ICC EVALUATION SERVICE®

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ICC-ES Evaluation Report

Reissued June 2022

ESR-1169

This report is subject to renewal June 2024.

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

REPORT HOLDER:

NEW MILLENNIUM BUILDING SYSTEMS, LLC

EVALUATION SUBJECT:

NEW MILLENNIUM STEEL ROOF, COMPOSITE FLOOR, AND FORM DECK PANELS

1.0 EVALUATION SCOPE

Compliance with the following code:

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

Property evaluated:

Structural

2.0 USES

The New Millennium steel deck panels are used as roof, composite floor, and form decks panels to support construction, gravity, and lateral loads.

3.0 DESCRIPTION

3.1 General:

The roof, composite floor, and form deck panels dimensions and profiles as shown in Figures 1A, 1B, and 2 and with perforation patterns shown in Table 2 (for acoustical deck panels only) are cold-formed from steel sheets complying with either of the following:

- ASTM A653 SS Grade 40, Grade 50 (Class 1, 3, & 4), or Grade 80 steel with galvanized or galvannealed coating. Optional primer or finish paint coatings applied over the galvanized or galvannealed coating are available for the top surface, bottom surface, or both surfaces.
- ASTM A1008 SS Grade 40, Grade 50, or Grade 80 steel with primer painted top and bottom surfaces. Optional finish paint coatings are available for the top surface, bottom surface, or both surfaces.

3.2 Roof Decks:

3.2.1 B Deck Panels

3.2.1.1 B-Dek: The No. 16 to No. 22 gage [0.0598 inch (1.52 mm) to 0.0295 inch (0.75 mm)] deck panels are SS Grade 40, 50, or 80.

3.2.1.2 B-Dek Acoustical Panels: The deck panels are the same as in Section 3.2.1.1 except the webs contain perforations.

3.2.1.3 B-Dek Cellular Panels: The deck panels are the same as in Section 3.2.1.1 except a liner section is attached to the bottom of the hat section.

3.2.1.4 B-Dek Cellular Acoustical Panels: The deck panels are the same as in Section 3.2.1.3 except that the bottom liner sections of panels contain perforations.

3.2.2 N Deck Panels

3.2.2.1 N-Dek and N-Dek Interlocking Panels: The No. 16 to No. 22 gage [0.0598 inch (1.52 mm) to 0.0295 inch (0.75mm)] deck panels are SS Grade 40, 50, or 80.

3.2.2.2 N-Dek Acoustical and N-Dek Interlocking Acoustical: The decks are the same as in 3.2.2.1 except the webs contain perforations.

3.2.2.3 N-Dek Cellular: The deck panels are the same as in Section 3.2.2.1 except a liner section is attached to the bottom of the hat section

3.2.2.4 N-Dek Cellular Acoustical Panels: The deck panels are the same as in Section 3.2.2.3 except the bottom liner sections of panels contain perforations.

3.3 Composite Floor-Dek (CFD) Panels:

3.3.1 CFD-1.5, CFD-2 Interlocking, CFD-3 Interlocking and CFD-3 ES Interlocking Panels: The deck panels have web embossments. The No. 16 gage [0.0598 inch (1.52 mm)] deck panels are SS Grade 40. The No. 18 to No. 22 gage [0.0474 inch (1.20 mm) to 0.0295 inch (0.75 mm)] deck panels are SS Grade 50.

3.4 Form Deck Panels:

3.4.1 EHD-Dek Panels: The No. 20 to No. 26 gage [0.0358 inch (0.91 mm) to 0.0179 inch (0.46 mm)] deck panels are SS Grade 80.

3.4.2 SD-Dek and SD-Dek Inverted Panels: The No. 16 through No. 22 gage deck panels [0.0598 inch (1.52 mm) through 0.0295 inch (0.749 mm)] are SS Grade 40.

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's steel deck panels 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 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 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 Use of New Millennium's steel roof deck panels has not been evaluated for use without a roof covering.

5.5 Calculations and details demonstrating that the loads applied to the steel deck panels 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.

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

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Steel Deck Roof and Floor Systems (AC43), dated February 2020.

7.0 IDENTIFICATION

7.1 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 manufacturing location (MD—Memphis, Tennessee); the cover width of the panel; and the evaluation report number (ESR-1169).

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

TABLE 1—SECTION PROPERTIES

DECK PANEL	F_y (ksi) [2]	GAGE	DESIGN THICKNESS [1] (in)	FULL MOMENT OF INERTIA (in^4/ft. width)	EFFECTIVE MOMENT OF INERTIA [3] (in^4/ft. width)		EFFECTIVE SECTION MODULUS [3] (in^3/ft. width)	
			t	I_x	Normal, I_{on}	Inverted, I_{oi}	Normal, S_{en}	Inverted, S_{ei}
EHD-Dek	80	26	0.0179	0.073	0.072	0.072	0.095	0.104
	80	24	0.0238	0.097	0.097	0.097	0.136	0.140
	80	22	0.0295	0.121	0.121	0.121	0.176	0.176
	80	20	0.0358	0.146	0.146	0.146	0.213	0.213
SD-Dek	40	22	0.0295	0.178	0.161	0.175	0.182	0.185
	40	20	0.0358	0.216	0.205	0.214	0.226	0.233
	40	18	0.0474	0.285	0.283	0.285	0.307	0.312
	40	16	0.0598	0.359	0.359	0.359	0.395	0.398
SD-Dek Inverted	40	22	0.0295	0.178	0.175	0.161	0.185	0.182
	40	20	0.0358	0.216	0.214	0.205	0.233	0.226
	40	18	0.0474	0.285	0.285	0.283	0.312	0.307
	40	16	0.0598	0.359	0.359	0.359	0.398	0.395
B-Dek	40	22	0.0295	0.178	0.161	0.175	0.182	0.194
	40	20	0.0358	0.215	0.205	0.214	0.225	0.237
	40	18	0.0474	0.285	0.283	0.285	0.307	0.317
	40	16	0.0598	0.359	0.359	0.359	0.395	0.399
B-Dek	80	22	0.0295	0.178	0.151	0.173	0.169	0.191
	80	20	0.0358	0.215	0.194	0.212	0.220	0.234
	80	18	0.0474	0.285	0.275	0.282	0.301	0.313
	80	16	0.0598	0.359	0.358	0.359	0.388	0.399
B-Dek Cellular	40	20/20	0.0358 / 0.0358	0.431	0.383	0.397	0.303	0.437
	40	20/18	0.0358 / 0.0474	0.475	0.420	0.462	0.315	0.456
	40	18/20	0.0474 / 0.0358	0.525	0.502	0.476	0.444	0.563
	40	18/18	0.0474 / 0.0474	0.578	0.552	0.554	0.459	0.587
	40	18/16	0.0474 / 0.0598	0.627	0.598	0.627	0.471	0.609
	40	16/18	0.0598 / 0.0474	0.680	0.676	0.643	0.631	0.724
	40	16/16	0.0598 / 0.0598	0.739	0.734	0.730	0.648	0.751
B-Dek Cellular Acoustical	40	20/20	0.0358 / 0.0358	0.419	0.373	0.397	0.301	0.437
	40	20/18	0.0358 / 0.0474	0.461	0.409	0.459	0.313	0.456
	40	18/20	0.0474 / 0.0358	0.509	0.487	0.476	0.441	0.563
	40	18/18	0.0474 / 0.0474	0.561	0.536	0.550	0.456	0.586
	40	18/16	0.0474 / 0.0598	0.609	0.582	0.609	0.469	0.608
	40	16/18	0.0598 / 0.0474	0.660	0.655	0.640	0.626	0.724
	40	16/16	0.0598 / 0.0598	0.717	0.712	0.717	0.643	0.750
B-Dek Acoustical	40	22	0.0295	0.172	0.156	0.170	0.175	0.186
	40	20	0.0358	0.209	0.199	0.207	0.217	0.228
	40	18	0.0474	0.277	0.275	0.277	0.296	0.306
	40	16	0.0598	0.349	0.349	0.349	0.381	0.385
B-Dek Acoustical	80	22	0.0295	0.172	0.146	0.168	0.162	0.184
	80	20	0.0358	0.209	0.189	0.205	0.212	0.225
	80	18	0.0474	0.277	0.268	0.274	0.290	0.302
	80	16	0.0598	0.349	0.348	0.349	0.375	0.385
N-Dek	40	22	0.0295	0.864	0.655	0.843	0.363	0.453
	40	20	0.0358	1.048	0.868	1.040	0.477	0.563
	40	18	0.0474	1.386	1.253	1.386	0.683	0.752
	40	16	0.0598	1.747	1.674	1.747	0.887	0.948
N-Dek Interlocking	40	22	0.0295	0.874	0.652	0.869	0.360	0.477
	40	20	0.0358	1.060	0.866	1.060	0.472	0.583
	40	18	0.0474	1.402	1.259	1.402	0.694	0.771
	40	16	0.0598	1.767	1.686	1.767	0.903	0.972
N-Dek Cellular	40	20/20	0.0358 / 0.0358	1.956	1.451	1.703	0.554	1.005
	40	20/18	0.0358 / 0.0474	2.141	1.569	1.984	0.552	1.043
	40	18/20	0.0474 / 0.0358	2.373	1.972	2.044	0.832	1.281
	40	18/18	0.0474 / 0.0474	2.605	2.148	2.368	0.853	1.350
	40	18/16	0.0474 / 0.0598	2.812	2.302	2.695	0.871	1.393
	40	16/18	0.0598 / 0.0474	3.059	2.757	2.746	1.176	1.670
	40	16/16	0.0598 / 0.0598	3.308	2.970	3.122	1.201	1.724

(Continued)

TABLE 1—SECTION PROPERTIES (Continued)

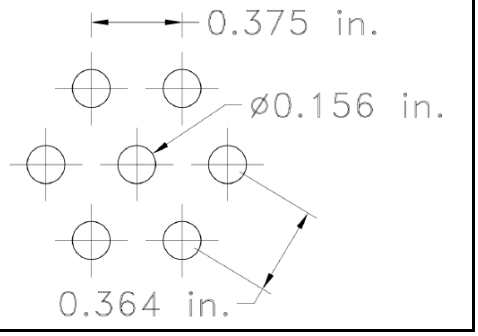
DECK PANEL	F_y (ksi) [2]	GAGE	DESIGN THICKNESS [1] (in)	FULL MOMENT OF INERTIA (in^4/ft. width)	EFFECTIVE MOMENT OF INERTIA [3] (in^4/ft. width)		EFFECTIVE SECTION MODULUS [3] (in^3/ft. width)	
			t	I_x	Normal, I_{on}	Inverted, I_{oi}	Normal, S_{en}	Inverted, S_{ei}
N-Dek Cellular Acoustical	40	20/20	0.0358 / 0.0358	1.888	1.407	1.702	0.556	1.005
	40	20/18	0.0358 / 0.0474	2.070	1.524	1.972	0.553	1.043
	40	18/20	0.0474 / 0.0358	2.290	1.909	2.043	0.824	1.283
	40	18/18	0.0474 / 0.0474	2.515	2.080	2.357	0.845	1.349
	40	18/16	0.0474 / 0.0598	2.717	2.232	2.667	0.863	1.391
	40	16/18	0.0598 / 0.0474	2.951	2.665	2.737	1.165	1.670
	40	16/16	0.0598 / 0.0598	3.193	2.872	3.095	1.190	1.722
N-Dek Acoustical	40	22	0.0295	0.810	0.606	0.789	0.330	0.419
	40	20	0.0358	0.983	0.809	0.975	0.437	0.522
	40	18	0.0474	1.301	1.175	1.301	0.631	0.699
	40	16	0.0598	1.640	1.574	1.640	0.822	0.881
N-Dek Interlocking Acoustical	40	22	0.0295	0.821	0.602	0.816	0.327	0.443
	40	20	0.0358	0.996	0.809	0.996	0.432	0.542
	40	18	0.0474	1.318	1.181	1.318	0.642	0.718
	40	16	0.0598	1.662	1.586	1.662	0.839	0.905
CFD-1.5	50	22	0.0295	0.180	0.157	0.177	0.176	0.183
	50	20	0.0358	0.218	0.201	0.215	0.227	0.234
	50	18	0.0474	0.289	0.283	0.287	0.310	0.316
	40	16	0.0598	0.364	0.364	0.364	0.403	0.406
CFD-2	50	22	0.0295	0.335	0.298	0.316	0.238	0.271
	50	20	0.0358	0.406	0.381	0.405	0.318	0.361
	50	18	0.0474	0.537	0.526	0.566	0.454	0.526
	40	16	0.0598	0.677	0.677	0.677	0.639	0.690
CFD-3	50	22	0.0295	0.813	0.736	0.752	0.398	0.438
	50	20	0.0358	0.987	0.932	0.953	0.519	0.573
	50	18	0.0474	1.306	1.283	1.329	0.738	0.828
	40	16	0.0598	1.646	1.646	1.646	1.032	1.081
CFD-3 ES Interlocking	50	22	0.0295	0.770	0.713	0.724	0.387	0.438
	50	20	0.0358	0.933	0.908	0.923	0.510	0.574
	50	18	0.0474	1.233	1.233	1.258	0.753	0.782
	40	16	0.0598	1.553	1.553	1.553	0.978	0.993

[1] The design thickness is the minimum uncoated based-metal thickness of the deck panel.

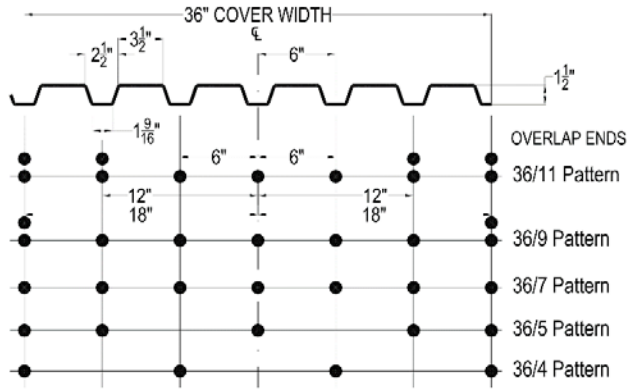
[2] When F_y = 80 ksi, effective properties are based on design yield strength equal to 75 percent of F_y = 80 ksi.

[3] Effective properties are net values.

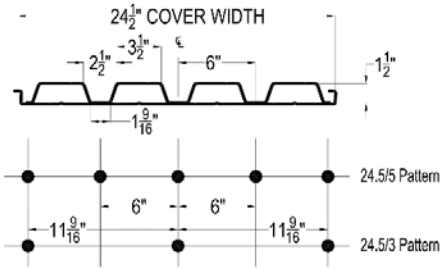
TABLE 2—ACOUSTICAL PERFORATION PROPERTIES

DECK TYPE	WIDTH OF PERFORATED BAND IN WEBS OF NON-CELLULAR DECKS OR IN LINER PANEL OF CELLULAR DECKS (in.)	NUMBER OF PERFORATED BANDS PER DECK PANEL	PERFORATION PATTERN
B-Dek Acoustical	0.906	12	
N-Dek Acoustical & N-Dek Interlocking Acoustical	2.219	6	
B-Dek Cellular Acoustical	3.531	4	
N-Dek Cellular Acoustical	5.406	3	

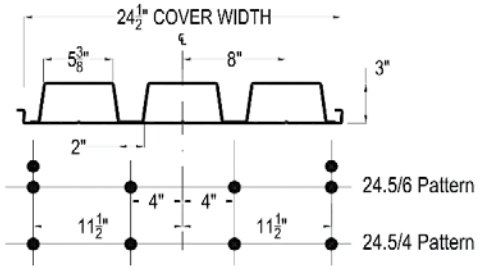
B-DEK, B-DEK ACOUSTICAL, CFD 1.5 & SD-DEK



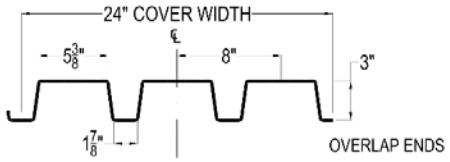
B-DEK CELLULAR & B-DEK CELLULAR ACOUSTICAL



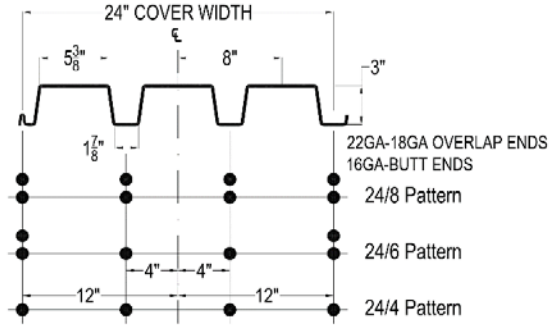
N-DEK CELLULAR & N-DEK CELLULAR ACOUSTICAL



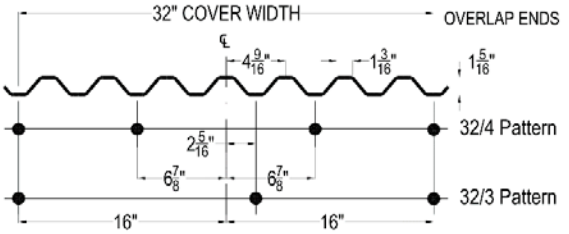
N-DEK & N-DEK ACOUSTICAL



N-DEK INTERLOCKING & N-DEK INTERLOCKING ACOUSTICAL



EHD DEK



SD-DEK INVERTED

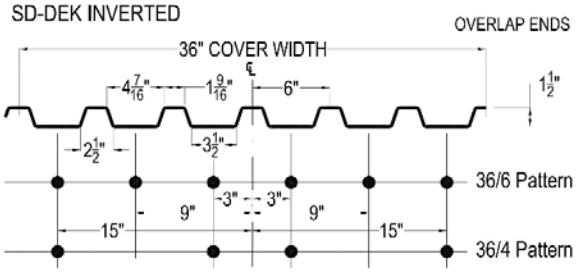
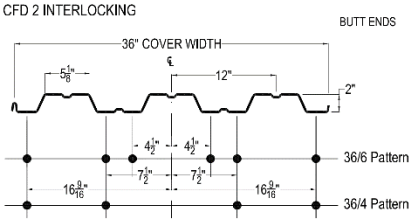


FIGURE 1A - STEEL DECK PROFILES

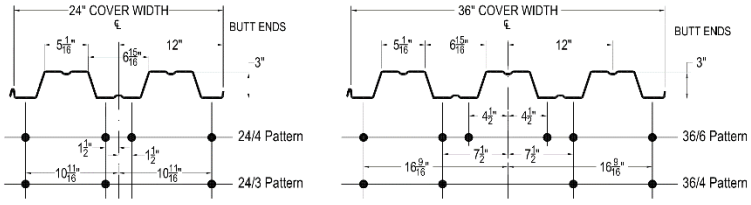
(DIMENSIONS SHOWN ARE NOMINAL)

Typical attachment patterns to supports are as shown.

CFD 2 INTERLOCKING



CFD 3 INTERLOCKING



CFD 3 ES INTERLOCKING

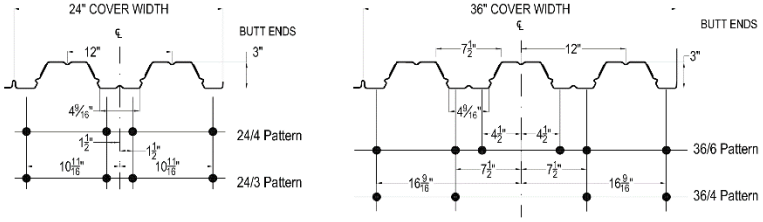
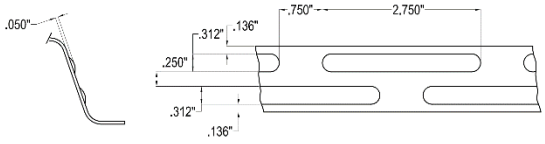


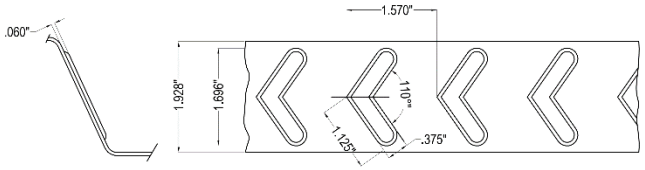
FIGURE 1B - STEEL DECK PROFILES

(DIMENSIONS SHOWN ARE NOMINAL)

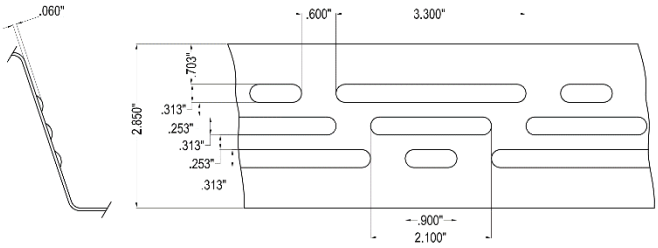
Typical attachment patterns to supports are as shown.



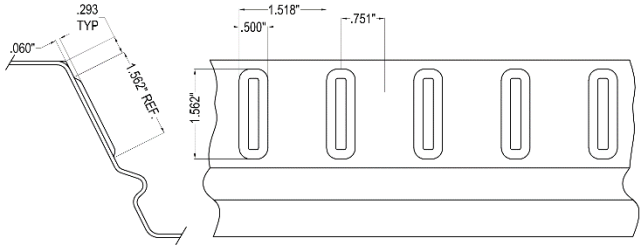
CFD 1.5 - EMBOSSMENT PATTERN



CFD2 INTERLOCKING - EMBOSSMENT PATTERN



CFD3 INTERLOCKING - EMBOSSMENT PATTERN



CFD3 ES INTERLOCKING - EMBOSSMENT PATTERN

FIGURE 2 - EMBOSSMENTS FOR COMPOSITE FLOOR DEKS
(DIMENSIONS SHOWN ARE NOMINAL)

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

REPORT HOLDER:

NEW MILLENNIUM BUILDING SYSTEMS, LLC

EVALUATION SUBJECT:
NEW MILLENNIUM STEEL ROOF, COMPOSITE FLOOR, AND FORM DECK PANELS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that New Millennium steel deck panels, described in ICC-ES evaluation report ESR-1169, 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) and Division of State Architect (DSA), see Sections 2.1 and 2.2 below.

2.0 CONCLUSIONS

The New Millennium steel floor and roof deck panels, described in Sections 2.0 through 7.0 of the evaluation report ESR-1169, comply with CBC Chapters 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 the CBC Chapters 16 and 17, as applicable.

2.1 OSHPD:

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

2.2 DSA:

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

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