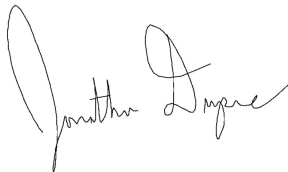


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APPROVAL REPORT

Project No: PR467254
Class: 4451
Product Name: Type BI
Product Type: Deck (Steel)
Name of Listing Company: New Millennium Building Systems LLC
Address of Listing Company: 6115 County Rd 42
Butler IN 46721
United States
Customer ID: 1000009190-1
Customer website: <http://www.newmill.com/>

Prepared by

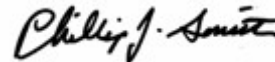


Jonathan Dupre
Engineer

Reviewed by



R Scott Holmes
Operations VP, Group Manager,
Materials



Phillip J. Smith
VP, Manager of Materials

1 May 2024
Date of Approval

1 INTRODUCTION

1.1 New Millennium Building Systems LLC requested Approval of their Type BI Steel Deck listed in Section 2 to determine if it meets 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	06/2012

1.4 Listing

The product will appear in the RoofNav, an on-line resource of FM Approvals. Drawings, and specifications are on file at FM Approvals.

2 DESCRIPTION

Trade Name	Thickness in (mm)	Yield Strength	Depth	Structural Attachment	Side Lap Attachment
Type BI	0.0295 in (0.75 mm, 22 ga.)	33 ksi (228 mPa)	1.5 in (38.1 mm)	Fasteners and Welds	Clinch
	0.0329 in (0.84 mm, 21 ga.)				
	0.0358 in (0.91 mm, 20 ga.)				
	0.0418 in (1.10 mm, 19 ga.)				
	0.0474 in (1.20 mm, 18 ga.)				
	0.0598 in (1.52 mm, 16 ga.)				

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 Standard 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	Waived, see 3050392
Combustibility From Below the Roof Deck	4.2	Not Required
Combination pull out / pull over resistance of fasteners (Testing)	4.3.1.1	Waived, see 3050392
Pull over resistance of fasteners (Calculation)	4.3.1.2	Waived, see 3050392
Combination pull off / pull over resistance of arc spot welds	4.3.1.3	Waived, see 3050392
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	Waived, not required
Steel Deck Bending Stresses Under Service Wind Loads	4.3.1.6	Waived, see 3050392
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, Not required
Foot Traffic Resistance of Insulation	4.4	Waived, see 3037399
Bearing Capacity of Insulation	4.5	Waived, not required
Corrosion Resistance Test (Optional Test)	4.6	Waived, not requested
Drivability Evaluation of Fasteners	4.7	Waived, not required

3.4 Side Lap Crimping and Interlocking Resistance

Sample: Type BI (22 ga. And 33 ksi) clinched with New Millennium RED Tool.

Results: Avg. 823 lbf: Max side lap fastened spacing of 36 in (914 mm) granted.

4 MARKING

- 4.1 The 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 manufacturer or code traceable to date of manufacture or lot identification
 - trade name or model number

When hazard warnings are needed, the marking should be universally recognizable.

- 4.2 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.
- 4.3 Markings denoting Approval by FM Approvals shall be applied by the manufacturer only within and on the premises of manufacturing locations under the FM Approvals Surveillance program.
- 4.4 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.
- 4.5 All markings shall be legible and durable.

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 locations 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 Locations

Site 1	Site 2
6115 County Road 42, Butler, IN 46721	3565 Highway 32 North, Hope, AR 71801

7 MANUFACTURER’S RESPONSIBILITIES

- 7.1 Documentation that is applicable to this approval is on file at FM Approvals and listed in the Documentation File, Section 8, of this report. No changes of any nature shall be made unless notice of the proposed change has been given and written authorization obtained from FM Approvals. The FM Approved Products/Specification Tested Revision Request Form shall be forwarded to FM Approvals as notice of proposed changes. 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 steel decks and is on file at FM Approvals.

Document Title	Issue Date
Surveillance Audit Manual	March 2024

9 CONCLUSION

- 9.1 Evaluation from this program indicates that the Type BI steel deck meets the requirements of the FM Approvals Standard listed in section 1.3 when installed as follows:

Type BI steel roof decks have a minimum yield strength of 33 ksi (228 MPa). Type BI is secured to the building structural supports with either 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 below or as specified within the listings of the FM Approved steel deck fastener. The side laps shall be secured using New Millennium’s RED tool with side lap clinches at a maximum of 36 in (914 mm). An FM Approved fully or partially adhered roof covering or mechanically attached roof covering is applied per proprietary listings.

- 9.2 This table is to be used for steel deck span limits when FM Approved steel deck structural fasteners are used:

Maximum Spans for Type BI						
Deck Design Thickness	Wind Rating - Three Span					
	1-60		1-75		1-90	
	in.	mm	in.	mm	in.	mm
0.0295 in. (0.75 mm, 22 ga.)	84	2134	84	2134	84	2134
0.0329 in. (0.84 mm, 21 ga.)	89	2261	89	2261	89	2261
0.0358 in. (0.91 mm, 20 ga.)	93	2362	93	2362	93	2362
0.0418 in. (1.10 mm, 19 ga.)	100	2540	100	2540	100	2540
0.0474 in. (1.20 mm, 18 ga.)	107	2718	107	2718	107	2718
0.0598 in. (1.52 mm, 16 ga.)	120	3048	120	3048	120	3048
Deck Design Thickness	Wind Rating - Two Span					
	1-60		1-75		1-90	
	in.	mm	in.	mm	in.	mm
0.0295 in. (0.75 mm, 22 ga.)	84	2134	84	2134	84	2134
0.0329 in. (0.84 mm, 21 ga.)	89	2261	89	2261	89	2261
0.0358 in. (0.91 mm, 20 ga.)	93	2362	93	2362	93	2362
0.0418 in. (1.10 mm, 19 ga.)	100	2540	100	2540	100	2540
0.0474 in. (1.20 mm, 18 ga.)	107	2718	107	2718	107	2718
0.0598 in. (1.52 mm, 16 ga.)	120	3048	120	3048	120	3048
Deck Design Thickness	Wind Rating - One Span					
	1-60		1-75		1-90	
	in.	mm	in.	mm	in.	mm
0.0295 in. (0.75 mm, 22 ga.)	71	1803	71	1803	71	1803
0.0329 in. (0.84 mm, 21 ga.)	75	1905	75	1905	75	1905
0.0358 in. (0.91 mm, 20 ga.)	79	2007	79	2007	79	2007
0.0418 in. (1.10 mm, 19 ga.)	85	2159	85	2159	85	2159
0.0474 in. (1.20 mm, 18 ga.)	91	2311	91	2311	91	2311
0.0598 in. (1.52 mm, 16 ga.)	102	2591	102	2591	102	2591

9.3 In lieu of mechanical fasteners, the decks can be secured to supports with puddle welds as noted in Tables A through E below. The weld diameter shown is the minimum visible weld diameter for a single sheet of deck for spans shown in. See Table E for the equivalent visible weld diameter needed when welding through multiple sheets of deck.

Table A							
Deck Yield		Weld Diameter		Weld Spacing		Weld Electrode	
psi	MPa	in.	mm	in.	mm	psi	MPa
33000	228	0.625	15.875	6	152.4	60000	414
Wind Rating - One Span							

Deck Design Thickness	1-60		1-75		1-90	
	in.	mm	in.	mm	in.	mm
0.0295 in. (0.75 mm, 22 ga.)	188	4775	150	3810	125	3175
0.0329 in. (0.84 mm, 21 ga.)	208	5283	166	4216	139	3531
0.0358 in. (0.91 mm, 20 ga.)	225	5715	180	4572	150	3810
0.0418 in. (1.10 mm, 19 ga.)	261	6629	208	5283	174	4420
0.0474 in. (1.20 mm, 18 ga.)	293	7442	234	5944	195	4953
0.0598 in. (1.52 mm, 16 ga.)	362	9195	289	7341	241	6121
Wind Rating - Two Spans						
Deck Design Thickness	1-60		1-75		1-90	
	in.	mm	in.	mm	in.	mm
0.0295 in. (0.75 mm, 22 ga.)	150	3810	120	3048	100	2540
0.0329 in. (0.84 mm, 21 ga.)	166	4216	133	3378	111	2819
0.0358 in. (0.91 mm, 20 ga.)	180	4572	144	3658	120	3048
0.0418 in. (1.10 mm, 19 ga.)	208	5283	167	4242	139	3531
0.0474 in. (1.20 mm, 18 ga.)	234	5944	187	4750	156	3962
0.0598 in. (1.52 mm, 16 ga.)	289	7341	231	5867	193	4902
Wind Rating - Three or More Spans						
Deck Design Thickness	1-60		1-75		1-90	
	in.	mm	in.	mm	in.	mm
0.0295 in. (0.75 mm, 22 ga.)	171	4343	136	3454	114	2896
0.0329 in. (0.84 mm, 21 ga.)	189	4801	151	3835	126	3200
0.0358 in. (0.91 mm, 20 ga.)	205	5207	164	4166	136	3454
0.0418 in. (1.10 mm, 19 ga.)	237	6020	189	4801	158	4013
0.0474 in. (1.20 mm, 18 ga.)	266	6756	213	5410	177	4496
0.0598 in. (1.52 mm, 16 ga.)	329	8357	263	6680	219	5563

Table B							
Deck Yield		Weld Diameter		Weld Spacing		Weld Electrode	
psi	MPa	in.	mm	in.	mm	psi	MPa
33000	228	0.625	15.875	12	304.8	60000	414

Deck Design Thickness	Wind Rating - One Span					
	1-60		1-75		1-90	
	in.	mm	in.	mm	in.	mm
0.0295 in. (0.75 mm, 22 ga.)	94	2388	75	1905	62	1575
0.0329 in. (0.84 mm, 21 ga.)	104	2642	83	2108	69	1753
0.0358 in. (0.91 mm, 20 ga.)	112	2845	90	2286	75	1905

0.0418 in. (1.10 mm, 19 ga.)	130	3302	104	2642	87	2210
0.0474 in. (1.20 mm, 18 ga.)	146	3708	117	2972	97	2464
0.0598 in. (1.52 mm, 16 ga.)	181	4597	144	3658	120	3048
Wind Rating - Two Spans						
Deck Design Thickness	1-60		1-75		1-90	
	in.	mm	in.	mm	in.	mm
0.0295 in. (0.75 mm, 22 ga.)	75	1905	60	1524	50	1270
0.0329 in. (0.84 mm, 21 ga.)	83	2108	66	1676	55	1397
0.0358 in. (0.91 mm, 20 ga.)	90	2286	72	1829	60	1524
0.0418 in. (1.10 mm, 19 ga.)	104	2642	83	2108	69	1753
0.0474 in. (1.20 mm, 18 ga.)	117	2972	93	2362	78	1981
0.0598 in. (1.52 mm, 16 ga.)	144	3658	115	2921	96	2438
Wind Rating - Three or More Spans						
Deck Design Thickness	1-60		1-75		1-90	
	in.	mm	in.	mm	in.	mm
0.0295 in. (0.75 mm, 22 ga.)	85	2159	68	1727	57	1448
0.0329 in. (0.84 mm, 21 ga.)	94	2388	75	1905	63	1600
0.0358 in. (0.91 mm, 20 ga.)	102	2591	82	2083	68	1727
0.0418 in. (1.10 mm, 19 ga.)	118	2997	94	2388	79	3708
0.0474 in. (1.20 mm, 18 ga.)	133	3378	106	2692	88	2235
0.0598 in. (1.52 mm, 16 ga.)	164	4166	131	3327	109	2769

Table C							
Deck Yield		Weld Diameter		Weld Spacing		Weld Electrode	
psi	MPa	in.	mm	in.	mm	psi	MPa
33000	228	0.75	19.05	6	152.4	60000	414

Wind Rating - One Span						
Deck Design Thickness	1-60		1-75		1-90	
	in.	mm	in.	mm	in.	mm
0.0295 in. (0.75 mm, 22 ga.)	227	5766	182	4623	151	3835
0.0329 in. (0.84 mm, 21 ga.)	252	6401	202	5131	168	4267
0.0358 in. (0.91 mm, 20 ga.)	273	6934	219	5563	182	4623
0.0418 in. (1.10 mm, 19 ga.)	317	8052	253	6426	211	5359
0.0474 in. (1.20 mm, 18 ga.)	356	9042	285	7239	237	6020
0.0598 in. (1.52 mm, 16 ga.)	442	11227	353	8966	294	7468
Wind Rating - Two Spans						

Deck Design Thickness	1-60		1-75		1-90	
	in.	mm	in.	mm	in.	mm
0.0295 in. (0.75 mm, 22 ga.)	182	4623	145	3683	121	3073
0.0329 in. (0.84 mm, 21 ga.)	202	5131	161	4089	134	3404
0.0358 in. (0.91 mm, 20 ga.)	219	5563	175	4445	146	3708
0.0418 in. (1.10 mm, 19 ga.)	253	6426	202	5131	169	4293
0.0474 in. (1.20 mm, 18 ga.)	285	7239	228	5791	190	4826
0.0598 in. (1.52 mm, 16 ga.)	353	8966	282	7163	235	5969
Wind Rating - Three or More Spans						
Deck Design Thickness	1-60		1-75		1-90	
	in.	mm	in.	mm	in.	mm
0.0295 in. (0.75 mm, 22 ga.)	206	5232	165	4191	137	3480
0.0329 in. (0.84 mm, 21 ga.)	229	5817	183	4648	153	3886
0.0358 in. (0.91 mm, 20 ga.)	248	6299	199	5055	165	4191
0.0418 in. (1.10 mm, 19 ga.)	288	7315	230	5842	192	4877
0.0474 in. (1.20 mm, 18 ga.)	324	8230	259	6579	216	5486
0.0598 in. (1.52 mm, 16 ga.)	401	10185	321	8153	267	6782

Table D							
Deck Yield		Weld Diameter		Weld Spacing		Weld Electrode	
psi	MPa	in.	mm	in.	mm	psi	MPa
33000	228	0.75	19.05	12	304.8	60000	414

Deck Design Thickness	Wind Rating - One Span					
	1-60		1-75		1-90	
	in.	mm	in.	mm	in.	mm
0.0295 in. (0.75 mm, 22 ga.)	113	2870	91	2311	75	1905
0.0329 in. (0.84 mm, 21 ga.)	126	3200	101	2565	84	2134
0.0358 in. (0.91 mm, 20 ga.)	136	3454	109	2769	91	2311
0.0418 in. (1.10 mm, 19 ga.)	158	4013	126	3200	105	2667
0.0474 in. (1.20 mm, 18 ga.)	178	4521	142	3607	118	2997
0.0598 in. (1.52 mm, 16 ga.)	221	5613	176	4470	147	3734
Deck Design Thickness	Wind Rating - Two Spans					
	1-60		1-75		1-90	
	in.	mm	in.	mm	in.	mm
0.0295 in. (0.75 mm, 22 ga.)	91	2311	72	1829	60	1524
0.0329 in. (0.84 mm, 21 ga.)	101	2565	80	2032	67	1702
0.0358 in. (0.91 mm, 20 ga.)	109	2769	87	2210	73	1854

0.0418 in. (1.10 mm, 19 ga.)	126	3200	101	2565	84	2134
0.0474 in. (1.20 mm, 18 ga.)	142	3607	114	2896	95	2413
0.0598 in. (1.52 mm, 16 ga.)	176	4470	141	3581	117	2972
Wind Rating - Three or More Spans						
Deck Design Thickness	1-60		1-75		1-90	
	in.	mm	in.	mm	in.	mm
0.0295 in. (0.75 mm, 22 ga.)	103	2616	82	2083	68	1727
0.0329 in. (0.84 mm, 21 ga.)	114	2896	91	2311	76	1930
0.0358 in. (0.91 mm, 20 ga.)	124	3150	99	2515	82	2083
0.0418 in. (1.10 mm, 19 ga.)	144	3658	115	2921	96	2438
0.0474 in. (1.20 mm, 18 ga.)	162	4115	129	3277	108	2743
0.0598 in. (1.52 mm, 16 ga.)	200	5080	160	4064	133	3378

The equivalent visible weld diameter needed when welding through multiple sheets of deck.

Table E				
Deck Design Thickness	Number of Welded Sheets			
	2		4	
	in. (mm)		in. (mm)	
	Visible Weld Diameter Through Single Sheet			
	0.625(15.9)		0.75 (19.1)	
	Equivalent Visible Weld Diameter for Multiple Sheets			
0.0295 in. (0.75 mm, 22 ga.)	0.625 (15.9)		0.750 (19.1)	
0.0329 in. (0.84 mm, 21 ga.)	0.625 (15.9)		0.750 (19.1)	
0.0358 in. (0.91 mm, 20 ga.)	0.625 (15.9)		0.750 (19.1)	
0.0418 in. (1.10 mm, 19 ga.)	0.625 (15.9)	N/A	0.750 (19.1)	N/A
0.0474 in. (1.20 mm, 18 ga.)	0.625 (15.9)	N/A	0.750 (19.1)	N/A
0.0598 in. (1.52 mm, 16 ga.)	0.625 (15.9)	N/A	0.750 (19.1)	N/A

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

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

PROJECT DATA RECORD: PR467254

ORIGINAL TEST DATA: See Table 1



Certificate of Compliance

This certificate is issued for the following:

Type BI

Prepared for:

New Millennium Building Systems LLC
6115 County Rd 42
Butler, IN 46721
United States

FM Approvals Class: 4451

Approval Identification: PR467254 Approval Granted: 1 May 2024

To verify the availability of the Approved product, please refer to www.roofnav.com

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in RoofNav, an online resource of FM Approvals.

A handwritten signature in black ink that reads 'Phillip J. Smith'.

Phillip J. Smith
VP - Manager of Materials
FM Approvals
One Technology Way
Norwood, MA 02062



Member of the FM Global Group