



Member of the FM Global Group

Not to be distributed outside of FM Approvals and its affiliates except by Customer

APPROVAL REPORT

Project No: PR463890
Class: 4451
Product Name: 1.5B Deck, 3N Deck, and 3N Deck (Interlocking)
Product Type: Deck (Steel)
Name of Listing Company: CSM Products & Solutions
Address of Listing Company: 8660 Lambright Road
Houston TX 77075
United States
Customer ID: 269713-1
Customer website: <http://www.metaldecking.com>

Prepared by

Reviewed by

Jonathan Dupre
Engineer

R Scott Holmes
Operations VP, Group Manager,
Materials

Phillip J. Smith
VP, Manager of Materials

19 September 2023

Date of Approval

1 INTRODUCTION

1.1 CSM Products & Solutions requested examination of their 1.5B Deck, 3N Deck, and 3N Deck (Interlocking) with the design thicknesses of 22 ga. (0.0295 in.), 20 ga. (0.0358), 18 ga. (0.0474 in.), and 16 ga. (0.0598 in.), to see if they met the Approval requirements of the standard listed in Section 1.3.

1.2 This report may be freely reproduced only in its entirety and without modification.

1.3 Standard

Title	Number	Issue Date
Approval Standard for Profiled Steel Panels for Use as Decking in Class 1 Insulated Roof Construction	4451	6/2012

1.4 Listing

The products will be listed in RoofNav, an on-line resource of FM Approvals. Drawings, and specifications are on file at FM Approvals.

2 DESCRIPTION

The products are described as follows:

Trade Name	Thickness, MSG	Structural Attachment	Side Lap Attachment	Depth
3N Deck, and 3N Deck (Interlocking)	0.0295, 0.0358, 0.0474, and 0.0598 in. (0.75, 0.91, 1.20, and 1.52 mm)(22, 20, 18, 16 ga.)	FM Approved Fasteners	FM Approved Fasteners and Button Punch	3 in. (76.2 mm)
1.5B Deck	0.0295, 0.0358, 0.0474, and 0.0598 in. (0.75, 0.91, 1.20, and 1.52 mm)(22, 20, 18, 16 ga.)	FM Approved Fasteners	FM Approved Fasteners	1.5 in. (38.1 mm)

3 EXAMINATIONS AND TESTS

3.1 Samples were submitted for examination and testing. The samples were considered to be representative of standard production and were examined or tested as indicated below. All data is on file at FM Approvals along with other documents and correspondence applicable to this program.

3.2 All testing and analysis considered appropriate was conducted and verified to be in compliance with the Standards defined in Section 1.3.

3.3 Several performance requirements and tests required by the Standard have been waived due to previous successful testing. See Table 1 below for details.

Table 1

FM Standard 4451 Performance Requirement	FM Standard 4451 Section	Submissions Required / Waivers
Allowable Live Load Deflection	4.1	Calculations Required
Combustibility From Below the Roof Deck	4.2	Waived, not required for non-acoustical decks with FM Approved Insulation
Combination pull out / pull over resistance of fasteners (Testing)	4.3.1.1	Waived, Steel deck installed in combination with FM Approved steel deck fasteners.
Pull over resistance of fasteners (Calculation)	4.3.1.2	Waived, Steel deck installed in combination with FM Approved steel deck fasteners.
Combination pull off / pull over resistance of arc spot welds	4.3.1.3	Waived, not requested
Side lap fastener and side lap crimping and interlocking resistance	4.3.1.4	Required
Fastener pull out resistance for above deck components	4.3.1.5	Not Required, no stiffening rib
Steel Deck Bending Stresses Under Service Wind Loads	4.3.1.6	Calculations Required
Wind Uplift Ratings Greater Than Class 1-90 and all assemblies that utilize steel deck with a design thickness less than 0.0295 in. (0.75 mm)	4.3.2	Waived, Maximum Class of 1-90 requested
Foot Traffic Resistance of Insulation	4.4	Required for 3" N-Deck profile, top rib opening is greater than 2.5 in (64 mm)
Bearing Capacity of Insulation	4.5	Waived, top flange width is greater than 2 in (51 mm)
Corrosion Resistance Test (Optional Test)	4.6	Not Requested
Drivability Evaluation of Fasteners	4.7	Waived, FM Approved fasteners will be used

3.4 Foot Traffic Resistance Testing

Three (3) foot traffic resistance tests were conducted with the following constructions. The samples passed testing.

Sample 1

Insulation: Georgia Pacific DensDeck Prime 0.5 in (12.7 mm)

Deck: 3N Deck – 22ga.

Sample 2

Insulation: Elevate ISOGARD GL 1.5 in (38.1 mm)

Deck: 3N Deck – 22ga.

Sample 3

Insulation: Atlas AC Foam II 1.5 in (38.1 mm)

Deck: 3N Deck (22 ga.)

3.5 Side Lap Crimping and Interlocking Resistance

One (1) Side Lap Crimping and Interlocking Resistance test was conducted on the sample below. The sample passed.

Deck: 3N Deck (22 ga.)

Crimping: Button Punch

4 MARKING

4.1 Marking on the product or, if not possible due to size, on its packaging or label accompanying the product, shall include the following information:

- name and address of the manufacturer or marking traceable to the manufacturer;
- date of manufacture or code traceable to date of manufacture or lot identification;
- model number, model type and/or product trade name as appropriate.

4.2 The product trade name, model number or model type identification shall correspond with RoofNav, the manufacturer's catalog designation and shall uniquely identify the product as FM Approved. The manufacturer shall not place this trade name or model number identification on any other product unless covered by a separate agreement with FM Approvals.

4.3 The Approval Mark shall be displayed visibly and permanently on the product and/or packaging as appropriate. The manufacturer shall not use this Mark on any other product unless such product is covered by a separate FM Approvals Approval Report.

4.4 Markings denoting Approval by FM Approvals shall be applied by the manufacturer only within and on the premises of manufacturing locations that are under the FM Approvals Surveillance Audit program.

4.5 The manufacturer agrees that use of the FM Approvals name or Approval Mark is subject to the conditions and limitations of the Approval by FM Approvals. Such conditions and limitations must be included in all references to Approval by FM Approvals.

5 REMARKS

The roof cover must be installed using a roof perimeter flashing system Approved by FM Approvals. See RoofNav.

6 SURVEILLANCE AUDIT

The manufacturing facilities at the following location shall be visited on a routine basis. The facility processes and quality control procedures in place have been determined to be satisfactory to manufacture products identical to that tested and Approved. An FM Approved Products/Specification Tested Revision Request Form shall be submitted to FM Approvals for requesting to manufacture products at any additional or alternate manufacturing facilities which are not listed below.

Audit Location

CSM Products & Solutions
8660 Lambright Road
Houston TX 77075
United States

7 MANUFACTURER'S RESPONSIBILITIES

- 7.1 The manufacturer shall notify FM Approvals of any planned change in the Approved products, prior to general sale or distribution, using the FM Approved Products/Specification Tested Revision Request Form. No changes of any nature shall be made unless notice of the proposed change has been given and written authorization obtained from FM Approvals.
- 7.2 To ensure compliance with his procedures in the field, the manufacturer shall supply to the installer such necessary instruction or assistance required to produce the desired performance achieved in the tests.
- 7.3 In accordance with the Master Agreement, the manufacturer shall make full and immediate disclosure to FM Approvals of all information concerning any defect in, or potential hazard of, the product or service manufactured or provided by the Customer which is Approved by, or being examined by, FM Approvals. The manufacturer shall make all necessary arrangements for the investigation of complaints / anomalies applicable to this approval and shall keep records of all complaints / anomalies including actions taken.

8 DOCUMENTATION

The following document describes the N-Deck and B-Deck and is on file at FM Approvals.

Document Title	Issue Date
Surveillance Audit Manual	August 2023

No new critical documents have been created as a result of this project as all components used are Approved by FM Approvals.

9 CONCLUSION

- 9.1 Test results from this program indicate that the submitted product as evaluated, meets the requirements of the FM Approvals Standard listed in section 1.3 when installed as follows:

9.2 CSM Products & Solutions 1.5B Deck, 3N Deck (Interlocking), 3N Deck steel roof decks are secured to the building structural supports with FM Approved steel deck fasteners spaced at the maximum center to center span as determined by the lesser of the values shown in the table as follows or as specified within listings of the FM Approved steel deck fastener. The side laps of the 3N Deck steel decks are secured by FM Approved Fasteners and side lap crimping and shall not exceed a spacing of 22 in (559 mm) using a button punch tool. Minimum 1.5 in (38 mm) FM Approved polyisocyanurate or minimum 0.5 in (12.7mm) gypsum board placed on the deck. An FM Approved fully or partially adhered roof covering or mechanically attached roof covering when the in-row fastener spacing is less than or equal to one-half of the deck span is applied per proprietary listings. Refer to the use of steel roof decks and fasteners throughout listings for details and limitations. Meets maximum Class 1-90 or per specified listings.

Deck Yield	40000
-------------------	--------------

CSM Products & Solutions 1.5B Deck steel deck						
Deck Design Thickness	Wind Rating - One Span					
	1-60		1-75		1-90	
MSG (in. [mm])	in.	mm	in.	mm	in.	mm
22 Ga (0.0295 [0.75])	69	1753	69	1753	69	1753
20 Ga (0.0358 [0.91])	77	1956	77	1956	77	1956
18 Ga (0.0474 [1.2])	87	2210	87	2210	87	2210
16 Ga (0.0598 [1.52])	104	2642	104	2642	104	2642
Deck Design Thickness	Wind Rating - Two Spans					
	1-60		1-75		1-90	
MSG (in. [mm])	in.	mm	in.	mm	in.	mm
22 Ga (0.0295 [0.75])	82	2083	82	2083	82	2083
20 Ga (0.0358 [0.91])	90	2286	90	2286	90	2286
18 Ga (0.0474 [1.2])	103	2616	103	2616	103	2616
16 Ga (0.0598 [1.52])	123	3124	123	3124	123	3124
Deck Design Thickness	Wind Rating - Three or More Spans					
	1-60		1-75		1-90	
MSG (in. [mm])	in.	mm	in.	mm	in.	mm
22 Ga (0.0295 [0.75])	82	2083	82	2083	82	2083
20 Ga (0.0358 [0.91])	90	2286	90	2286	90	2286
18 Ga (0.0474 [1.2])	103	2616	103	2616	103	2616
16 Ga (0.0598 [1.52])	123	3124	123	3124	123	3124

Deck Yield	50000
-------------------	--------------

CSM Products & Solutions 3N Deck Interlock steel deck						
Deck Design Thickness	Wind Rating - One Span					
	1-60		1-75		1-90	
MSG (in. [mm])	in.	mm	in.	mm	in.	mm
22 Ga (0.0295 [0.75])	149	3785	149	3785	149	3785
20 Ga (0.0358 [0.91])	164	4166	164	4166	164	4166
18 Ga (0.0474 [1.2])	188	4775	188	4775	188	4775
16 Ga (0.0598 [1.52])	210	5334	210	5334	210	5334

Deck Design Thickness	Wind Rating - Two Spans					
	1-60		1-75		1-90	
MSG (in. [mm])	in.	mm	in.	mm	in.	mm
22 Ga (0.0295 [0.75])	175	4445	165	4191	150	3810
20 Ga (0.0358 [0.91])	193	4902	188	4775	170	4318
18 Ga (0.0474 [1.2])	221	5613	221	5613	207	5258
16 Ga (0.0598 [1.52])	248	6299	248	6299	242	6147

Deck Design Thickness	Wind Rating - Three or More Spans					
	1-60		1-75		1-90	
MSG (in. [mm])	in.	mm	in.	mm	in.	mm
22 Ga (0.0295 [0.75])	175	4445	175	4445	167	4242
20 Ga (0.0358 [0.91])	193	4902	193	4902	191	4851
18 Ga (0.0474 [1.2])	221	5613	221	5613	221	5613
16 Ga (0.0598 [1.52])	248	6299	248	6299	248	6299

Deck Yield	50000
-------------------	--------------

CSM Products & Solutions 3N Deck steel deck						
Deck Design Thickness	Wind Rating - One Span					
	1-60		1-75		1-90	
MSG (in. [mm])	in.	mm	in.	mm	in.	mm
22 Ga (0.0295 [0.75])	147	3734	147	3734	147	3734
20 Ga (0.0358 [0.91])	163	4140	163	4140	163	4140
18 Ga (0.0474 [1.2])	187	4750	187	4750	187	4750
16 Ga (0.0598 [1.52])	209	5309	209	5309	209	5309

Deck Design Thickness	Wind Rating - Two Spans					
	1-60		1-75		1-90	
MSG (in. [mm])	in.	mm	in.	mm	in.	mm
22 Ga (0.0295 [0.75])	173	4394	164	4166	149	3785
20 Ga (0.0358 [0.91])	192	4877	187	4750	170	4318
18 Ga (0.0474 [1.2])	220	5588	220	5588	206	5232
16 Ga (0.0598 [1.52])	247	6274	247	6274	241	6121

Deck Design Thickness	Wind Rating - Three or More Spans					
	1-60		1-75		1-90	
MSG (in. [mm])	in.	mm	in.	mm	in.	mm
22 Ga (0.0295 [0.75])	173	4394	173	4394	167	4242
20 Ga (0.0358 [0.91])	192	4877	192	4877	190	4826
18 Ga (0.0474 [1.2])	220	5588	220	5588	220	5588
16 Ga (0.0598 [1.52])	247	6274	247	6274	247	6274

Tests show that the tested roof constructions in and of themselves would not create a need for automatic sprinklers.

- 9.3** Since a duly signed Master Agreement is on file for this customer, Approval is effective as of the date of this report.
- 9.4** Continued Approval will depend upon satisfactory field experience and periodic Facilities and Procedures Audits.

PROJECT DATA RECORD: PR463890