18	0.0474	20'-9"				2836	1130	706	0.01
	16	0.0598	23'-9"				5217	2327	1454	0.02

For SI: 1 inch = 25.4 mm; 1 foot = 0.305 m; 1 lbf = 4.45N.

<sup>1</sup>See Section 4.1 for hanger design requirements.

<sup>2</sup>VWT-20-250 and VWT-20-375 are for use with the S, S Acoustical, LS and LS Acoustical.

<sup>3</sup>VWT-20ES-250 and VWT-20ES-375 are for use with the S ES, S ES Acoustical, LS ES, and LS ES Acoustical.

<sup>4</sup>Concrete must be either lightweight (110 pcf) or normal weight (145pcf) complying with IBC Chapter 19.

<sup>5</sup>Concrete slab thickness is measured from the bottom of steel deck panel to top of concrete.

**TABLE 2—TENSION LOADS FOR VERSA-WEDGE HANGERS  
INSTALLED WITH RIVETS IN RIBS OF BARE VERSA-DEK PANELS<sup>1</sup>**

VERSA-DEK STEEL DECK PANELS (See <a href="#">ESR-2657</a> )				RIVET DIAMETER (Celus Tigerbolt Structural Blind Rivet Part Number)	VERSA-WEDGE HANGERS				
Product Designation	Base Metal Thickness		Maximum Panel Span		Product Designation	Nominal Tension Load, R <sub>n</sub>	Design Tension Load, φR <sub>n</sub>	Allowable Tension Load, R <sub>n</sub> /Ω	Deflection at Allowable Tension Load
	gage	Inch	feet-inch			lbf	Lbf	lbf	inch
S, S Acoustical, LS, and LS Acoustical <sup>2</sup>	20	0.0358	2'-7"	3/16" (SBS-64-TB)	VWT-20-250 <sup>2</sup>	632	297	186	0.18
	18	0.0474			VWT-20ES-250 <sup>3</sup>	1259	693	433	0.28
	16	0.0598		1/4" (SBS-86-TB)	VWT-20-375 <sup>2</sup> VWT-20ES-375 <sup>3</sup>	1848	1018	636	0.22
S ES, S ES Acoustical, LS ES, and LS ES Acoustical <sup>3</sup>	20	0.0358		3/16" (SBS-64-TB)	VWC-20-250 <sup>2</sup>	749	232	145	0.11
	18	0.0474			VWC-20ES-250 <sup>3</sup>	1283	706	442	0.14
	16	0.0598		1/4" (SBS-86-TB)	VWC-20-375 <sup>2</sup> VWC-20ES-375 <sup>3</sup>	1879	859	537	0.12
3.5 LS and 3.5 LS Acoustical	20	0.0358		1/4" (SBS-86-TB)	VWT-35-375 VWT-35-500	1496	657	411	0.39
	18	0.0474				2841	1564	978	0.54
	16	0.0598				4110	2264	1415	0.59

For **SI**: 1 inch = 25.4 mm; 1 foot = 0.305 m; 1 lbf = 4.45N.

<sup>1</sup>See Section 4.1 for hanger design requirements.

<sup>2</sup>VWC/VWT-20-250 and VWC/VWT-20-375 are for use with the S, S Acoustical, LS and LS Acoustical.

<sup>3</sup>VWC/VWT-20ES-250 and VWC/VWT-20ES-375 are for use with the S ES, S ES Acoustical, LS ES, and LS ES Acoustical.

**TABLE 3—TENSION LOADS FOR VERSA-WEDGE HANGERS  
INSTALLED WITHOUT RIVETS IN RIBS OF BARE VERSA-DEK PANELS<sup>1</sup>**

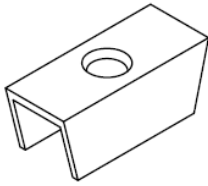
VERSA-DEK STEEL DECKS PANELS (See <a href="#">ESR-2657</a> )				VERSA-WEDGE HANGERS					
Product Designation	Base Metal Thickness		Maximum Panel Span	Product Designation	Nominal Tension Load, R <sub>n</sub>	Design Tension Load, φR <sub>n</sub>	Allowable Tension Load, R <sub>n</sub> /Ω	Deflection at Allowable Tension Load	
	gage	inch	feet-inch		lbf	lbf	lbf	inch	
S, S Acoustical, LS, and LS Acoustical <sup>2</sup>	20	0.0358	2'-7"	VWT-20-250 <sup>2</sup> VWT-20ES-250 <sup>3</sup>	726	400	250	0.33	
	18	0.0474			1147	632	395	0.25	
	16	0.0598			1558	677	423	0.21	
	S ES, S ES Acoustical, LS ES, and LS ES Acoustical <sup>3</sup>	20	0.0358	12'-0"	VWT-20-375 <sup>2</sup> VWT-20ES-375 <sup>3</sup>	238	131	82	0.20
		18	0.0474	13'-9"		411	226	142	0.16
		16	0.0598	15'-9"		711	392	245	0.21
3.5 LS and 3.5 LS Acoustical	20	0.0358	2'-7"	VWC-20-250 <sup>2</sup> VWC-20ES-250 <sup>3</sup>	855	428	268	0.15	
	18	0.0474			1164	502	314	0.11	
	16	0.0598			1424	779	487	0.10	
	3.5 LS and 3.5 LS Acoustical	20	0.0358	12'-0"	VWC-20-375 <sup>2</sup> VWC-20ES-375 <sup>3</sup>	211	116	73	0.09
		18	0.0474	13'-9"		399	214	134	0.09
		16	0.0598	15'-9"		704	388	242	0.11
	3.5 LS and 3.5 LS Acoustical	20	0.0358	2'-7"	VWC-35-250 VWC-35-375	851	469	293	0.26
		18	0.0474			1710	942	589	0.38
		16	0.0598			1719	946	591	0.29
3.5 LS and 3.5 LS Acoustical		20	0.0358	2'-7"	VWT-35-375 VWT-35-500	879	484	303	0.29
		18	0.0474			1641	878	549	0.27
		16	0.0598			2512	1384	865	0.37
3.5 LS and 3.5 LS Acoustical		20	0.0358	19'-0"	VWC-35-250 VWC-35-375 VWT-35-375 VWT-35-500	265	146	91	0.14
		18	0.0474	20'-0"		603	286	179	0.19
		16	0.0598	21'-9"		1125	620	387	0.51

For **SI**: 1 inch = 25.4 mm; 1 foot = 0.305 m; 1 lbf = 4.45N.

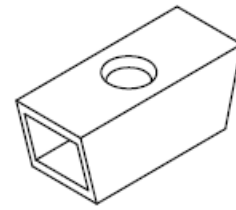
<sup>1</sup>See Section 4.1 for hanger design requirements.

<sup>2</sup>VWC/VWT-20-250 and VWC/VWT-20-375 are for use with the S, S Acoustical, LS and LS Acoustical.

<sup>3</sup>VWC/VWT-20ES-250 and VWC/VWT-20ES-375 are for use with the S ES, S ES Acoustical, LS ES, and LS ES Acoustical.

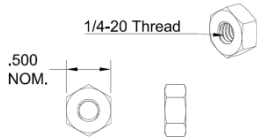


**Versa-Wedge Clip (VWC)**



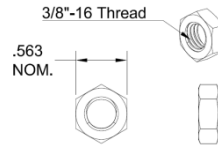
**Versa-Wedge Tube (VWT)**

**COMPONENTS USED WITH THE  
VWC/VWT-250 PRODUCTS**



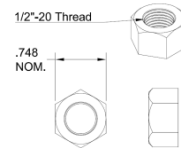
**1/4-20 HEAVY NUT**

**COMPONENTS USED WITH THE  
VWC/VWT-375 PRODUCTS**



**3/8-16 THREADED ROD**

**COMPONENTS USED WITH THE  
VWC/VWT-500 PRODUCTS**



**1/2-20 THREADED ROD**



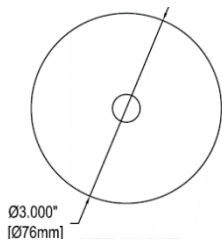
**1/4-20 THREADED ROD**



**3/8-16 THREADED ROD**



**1/2-20 THREADED ROD**

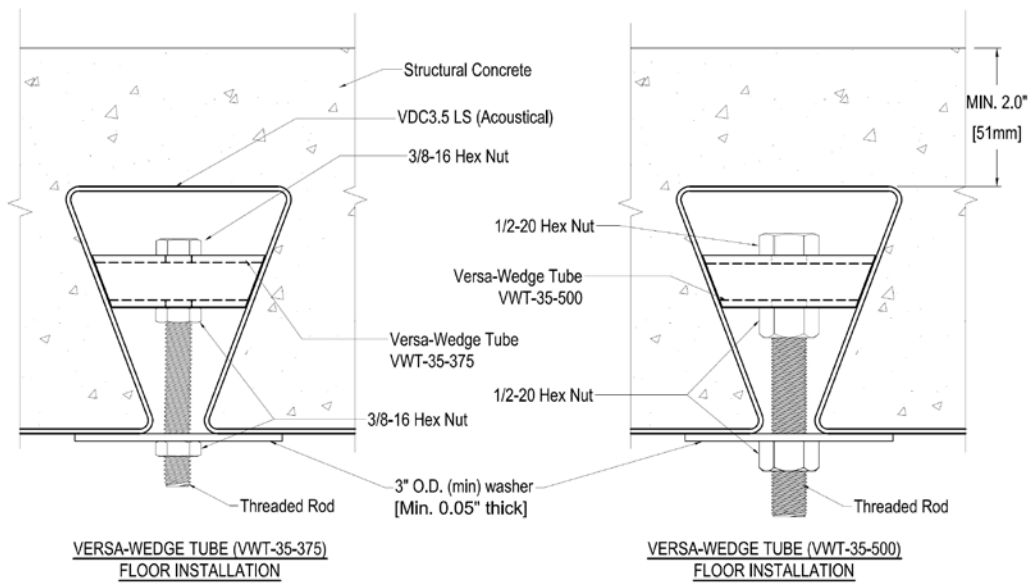
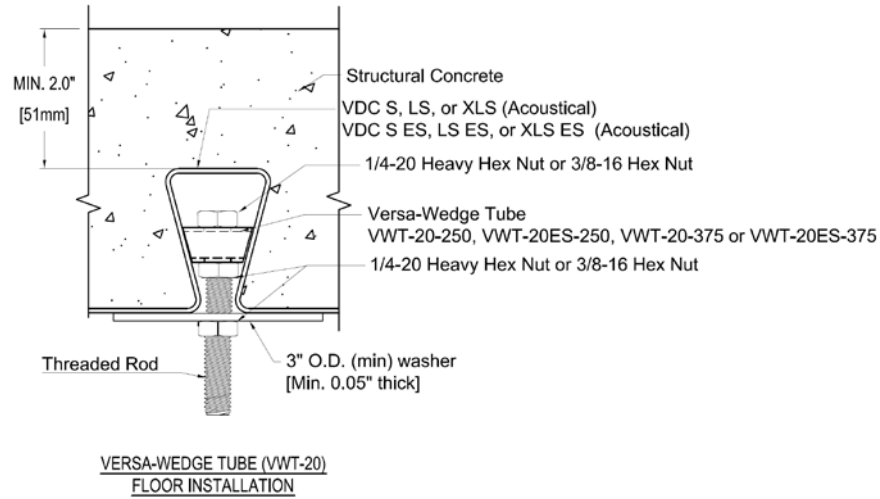


**STEEL WASHER**

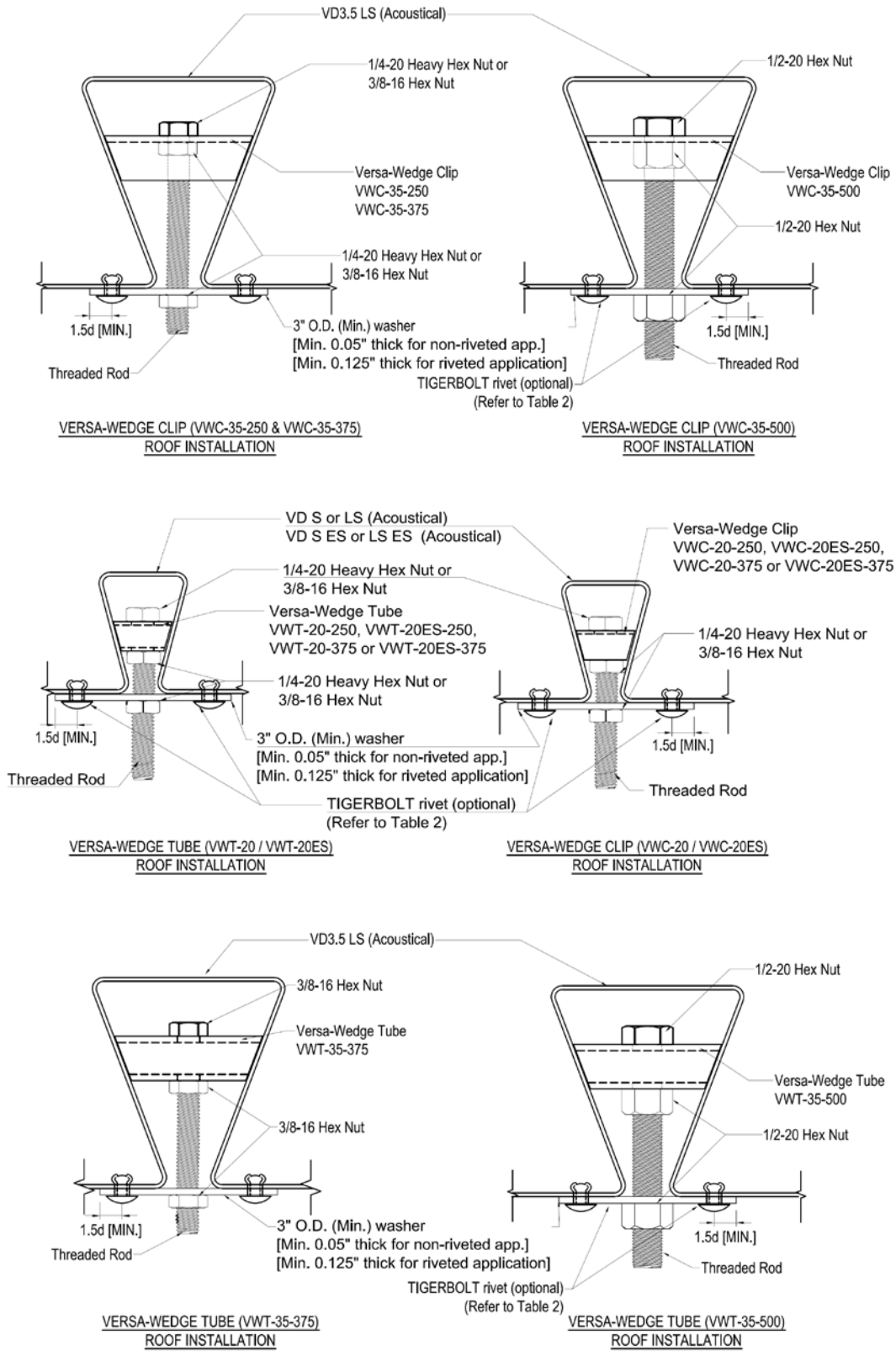


**CELUS® TIGERBOLT® STEEL RIVET**

**FIGURE 1—VERSA WEDGE HANGER SYSTEM COMPONENTS**  
 Note: Hex bolts not shown but must have head dimensions similar to the nuts shown above.



**FIGURE 2—VWC AND VWT FLOOR INSTALLATION DETAILS**  
Note: Hex bolts not shown.



**FIGURE 3—VWC AND VWT ROOF INSTALLATION DETAILS**  
 Note: Hex bolts not shown.

DIVISION: 05 00 00—METALS

Section: 05 05 23—Metal Fastenings

## REPORT HOLDER:

NEW MILLENNIUM BUILDING SYSTEMS, LLC

## EVALUATION SUBJECT:

VERSA-WEDGE® STEEL DECK HANGERS

## 1.0 REPORT PURPOSE AND SCOPE

## Purpose:

The purpose of this evaluation report supplement is to indicate that Versa-Wedge® steel deck hangers, described in ICC-ES evaluation report ESR-3477, have also been evaluated for compliance with the code noted below.

## Applicable code edition:

2019 *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 Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

## 2.0 CONCLUSIONS

## 2.1 CBC:

The Versa-Wedge® steel deck hangers, described in Sections 2.0 through 7.0 of the evaluation report ESR-3477, comply with CBC Chapter 22 provided the design and installation are in accordance with the 2018 *International Building Code*® provisions noted in the evaluation report and the additional requirements of CBC Chapters 16, 17 and 22, as applicable.

**2.1.1 OSHPD:** The applicable OSHPD Sections of the CBC are beyond the scope of this supplement.

**2.1.2 DSA:** The applicable DSA Sections of the CBC are beyond the scope of this supplement.

This supplement expires concurrently with the evaluation report, reissued November 2022.