ICC-ES Evaluation Report

ESR-2635

Reissued January 2024

Subject to renewal January 2026

This report also contains:

- LABC Supplement

- CBC Supplement

- FBC Supplement

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DIVISION: 05 00 00 — METALS **Section: 05 31 00 — Steel Decking**	**REPORT HOLDER: NEW MILLENNIUM BUILDING SYSTEMS, LLC**	**EVALUATION SUBJECT: NEW MILLENNIUM COMPOSITE DECK PANELS: 2.0VSC, 2.0VLSC, 2.0VSESC, 2.0VLSESC, 3.5VLSC, AND 3.5VLSCA**	

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015, 2012, 2009, and 2006 *International Building Code®* (IBC)

For evaluation for compliance with codes adopted by the *Los Angeles Department of Building and Safety* (LADBS), see ESR-2635 LABC and LARC Supplement.

Property evaluated:

Structural

2.0 USES

The New Millennium Versa-Dek® 2.0 S Composite (2.0VSC), Versa-Dek® 2.0 LS Composite (2.0VLSC), Versa-Dek® 2.0 S ES Composite (2.0VSESC), Versa-Dek® 2.0 LS ES Composite (2.0VLSESC), Versa-Dek® 3.5 LS Composite (3.5VLCS), and Versa-Dek® 3.5 LS Composite Acoustical (3.5VLCSA) deck panels are used in conjunction with structural normal weight and lightweight concrete topping with minimum specified compressive strength, f_c', of 3,000 psi (20.68 MPa) to support construction, gravity, and lateral loads.

3.0 DESCRIPTION

3.1 General:

The New Millennium 2.0VSC, 2.0VLSC, 2.0VSESC, 2.0VLSESC, 3.5VLSC, and 3.5VLSCA deck panels are cold-formed from steel sheets complying with either of the following:

- ASTM A653 SS Grade 40 steel with a minimum G40 galvanization. Some panels may have a paint coating over the galvanized bottom surface, which is not in contact with concrete.
- ASTM A1008 SS Grade 40 steel with a mill finished (bare steel) top surface and primed painted bottom surface.

Panels dimensions and profiles are shown in the tables and figures of this report.

3.2 2.0VSC, 2.0VLSC, 2.0VSESC, and 2.0VLSESC Panels:

The 2.0VSC, 2.0VLSC, 2.0VSESC, and 2.0VLSESC deck panels are fluted sections as shown in Figure 1 and are available in design thicknesses ranging from No. 16 to No. 22 gage [0.0598 inch (1.52 mm) to 0.0295 inch (0.75 mm)].

3.3 3.5VLSC and 3.5VLSCA Panels:

The 3.5VLSC and 3.5VLSCA deck panels are fluted sections as shown in Figure 1 and are available in design thicknesses ranging from No. 16 to No. 20 gage [0.0598 inch (1.52 mm) to 0.0358 inch (0.91 mm)]. The 3.5VLSCA deck panel is identical to the 3.5VLSC deck panel, except that the bottom flanges of the 3.5VLSCA panel are perforated with holes as shown in Figure 2. The 3.5VLSCA assembly includes factory-installed acoustical insulation and a nonstructural No. 20 gage [0.0358 inch (0.91 mm)] cap to protect the acoustical insulation during concrete placement.

4.0 DESIGN AND INSTALLATION

4.1 Design: Deck panel section properties are provided in Table 1.

4.2 Installation: The deck panels must be installed in accordance with this report and also with New Millennium's published installation guidelines and instructions. If there is a conflict between New Millennium's published installation guidelines and instructions and this report, this report governs.

5.0 CONDITIONS OF USE

The New Millennium steel deck panels described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The design base-metal thicknesses for all steel deck panels are indicated in Table 1. The thickness delivered to the jobsite must be at least 95 percent of the thickness noted in the tables.

5.2 The minimum loads of IBC Chapter 16 in addition to the construction loads required by references in IBC Section 2210.1.1 must be considered by the registered design professional based on the specific occupancy or use, as applicable.

5.3 Special inspections must be provided in accordance with Chapter 17 of the IBC.

5.4 Calculations and details demonstrating that the loads applied to the decks comply with this report must be submitted to the code official for approval. Calculations and drawings must be prepared, signed, and sealed by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.5 The steel deck panels are manufactured in Memphis, Tennessee under an approved quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with ICC-ES Acceptance Criteria for Steel Deck Roof and Floor Systems (AC43), dated August 2022.

7.0 IDENTIFICATION

7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-2635) along with the name, registered trademark, or registered logo of the report holder [and/or listee] must be included in the product label. [Electronic labeling is the ICC-ES web address (www.icc-es.org); specific URL related to the report; or the ICC-ES machine-readable code placed on the aforementioned items.]

7.2 In addition, each bundle of the New Millennium steel deck panels described in this report is identified by a label bearing the manufacturer's name (New Millennium Building Systems, LLC); the deck panel profile name; the design thickness; the minimum specified yield strength; the cover width of the panel; the manufacturing location (MD—Memphis, Tennessee); and the evaluation report number (ESR-2635).

7.3 The report holder's contact information is as follows:

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

SYMBOLS AND DEFINITIONS

Symbol	Definition
c_p	Perforation center-to-center spacing
D_d	Depth of deck panel
d	Panel corrugation pitch
d_p	Diameter of perforation
E_p	Width of perforation band in deck bottom flange
e	One-half the bottom flange width of deck panel measured between points of intercepts
f	Top flange width of panel measured between points of intercepts
h	Flat dimension of web measured in plane of web
h_{sl}	Total slab height
I_{gx}	Moment of inertia of full unreduced section (considering perforations for acoustical deck)
I_{oi}	Effective moment of inertia in inverted (negative) bending
I_{on}	Effective moment of inertia in normal (positive) bending
R	Inside bend radius
S_{ei}	Effective section modulus in inverted (negative) bending
S_{en}	Effective section modulus in normal (positive) bending
t	Base steel thickness of deck panel
w	Web width of deck panel measured between points of intercept in plane of web
θ	Web angle

TABLE 1—SECTION PROPERTIES[1, 2, 3,4]

DECK PANEL	GAGE	t (in.)	h (in.)	SECTION PROPERTIES				
				I_{gx} (in.^{4}/ft)	I_{on} (in.^{4}/ft)	I_{oi} (in.^{4}/ft)	S_{en} (in.^{3}/ft)	S_{ei} (in.^{3}/ft)
Versa-Dek® 2.0 S Composite (2.0VSC)	22	0.0295	1.706	0.401	0.398	0.322	0.286	0.256
	20	0.0358	1.698	0.485	0.485	0.416	0.356	0.319
	18	0.0474	1.682	0.640	0.640	0.596	0.473	0.438
	16	0.0598	1.666	0.805	0.805	0.786	0.595	0.567
Versa-Dek® 2.0 LS Composite (2.0VLSC)	22	0.0295	1.706	0.399	0.396	0.370	0.284	0.280
	20	0.0358	1.698	0.483	0.482	0.464	0.354	0.345
	18	0.0474	1.682	0.637	0.637	0.637	0.471	0.463
	16	0.0598	1.666	0.801	0.801	0.801	0.593	0.589
Versa-Dek® 2.0 S ES Composite (2.0VSESC)	22	0.0295	1.708	0.422	0.422	0.337	0.307	0.273
	20	0.0358	1.699	0.511	0.511	0.437	0.390	0.346
	18	0.0474	1.684	0.674	0.674	0.627	0.514	0.475
	16	0.0598	1.668	0.848	0.848	0.828	0.646	0.615
Versa-Dek® 2.0 LS ES Composite (2.0VLSESC)	22	0.0295	1.708	0.417	0.417	0.406	0.304	0.309
	20	0.0358	1.699	0.505	0.505	0.505	0.386	0.379
	18	0.0474	1.684	0.667	0.667	0.667	0.510	0.507
	16	0.0598	1.668	0.838	0.838	0.838	0.640	0.640
VersaDek® 3.5 LS Composite (3.5VLSC)	20	0.0358	3.330	2.042	1.917	1.766	0.775	0.910
	18	0.0474	3.313	2.697	2.648	2.475	1.113	1.226
	16	0.0598	3.295	3.395	3.394	3.262	1.504	1.573
VersaDek® 3.5 LS Composite Acoustical (3.5VLSCA)	20	0.0358	3.330	1.877	1.766	1.742	0.754	0.909
	18	0.0474	3.313	2.480	2.436	2.418	1.084	1.224
	16	0.0598	3.295	3.123	3.122	3.123	1.466	1.564

For **SI** dimensions: 1 inch = 25.4 mm; 1 plf = 14.6 N/m; 1 foot = 304.8 mm

Notes:
[1]Effective properties are based on yield strength (F_y) of 40 ksi.
[2]The design thickness is the uncoated base-metal thickness of the deck panel.
[3]The full moment of inertia is also referred to as the gross moment of inertia.
[4]Deck deflection under uniform loads can be determined using the moment of inertia, I_D, calculated as follows:
- for a simple span, I_D is permitted to be equal to $(I_x + 2*I_{on})/3$ or I_{on}.
- for multiple spans, I_D is permitted to be equal to $(I_x + 2*I_{oi})/3$, $(I_x + 2*I_{on})/3$ or the minimum of I_{on} and I_{oi}.

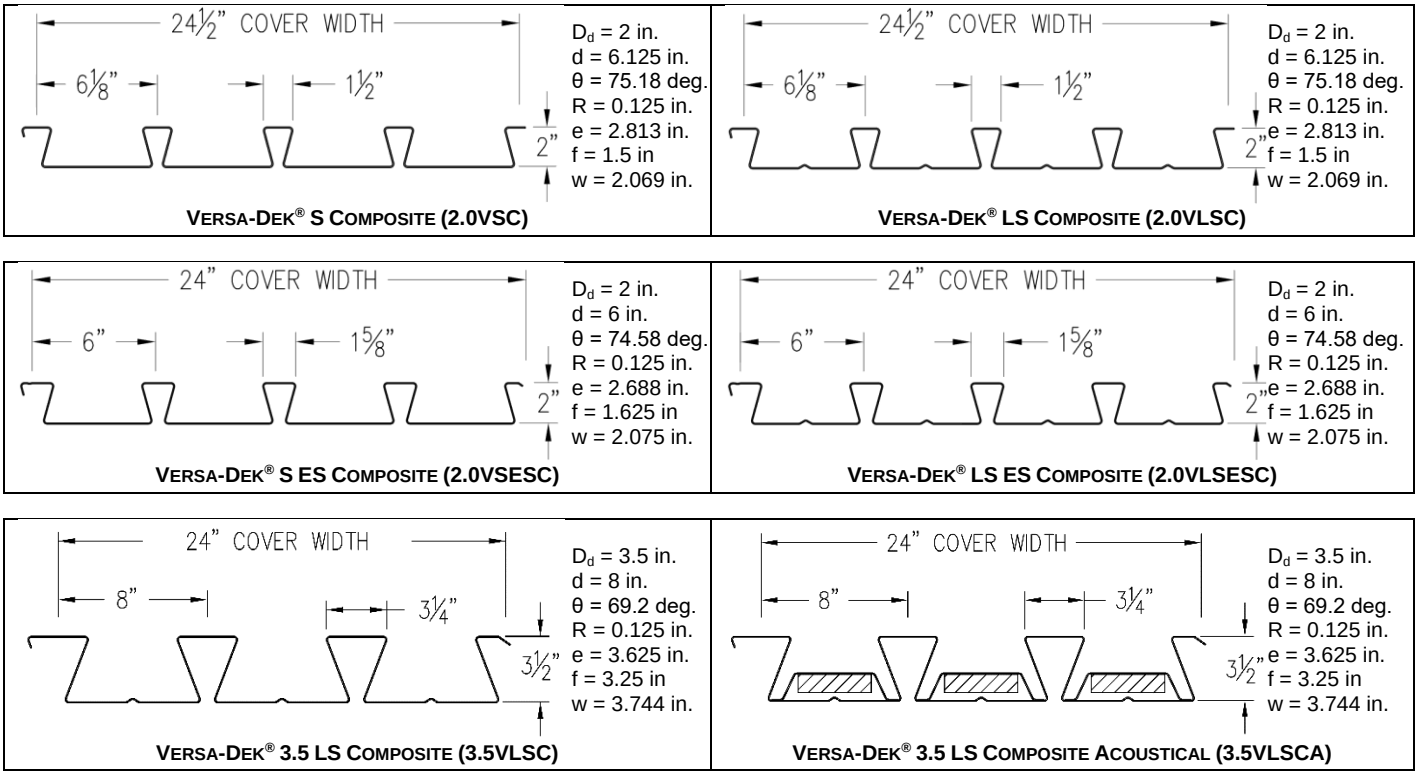
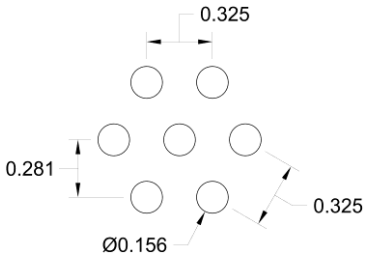


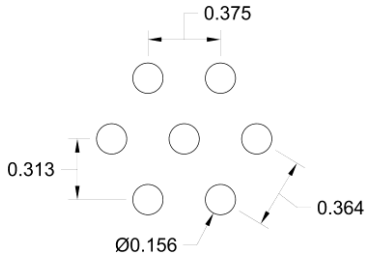
FIGURE 1—STEEL DECK PANEL PROFILES

DECK TYPE	DIAMETER OF PERFORATION, d_p (in.)	PERFORATION CENTER-TO-CENTER SPACING, c_p (in.)	PERFORATED BAND WIDTH IN DECK BOTTOM FLANGE, E_p (in.)
Versa-Dek® 3.5 LS Composite Acoustical, 3.5VLSCA (Option 1)	0.156	0.325	5.844
Versa-Dek® 3.5 LS Composite Acoustical, 3.5VLSCA (Option 2)	0.156	0.375*	5.781

*Note: Table shows the perforation center-to-center spacing, c_p, for deck calculation purposes taken as (0.375+0.364)/2=0.370 in.



Versa-Dek® 3.5 LS Composite Acoustical (Option 1)



Versa-Dek® 3.5 LS Composite Acoustical (Option 2)

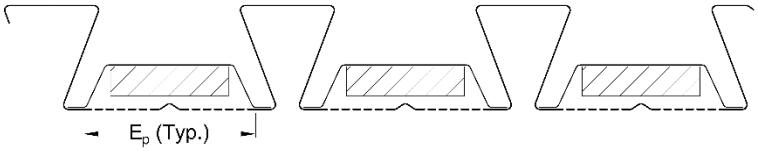


FIGURE 2—PERFORATION PATTERNS OF VERSA-DEK® 3.5 LS COMPOSITE ACOUSTICAL (3.5VLSCA) PROFILE

ICC-ES Evaluation Report

ESR-2635 LABC Supplement

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DIVISION: 05 00 00—METALS
Section: 05 31 00—Steel Decking

REPORT HOLDER:

NEW MILLENNIUM BUILDING SYSTEMS, LLC

EVALUATION SUBJECT:

NEW MILLENNIUM COMPOSITE DECK PANELS: 2.0VSC, 2.0VLSC, 2.0VSESC, 2.0VLSESC, 3.5VLSC, AND 3.5VLSCA

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that steel deck panels, described in ICC-ES evaluation report ESR-2635, have also been evaluated for compliance with the code noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code edition:

2023 *City of Los Angeles Building Code* (LABC)

2.0 CONCLUSIONS

The steel deck panels, described in Sections 2.0 through 7.0 of the ICC-ES evaluation report ESR-2635, comply with the LABC Chapter 22, and are subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The steel deck panels described in this evaluation report supplement must comply with all of the following conditions:

- The design, installation, conditions of use and identification of the steel deck panels are in accordance with the 2021 *International Building Code®* (IBC) provisions noted in the evaluation report ESR-2635.
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- When exposed to weather, the deck units shall be galvanized.

This supplement expires concurrently with the evaluation report, reissued January 2024.

DIVISION: 05 00 00—METALS
Section: 05 31 00—Steel Decking

REPORT HOLDER:

NEW MILLENNIUM BUILDING SYSTEMS, LLC

EVALUATION SUBJECT:

NEW MILLENNIUM COMPOSITE DECK PANELS: 2.0VSC, 2.0VLSC, 2.0VSESC, 2.0VLSESC, 3.5VLSC, AND 3.5VLSCA

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the New Millennium steel roof deck panels described in ICC-ES evaluation report ESR-2635 have also been evaluated for compliance with the code noted below.

Applicable code edition:

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 Architect (DSA), see Sections 2.1 and 2.2 below.

2.0 CONCLUSIONS

The New Millennium roof deck panels, described in Sections 2.0 through 7.0 of the ICC-ES evaluation report ESR-2635, comply with CBC Chapter 22, 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 the CBC Chapters 16 and 17, as applicable.

2.1 OSHPD: The applicable OSHPD Sections and Chapters of the CBC are beyond the scope of this supplement.

2.2 DSA: The applicable DSA Sections and Chapters of the CBC are beyond the scope of this supplement.

This supplement expires concurrently with the evaluation report, reissued January 2024.

DIVISION: 05 00 00—METALS
Section: 05 31 00—Steel Decking

REPORT HOLDER:

NEW MILLENNIUM BUILDING SYSTEMS, LLC

EVALUATION SUBJECT:

NEW MILLENNIUM COMPOSITE DECK PANELS: 2.0VSC, 2.0VLSC, 2.0VSESC, 2.0VLSESC, 3.5VLSC, AND 3.5VLSCA

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that New Millennium steel floor deck panels, described in ICC-ES evaluation report ESR-2635, has also been evaluated for compliance with the code noted below.

Applicable code edition:

2020 *Florida Building Code—Building*

2.0 CONCLUSIONS

The steel deck panels, described in Sections 2.0 through 7.0 of ICC-ES evaluation report ESR-2635, comply with the *Florida Building Code—Building*. The design requirements shall be determined in accordance with the *Florida Building Code—Building*. The installation requirements noted in ICC-ES evaluation report ESR-2635 for the 2018 *International Building Code®* meet the requirements of the *Florida Building Code—Building*.

Use of the steel deck panels has also been found to be in compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* except that the 22 gage steel deck panels must have a minimum G90 galvanized coating in accordance with 2222.6.1 of the *Florida Building Code—Building*.

For products falling under Florida Rule 61G20-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report, reissued January 2024.