

# UL Evaluation Report



## UL ER10167-02

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Sub-level 3: 07 54 00 – Thermoplastic Membrane Roofing

Sub-level 4: 07 54 19 – Polyvinyl-Chloride Roofing

### COMPANY:

Johns Manville

717 17<sup>th</sup> St.

Denver, CO 80202-3330 USA

[www.jm.com](http://www.jm.com)

1. SUBJECT: JM PVC 50 mil, JM PVC 60 mil, JM PVC 80 mil

JM PVC Fleece Backed 50 mil, JM PVC Fleece Backed 60 mil,  
JM PVC Fleece Backed 80 mil

JM PVC SD Plus 50 mil, JM PVC SD Plus 60 mil, JM PVC SD Plus 80 mil

### 2. SCOPE OF EVALUATION

- 2015, 2012, 2009 and 2006 *International Building Code*® (IBC)
- 2015, 2012, 2009 and 2006 *International Residential Code*® (IRC)
- ICC ES Acceptance Criteria for Roof-Covering Systems (AC75), Dated Jul 2010 (Editorially revised April 2014)
- ICC ES Acceptance Criteria for Quality Documentation (AC10), Dated June 2014

### The products were evaluated for the following properties:

- Roofing Systems for Exterior Fire Exposure (ANSI/UL 790, ASTM E108)
- Roofing Systems, Wind Uplift Resistance (FM 4474, ANSI/UL 1897)
- Physical Properties (ASTM D4434, ASTM G154)
- Foot Traffic Resistance (FM 4470)

### 3. REFERENCED DOCUMENTS

- ANSI/UL 790, Standard Test Methods for Fire Tests of Roof Coverings, Eighth Edition including revisions through July 29, 2014
- ANSI/UL 1897, Uplift Tests for Roof Covering Systems, Sixth Edition, dated September 14, 2012
- ASTM D4434-2015, *Standard Specification for Poly (Vinyl Chloride) Sheet Roofing*
- ASTM E108-2011, Test Methods for Fire Tests of Roof Covering
- ASTM G154-2012, Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials
- FM 4470-2012, Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction
- FM 4474-2011, Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures
- ICC ES Acceptance Criteria for Membrane Roof-Covering Systems (AC75), Dated April 2014
- ICC ES Acceptance Criteria for Quality Documentation (AC10), Dated June 2014

### 4. USES

JM PVC, JM PVC Fleece Backed and JM PVC SD Plus membranes are single-ply membranes used as roof coverings in mechanically fastened or fully adhered Class A, B or C roof assemblies installed on combustible or non-combustible roof decks.

### 5. PRODUCT DESCRIPTION

Johns Manville PVC membranes are reinforced single ply polyvinyl chloride (PVC) membranes designed to be used in adhered roofing systems or mechanically fastened roofing systems as described in this report. The membranes are provided in rolls of various lengths and widths.

These roofing systems consist of the single-ply PVC roofing membrane, insulation where used, barrier board or slip sheet where used, flashing, mechanical fasteners, and adhesives that are installed on a combustible or non-combustible roof deck.

These roofing assemblies incorporating the membranes comply with the following properties when installed as described in this report.

**Fire Classification:** Roofing assemblies covered under this report have been tested for fire classification Class A, B or C in accordance with ANSI/UL 790 or ASTM E108, as required by [Section 1505.1](#) of 2015, 2012, 2009 and 2006 IBC and [Section R902.1](#) of the 2015, 2012, 2009 and 2006 IRC.

**Wind Resistance:** Roofing assemblies covered under this report have been tested for wind uplift resistance in accordance with FM 4474 and ANSI/UL 1897, and therefore qualify for use under Roofing membranes [Section 1504.3.1](#) of the 2015, 2012, 2009 and 2006 IBC.

The roofing assemblies shall be designed to resist the design wind load pressures for components and claddings in accordance with [Section 1609](#) of the 2015, 2012, 2009 and 2006 IBC and [Section R905.1](#) of the 2015, 2012, 2009 and 2006 IRC.

**Physical Properties:** The roofing membranes covered under this Report have been tested for physical properties in accordance with ASTM D4434 and ASTM G154, and therefore qualify for use under [Section 1507.13.2](#) and [Section 1504.6](#) of the 2015, 2012, 2009 and 2006 IBC and [Section R905.13.2](#) of the 2015, 2012, 2009 and 2006 IRC.

**Impact Test:** The single-ply roofing membranes covered under this Report have been tested for impact resistance in accordance with "Resistance to Foot Traffic Test" in Section 5.5 of FM 4470 and therefore qualify for use under [Section 1504.7](#) of the 2015, 2012, 2009 and 2006 IBC.

## 5.1 Membranes:

**5.1.1 JM PVC (50, 60, 80 mil)** are membranes having a proprietary thermoplastic formulation consisting of PVC resins, plasticizers, stabilizers, biocides, flame retardants, U.V. absorbents with DuPont™ Elvaloy KEE which incorporate a polyester scrim that is laminated between two layers of PVC film giving the membrane strength and durability.

**5.1.2 JM Fleece Backed (50, 60, 80 mil)** are JM PVC membranes combining its proprietary thermoplastic formulation with DuPont™ Elvaloy KEE. These membranes are manufactured with a spunbond 3.8 oz. polyester fleece back mat bound to the underneath side of the membrane for enhanced adhesion characteristics.

**5.1.3 JM PVC SD Plus (50, 60, 80 mils)** are membranes having a proprietary thermoplastic formulation consisting of PVC resins, plasticizers, stabilizers, biocides, flame retardants, U.V. absorbents which incorporate a polyester scrim that is laminated between two layers of PVC film giving the membrane strength and durability.

## 5.2 Insulation:

Foam plastic insulation when used shall have a flame spread index of not more than 75 when tested at the maximum thickness intended for the use in accordance with ANSI/UL 723 or ASTM E 84 to qualify for use under [Section 2603.3](#) and Exception 3 of the 2015, 2012, 2009 and 2006 IBC. To qualify for use under [Section 2603.4.1.5](#) of the 2015, 2012, 2009 and 2006 IBC, a thermal barrier is not required for foam plastic insulation that is part of a Class A, B or C roof-covering assembly, provided the assembly with foam plastic insulation complies with FM 4450 or UL 1256.

## 5.3 Fasteners:

Fasteners used to mechanically fasten insulation and membranes to the roof deck shall be corrosion resistant and shall be one of the fasteners identified in the Appendix of this Report.

#### 5.4 Adhesive:

The adhesive used for adhering John Manville PVC membranes to the insulation or roofing substrate shall be as noted in the Appendix of this Report.

#### 5.5 Asphalt:

Hot roofing asphalt, when specified in the roofing assemblies shall conform to ASTM D312, Type IV.

### 6. INSTALLATION

John Manville single ply PVC membranes shall be installed in accordance with the applicable code, this report and the manufacturer's published installation instructions. The membranes shall be installed in accordance with [Section 1507.13](#) of the 2015, 2012, 2009 and 2006 IBC or [Section R905.13](#) of the 2015, 2012, 2009 and 2006 IRC as applicable, except as noted in this report.

The manufacturer's published installation instructions shall be available at all times on the jobsite during installation.

The slope of the roof on which the membranes are installed shall be a minimum of 1/4:12 (2% slope) and shall not be more than the maximum slope indicated in Tables of this Report.

Penetrations and terminations of the roof covering shall be flashed and made watertight in accordance with the requirements of the membrane manufacturer, [Section 1503.2](#) of 2015, 2012, 2009 and 2006 IBC or [Section R903.2](#) of 2015, 2012, 2009 and 2006 IRC and applicable code.

### 7. Fire Classification

**7.1 New Construction:** Roof assemblies utilizing JM PVC (50, 60, 80 mil), JM Fleece Backed (50, 60, 80 mil) and JM PVC SD Plus (50, 60, 80 mil) single ply PVC roof coverings are described in UL Certification Category for Roofing Systems, ([TGFU](#)), under File R10167 and in Tables in this Report.

**7.2 Reroofing:** The existing roof shall be inspected in accordance with the provisions and limitations of [Section 1510](#) of the 2015, 2012, 2009 and 2006 or [Section R907](#) of the 2015, 2012, 2009 and 2006 IRC, as applicable. The existing deck shall be inspected to verify that the structure to be reroofed is structurally sound and adequate to support and secure the roofing membrane. Prior to installation of new roof coverings, inspection by and approval from the code official having jurisdiction is required.

Johns Manville PVC membranes may be installed over existing Classified Class A, B or C roofing systems as described in the UL Certification Category for Roofing Systems ([TGFU](#)), File R10167 under the heading Maintenance and Repair Systems (PVC) for applicable coverage and details of the roof assemblies and in Tables in this Report.

Class A, B or C roof coverings may be installed over existing classified roof assemblies under the following conditions without additional roof classification tests, provided the resulting classification is the lower of the new and existing roof classifications under the following conditions:

- New uninsulated roof coverings installed only over existing uninsulated assemblies.
- New insulated roof coverings installed over existing uninsulated assemblies only.

## 8. Wind Resistance

**8.1 New Construction:** The allowable wind uplift pressures for the roof assemblies are noted in the Tables in this Report. Metal edge securement for all systems shall be designed in accordance with ANSI/SPRI ES-1, complying with [Section 1504.5](#) of 2015, 2012, 2009 and 2006 IBC. For certifications of metal edge securement systems in accordance with ANSI/SPRI ES-1, See UL Online Certifications Directory Roof-edge Systems, Metal for Use with Low-slope Roofing Systems ([TGJZ](#)).

**8.2 Reroofing:** Roof covering systems employing mechanical fasteners shall be qualified, to the satisfaction of the code official, as to the adequacy of fasteners penetrating through existing roof coverings into structural substrates. Since the composition and/or conditions of any particular underlying existing roofing materials may vary and reroofing material may vary, reroofing with adhered systems is outside the scope of this report.

## 9. CONDITIONS OF USE

The Johns Manville single ply PVC roofing membranes described in this Report comply with, or are suitable alternatives to, what is specified in those codes listed in Section 2 of this Report, subject to the following conditions:

- 9.1** Materials and methods of installation shall comply with this Report and the manufacturer's published installation instructions. In the event of a conflict between the installation instructions and this Report, this Report governs.
- 9.2** Johns Manville single ply PVC roofing membranes shall be installed by professional roofing contractors trained and approved by the manufacturer.
- 9.3** See UL Online Certification Directory Roofing Systems ([TGUFU](#)) File R10167. Also refer to the Tables of this Report.
- 9.4** Above-deck thermal insulation board shall comply with the applicable standards listed in Table 1508.2 in [Section 1508.2](#) of 2015, 2012, 2009 and 2006 IBC.
- 9.5** Wind uplift pressures on any roof area, including edges and corner zones shall not exceed the allowable wind pressure for the roof covering installed in that particular area. Refer to the Tables in this Report.
- 9.6** For assemblies containing mechanical attachment for the perimeter and corner roof zones 2 and 3, the attachment density may be increased by a qualified design professional, as necessary, to meet the design pressure requirements in these areas.

- 9.7 The allowable wind uplift pressures listed in the Tables of this Report are for the roof systems only. The deck and framing to which the roofing system is attached shall be designed for the applicable components and cladding, wind loads in accordance with the applicable codes.
- 9.8 When application is over an existing roof, documentation of the wind uplift resistance of the composite roof construction shall be submitted to the code official.
- 9.9 The metal edge securement shall be designed and installed for wind loads in accordance with [Chapter 16](#) of 2015, 2012, 2009 and 2006 IBC and test for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except  $V_{ult}$  wind speed shall be determined from Figure 1609A, 1609B, or 1609C of 2015, 2012, 2009 and 2006 IBC as applicable.
- 9.10 The Johns Manville PVC single ply membranes covered under this report are produced under the UL LLC Classification and Follow-Up Service Program, which includes audits in accordance with quality elements of ICC-ES Acceptance Criteria for Quality Documentation, AC 10.

## 10. SUPPORTING EVIDENCE

- 10.1 Data in accordance with ICC-ES Acceptance Criteria for Membrane Roof-Covering Systems, AC75.
- 10.2 Manufacturer's descriptive product literature, including installation instructions.
- 10.3 UL Classification Reports in accordance with ANSI/UL 790. See UL Product Certification Category under File R10167 for Roofing Systems (TGFU).
- 10.4 Data in accordance with ANSI/UL 1897.
- 10.5 Data in accordance with FM 4474.
- 10.6 Data in accordance with FM 4470.
- 10.7 Data in accordance with ASTM D4434 and ASTM G154.
- 10.8 Documentation of quality system elements in accordance with ICC-ES Acceptance Criteria for Quality Documentation, AC10.

## 11. IDENTIFICATION

The Johns Manville PVC single ply membranes described in this evaluation report are identified by a marking bearing the report holder's name (Johns Manville), the plant identification, the product designation, the UL Classification Mark, and the evaluation report number UL ER10167-02. The validity of the evaluation report is contingent upon this identification appearing on the product or UL Classification Mark certificate.

## 12. USE OF UL EVALUATION REPORT

- 12.1 The approval of building products, materials or systems is under the responsibility of the applicable authorities having jurisdiction.
- 12.2 UL Evaluation Reports shall not be used in any manner that implies an endorsement of the product, material or system by UL.
- 12.3 The current status of this report, as well as a complete directory of UL Evaluation Reports may be found at UL.com via our On-Line Certifications Directory at [www.ul.com/erdirectory](http://www.ul.com/erdirectory).

**APPENDIX**

<b>Table</b>	<b>Deck</b>	<b>Application</b>	<b>Description</b>
<a href="#">1</a>	Structural Concrete	New or Existing	Adhered Assemblies over Concrete Deck
<a href="#">2</a>	Structural Concrete	New or Existing	Mechanically Fastened Assemblies over Concrete Deck
<a href="#">3</a>	Structural Concrete	New, Existing or Recover	Induction Welded Assemblies over Concrete Deck
<a href="#">4</a>	Structural Cement Board	New or Existing	Adhered Assemblies over Tectum I Cementitious Wood Fiber Panels
<a href="#">5</a>	Structural Cement Board	New or Existing	Adhered Assemblies over Tectum I Cementitious Wood Fiber Panels
<a href="#">6</a>	Poured Gypsum Deck	New or Existing	Adhered Assemblies over Poured Gypsum Deck
<a href="#">7</a>	Poured Gypsum Deck	New, Existing or Recover	Mechanically Fastened Assemblies over Poured Gypsum Deck
<a href="#">8</a>	Structural Concrete	New or Existing	Adhered Lightweight Concrete Assemblies over Concrete Deck
<a href="#">9</a>	Structural Concrete	New, Existing or Recover	Mechanically Fastened Assemblies over Concrete Deck
<a href="#">10</a>	Steel	New or Existing	Adhered Lightweight Concrete Assemblies over Steel
<a href="#">11</a>	Steel	New, Existing or Recover	Mechanically Fastened Lightweight Concrete Assemblies over Steel
<a href="#">12</a>	Structural Concrete	Recover	Adhered Roof Cover
<a href="#">13</a>	Structural Concrete or Steel	Recover	Mechanically Fastened Roof Cover
<a href="#">14</a>	Structural Concrete or Steel	Recover	Induction Welded Roof Cover
<a href="#">15</a>	Steel	New, Existing or Recover	Adhered Roof Cover
<a href="#">16</a>	Steel	New, Existing or Recover	Mechanically Fastened Roof Cover
<a href="#">17</a>	Steel	New, Existing or Recover	Induction Welded Roof Cover
<a href="#">18</a>	Wood	New or Existing	Mechanically Fastened Roof Cover
<a href="#">19</a>	Wood	New or Existing	Induction Welded Roof Cover

**The following notes apply to the systems outlined herein:**

1. Roof decks shall be in accordance with IBC or IRC requirements to the satisfaction of the AHJ. Wind load resistance of the roof deck shall be documented through proper codified and/or FBC Approval documentation. Wind load resistance of the roof deck shall be documented through proper codified Approval documentation.
2. Unless otherwise noted, fasteners and stress plates for insulation attachment shall be as follows. Fasteners shall be of sufficient length for the following engagements:
  - Steel or Wood Deck: JM All Purpose Fasteners #14 or JM UltraFast Fastener #12 must penetrate steel decking a minimum 3/4-inch into the top flute of the steel deck or wood deck.
  - Concrete Deck: JM All Purpose Fastener #14 minimum 1 inch embedment. Fasteners installed with a pilot hole in accordance with the fastener manufacturer's published installation instructions.
  - All Fasteners shall be FM Approved.
3. Preliminary insulation attachment minimum five fasteners per 4 x 8 ft board or minimum four fasteners per 4 x 4 ft board.
4. Unless otherwise noted, insulation adhesive application rates are as follows. Ribbon or bead width is at the time of application; the ribbons/beads shall expand as noted in the manufacturer's published instructions:

Hot asphalt	Full coverage at 20 -25 lbs/sq
JM Urethane Insulation Adhesive:	Continuous 0.75-inch ribbons, 12-inch oc
JM Two Part Urethane Insulation Adhesive:	Continuous 0.75-inch ribbons, 12-inch oc
JM Roofing System Urethane Adhesive:	Continuous 0.5 to 0.75-inch wide ribbons, 12-inch oc

*Note: When multiple layer(s) of insulation and/or coverboard are installed in ribbon-applied adhesive, adhesive ribbons shall be staggered from layer-to-layer a distance of one-half the ribbon spacing.*

*Note: The maximum edge distance from the adhesive ribbon to the edge of the insulation board shall be not less than one-half the specified ribbons spacing*

5. Unless otherwise noted, all insulations are flat stock or tapered board of the minimum thickness noted. Tapered polyisocyanurate at the following thickness limitations may be substituted with the following Maximum Design Pressure (MDP) limitations. All foam plastic insulation shall be UL Classified foam plastic for Roofing Systems, and shall be limited to the maximum thickness in accordance with Section 5.2 of this report or maximum thickness in accordance with the tables in this report, whichever is less.
6. Bonded polyisocyanurate insulation boards shall be maximum 4 x 4 ft.
7. For recover applications for mechanically fastened roof assemblies and induction welded assemblies, the insulation is optional. Alternatively, min. 0.25-inch Invinsa, DensDeck, DensDeck Prime, SECUROCK Gypsum-Fiber RoofBoard may be used as a separator board, preliminarily attached prior to roof cover installation. For all recover applications, the existing roof system shall be suitable for a recover application.



8. For adhered membrane systems, min. 1-inch side-laps with min. 1.5-inch wide heat weld. In-lap fastened systems shall have min. 6-inch wide side-laps with min. 1.5-inch wide heat weld. Side-laps shall be installed perpendicular to the direction of the steel deck ribs and parallel to the direction of the wood trusses for mechanically attached systems, unless otherwise noted.

9. The deck details consist of:

Concrete deck	Min. $f'_c = 2,500$ psi at 28 days	
Structural Cement Fiber Unit	Min. 2.5-inch thick Tectum I cementitious wood fiber units	
Steel Deck	Min. 22 ga wide rib deck (Type WR) conforming to ANSI/SDI-RD1.0; 0.5% vented for LWIC applications only.	
	F<#>	<#> #12-24 HWH self-drilling screws or equivalent fastener at each flute used to secure the deck to the structural supports; min. 1/4-inch penetration
	L<#>	Max. span of <#>ft
	P	Min. 5/8-inch diameter puddle welds at each flute used to secure the deck to the structural supports
	S<#>	1/4 in. – 14 HWH X 7/8 in. self-drilling screws or equivalent fastener
	W	3/4-inch OD flat washer used with indicated fastener

10. When insulation is generic in the following tables, one or more layers in any combination of the following insulations could be used: ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGR, ENRGY 3 FR, Fesco Board, Fesco Foam, Invinsa Roof Board, Invinsa FR Roof Board, Retro-Fit Board, RetroPlus Roof Board; SECUROCK Glass-Mat Roof Board or SECUROCK Gypsum-Fiber Roof Board.

11. For roof covering systems consisting of JM PVC Fleece Backed and DynaFast 180 S, one ply of JM PVC Fleece Backed-50 mil or JM PVC Fleece Backed-60 mil fully adhered in ASTM D 312 Type IV asphalt over DynaFast 180 S. DynaFast 180 S fastened to deck as described in the roof cover system shown in the tables of this report.

12. "MDP" = Maximum Design Pressure is the result of testing for wind load resistance based on allowable wind loads. A safety factor of 2 was applied to the maximum test load achieved without failure. Refer to FBC 1609.1.5 for determination of design wind loads.

**TABLE 1: ADHERED ASSEMBLIES OVER CONCRETE DECK (NEW OR EXISTING)**

Adhered Assemblies over Concrete Deck (New or Existing)												
System No.	Vapor Barrier	Base Insulation Layer			Top Insulation or Base Ply			Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Fastener	Attach	Type	Fastener	Attach	Type	Attach		Class	Maximum Incline
1	-	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	All Purpose Fasteners and UltraFast Plates (round or square)	1 per 1.78 ft <sup>2</sup>	-	-	-	JM PVC	JM PVC Membrane Adhesive (Low VOC) applied 1.67 gal/100 ft <sup>2</sup>	52.5	A	1:12
2	-	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	-	Simultaneously secured with top layer	Min. 0.25-inch Gypsum-Fiber Roof Board	All Purpose Fasteners and UltraFast Plates (square)	1 per 1.33 ft <sup>2</sup>	JM PVC	JM PVC Membrane Adhesive (Low VOC) applied 1 - 1.1 gal/100 ft <sup>2</sup>	52.5	A	1:12
								JM Fleece Backed	JM PVC Membrane Adhesive (Water Based) applied 0.8 - 1.2 gal/100 ft <sup>2</sup>			1:12
3	-	Min. 1.5-inch thick, ENRGY 3	All Purpose Fasteners and UltraFast Plates (round or square)	1 per 1.33 ft <sup>2</sup>	Min. 0.25-inch Gypsum-Fiber Roof Board	JM Two Part Urethane Insulation Adhesive	12-inch oc	JM PVC	JM PVC Membrane Adhesive (Low VOC) applied 1 - 1.1 gal/100 ft <sup>2</sup>	52.5	A	1:12
								JM Fleece Backed	JM PVC Membrane Adhesive (Water Based) applied 0.8 - 1.2 gal/100 ft <sup>2</sup>			1:12
4		(Optional) INSULATION	-	Simultaneously secured with top layer	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	All Purpose Fasteners and UltraFast Plates (round or square)	1 per 1.78 ft <sup>2</sup>	JM Fleece Backed	ASTM D312 Type IV Asphalt	52.5	A	2:12

**TABLE 1: ADHERED ASSEMBLIES OVER CONCRETE DECK (NEW OR EXISTING) (cont)**

Adhered Assemblies over Concrete Deck (New or Existing)												
System No.	Vapor Barrier	Base Insulation Layer			Top Insulation or Base Ply			Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Fastener	Attach	Type	Fastener	Attach	Type	Attach		Class	Maximum Incline
5		Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	-	Simultaneously secured with top layer	Min. 0.25-inch Gypsum-Fiber Roof Board	All Purpose Fasteners and UltraFast Plates (square)	1 per 1.0 ft <sup>2</sup>	JM PVC	JM PVC Membrane Adhesive (Low VOC) applied 1 - 1.1 gal/100 ft <sup>2</sup>	60.0	A	1:12
								JM Fleece Backed	JM PVC Membrane Adhesive (Water Based) applied 0.8 - 1.2 gal/100 ft <sup>2</sup>			1:12
6	-	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	All Purpose Fasteners and UltraFast Plates (round or square)	1 per 1.0 ft <sup>2</sup>	Min. 0.25-inch Gypsum-Fiber Roof Board, RetroPlus, or Invinsa, Invinsa FR Roof Board	JM Roofing System Urethane Adhesive or JM Two Part Urethane Insulation Adhesive	6-inch oc	JM Fleece Backed	JM Roofing System Urethane Adhesive applied 12-inch OC	67.5	A	1/2:12
7	(Optional) JM Vapor Barrier SA applied over deck primed with JM SA Primer Low VOC	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	JM Roofing System Urethane Adhesive or JM Two Part Urethane Insulation Adhesive	12-inch oc	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, RetroPlus, or Invinsa, Invinsa FR Roof Board	JM Roofing System Urethane Adhesive or JM Two Part Urethane Insulation Adhesive	12-inch oc	JM Fleece Backed	JM Roofing System Urethane Adhesive applied 12-inch OC	67.5	A	1/2:12
8	-	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, any combination	JM Urethane Insulation Adhesive or JM Two Part Urethane Insulation Adhesive	12-inch oc	(Optional) Invinsa or Invinsa FR Roof Board	JM Urethane Insulation Adhesive or JM Two Part Urethane Insulation Adhesive	12-inch oc	JM Fleece Backed	JM PVC Membrane Adhesive (Water Based) applied 1 gal/100 ft <sup>2</sup>	105.0	A	1:12
									ASTM D312 Type IV Asphalt			2:12

**TABLE 1: ADHERED ASSEMBLIES OVER CONCRETE DECK (NEW OR EXISTING) (cont)**

Adhered Assemblies over Concrete Deck (New or Existing)												
System No.	Vapor Barrier	Base Insulation Layer			Top Insulation or Base Ply			Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Fastener	Attach	Type	Fastener	Attach	Type	Attach		Class	Maximum Incline
9	-	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, any combination	JM Urethane Insulation Adhesive or JM Two Part Urethane Insulation Adhesive	12-inch oc	(Optional) Invinsa or Invinsa FR Roof Board	JM Urethane Insulation Adhesive or JM Two Part Urethane Insulation Adhesive	12-inch oc	JM PVC	JM PVC Membrane Adhesive (Low VOC) applied 1.67 gal/100 ft <sup>2</sup> Or JM PVC Membrane Adhesive (Water Based) applied 0.67 gal/100 ft <sup>2</sup>	105.0	A	1:12
10	-	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, any combination	JM Urethane Insulation Adhesive	12-inch oc	Invinsa, or Invinsa FR Roof Board	JM Urethane Insulation Adhesive	12-inch oc	JM PVC	JM PVC Membrane Adhesive (Low VOC) applied 0.83 gal/100 ft <sup>2</sup> Or JM PVC Membrane Adhesive (Water Based) applied 0.67 gal/100 ft <sup>2</sup>	112.5	A	1:12
11	-	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, any combination, min. 1-inch Fesco, min. 1.5-inch Fesco Foam or Retro-Fit	ASTM D312 Type IV Asphalt	-	-	-	-	JM Fleece Backed	ASTM D312 Type IV Asphalt	150.0	A	2:12
12	-	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, any combination	JM Two Part Urethane Insulation Adhesive	12-inch oc	-	-	-	JM PVC	JM PVC Membrane Adhesive (Low VOC) applied 1.67 gal/100 ft <sup>2</sup>	217.5	A	1:12
								JM Fleece Backed	ASTM D312 Type IV Asphalt			2:12
13	-	-	-	-	-	-	-	JM Fleece Backed	JM PVC Membrane Adhesive (Water Based) applied 1.0 gal/100 ft <sup>2</sup>	217.5	A	1:12

**TABLE 2: Mechanically Fastened Assemblies over Concrete Deck (New or Existing)**

System No.	Base Insulation Layer		Top Insulation Layer		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
	Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
14	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	JM PVC	Extra HL Fasteners & Plates 6-inch OC within 6-inch wide laps spaced 114-inch OC. Laps sealed with 1.5-in. heat weld outside lap	37.5	A	2:12
15	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	JM PVC	HL Fasteners & Plates 12-inch OC within 5-inch wide laps spaced 73-inch OC. Laps sealed with 1.5-in. heat weld outside lap	45.0	A	2:12
16	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	JM PVC	HL Fasteners & Plates 6-inch OC within 6-inch wide laps spaced 114-inch OC. Laps sealed with 1.5 in. heat weld outside lap	45.0	A	2:12
					JM Fleece Backed				2:12
17	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	JM PVC SD Plus	HL Fasteners & Plates 12-inch OC within 6-inch wide laps spaced 54-inch OC. Laps sealed with 1.5-in. heat weld outside lap	45.0	A	2:12
18	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	JM PVC	HL Fasteners & Plates 6-inch OC within 6-inch wide laps spaced 72-inch OC. Laps sealed with 1.5-in. heat weld outside lap	45.0	A	2:12
19	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	JM PVC (Min.60 mil)	HL Fasteners & Plates 12-inch OC within 5-inch wide laps spaced 73-inch OC. Laps sealed with 1.5-in heat weld outside lap	52.5	A	2:12

**TABLE 2: Mechanically Fastened Assemblies over Concrete Deck (New or Existing) (cont)**

System No.	Base Insulation Layer		Top Insulation Layer		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
	Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
20	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	Base Ply: DynaFast 180S Membrane: JM PVC Fleece Backed	HL Fasteners & Plates 6-inch OC within 4-inch wide laps spaced 70-inch OC. Laps sealed with 1.5-in. heat weld outside lap	52.5	A	3/4:12
21	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	JM PVC	HL Fasteners & Plates 6-inch OC within 5-inch wide laps spaced 73-inch OC. Laps sealed with 1.5-in. heat weld outside lap	60.0	A	2:12
22	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	JM PVS SD Plus	HL Fasteners & Plates 6-inch OC within 6-inch wide laps spaced 54-inch. Laps sealed with 1.5-in. heat weld outside lap	60.0	A	2:12
23	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	JM PVC	HL Fasteners & Plates 6-inch OC within 4.5-inch wide laps spaced 114-inch. Laps sealed with 2-in. heat weld outside lap	60.0	A	2:12
24	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	JM PVC	HL Fasteners & Plates 6-inch OC within 5.5-inch wide laps spaced 114-inch. Laps sealed with 2-in. heat weld outside lap	60.0	A	2:12
25	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	JM PVC	Extra HL Fasteners & OMG Super XHD 2-3/4 Barbed Plates 6-inch OC within 5.5-inch wide laps spaced 114-inch OC. Laps sealed with 2-in. heat weld outside lap	60.0	A	2:12

**TABLE 2: Mechanically Fastened Assemblies over Concrete Deck (New or Existing) (cont)**

System No.	Base Insulation Layer		Top Insulation Layer		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
	Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
26	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	Base Ply: DynaFast 180S Membrane: JM PVC Fleece Backed	APB Fasteners & Plates 6-inch OC within 4-inch wide laps. Laps sealed with 1.5 in. heat weld outside lap	60.0	A	3/4:12
27	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	Base Ply: DynaFast 180S Membrane: JM PVC Fleece Backed	HL Fasteners & Plates 12-inch OC within 4-inch wide laps. Laps sealed with 1.5 in. heat weld outside lap	60.0	A	3/4:12
28	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	Base Ply: DynaFast 180S Membrane: JM PVC Fleece Backed	High Load LH Fasteners & Polymer Membrane Batten OR High Load Fasteners & Deep Well Batten strip 6-inch OC within 4-inch wide laps spaced 71-inch OC. Laps sealed with 1.5-in. heat weld outside lap	60.0	A	3/4:12
29	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	JM PVC (min. 60 mil)	HL Fasteners & Plates 6-inch OC within 6-inch wide laps spaced 72-inch OC. Laps sealed with 2-in. heat weld outside lap	75.0	A	2:12

**TABLE 3: INDUCTION WELDED ASSEMBLIES OVER CONCRETE DECK (New, Existing or Recover)**

System No.	Base Insulation Layer		Top Insulation Layer		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
	Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
30	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	JM PVC SD Plus (min. 60 mil)	Induction welded to JM PVC RhinoPlates with All Purpose Fasteners placed max. 12-inch OC in rows max. 72 inch	37.5	A	2:12
31	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	JM PVC SD Plus (min. 60 mil)	Induction welded to JM PVC RhinoPlates with All Purpose Fasteners placed max. 12-inch OC in rows max. 72 inch	45.0	A	2:12
32	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Attached with All Purpose Fasteners and JM PVC RhinoPlates at a rate of 8 per 4-ft x 8-ft board (staggered) (1 fastener per 4.0-ft <sup>2</sup> )	JM PVC SD Plus (min. 60 mil)	Induction welded to JM PVC RhinoPlates	52.5	A	2:12
33	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Attached with All Purpose Fasteners and JM PVC RhinoPlates at a rate of 8 per 4-ft x 8-ft board (1 fastener per 4.0-ft <sup>2</sup> )	JM PVC SD Plus (min. 60 mil)	Induction welded to JM PVC RhinoPlates	67.5	A	2:12
34	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	JM PVC SD Plus (min. 60 mil)	Induction welded to JM PVC RhinoPlates with All Purpose Fasteners placed max. 6-inch OC in rows max. 72 inch	82.5	A	2:12



**TABLE 3: INDUCTION WELDED ASSEMBLIES OVER CONCRETE DECK (New, Existing or Recover) (cont)**

System No.	Base Insulation Layer		Top Insulation Layer		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
	Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
35	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. attached	JM PVC SD Plus	Induction welded to JM PVC RhinoPlates with All Purpose Fasteners placed max. 6-inch OC in rows max. 60 inch	90.0	A	2:12
36	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. or with top layer attached	Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Attached with All Purpose Fasteners and JM PVC RhinoPlates at a rate of 15 per 4-ft x 8-ft board (1 fastener per 2.13-ft <sup>2</sup> )	JM PVC SD Plus	Induction welded to JM PVC Rhinoplastes	90.0	A	2:12

**TABLE 4: ADHERED ASSEMBLIES OVER STRUCTURAL CEMENT BOARDS (New or Existing)**

System No.	Base Insulation Layer		Top Insulation Layer		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
	Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
37	Min. 475 psi Celcore MF with HS Rheology Admixture installed	Poured-in-place	-	-	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 12-inch OC	167.5	A	1/2:12

**TABLE 5: MECHANICALLY FASTENED ASSEMBLIES OVER STRUCTURAL CEMENT BOARDS (New or Existing)**

System No.	Base Insulation Layer		Top Insulation Layer		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
	Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
38			-	-	Base Ply: DynaFast 180S Membrane: JM PVC Fleece Backed	1.8 in. Twin-Loc-Nail without integrated plate fastened 6-inch OC along Straight Line Batten Bar within min. 4-inch heat welded side laps and in one intermediate row centered between side laps	60.0	A	3/4:12

**TABLE 6: ADHERED ASSEMBLIES OVER POURED GYPSUM DECK (New or Existing)**

System No.	Base Insulation Layer			Top Insulation or Base Ply			Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
	Type	Fastener	Attach	Type	Fastener	Attach	Type	Attach		Class	Maximum Incline
39	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, any combination	JM Urethane Insulation Adhesive	12-inch oc	Invinsa or Invinsa Roof Board	JM Urethane Insulation Adhesive	12-inch oc	JM PVC	JM PVC Membrane Adhesive (Low VOC) applied 0.83 gal/100 ft <sup>2</sup> JM PVC Membrane Adhesive (Water Based) applied 0.67 gal/100 ft <sup>2</sup>	112.5	A	1:12

**TABLE 7: MECHANICALLY FASTENED ASSEMBLIES OVER POURED-GYPSUM DECK (New, Existing or Recover)**

System No.	Base Insulation Layer		Top Insulation Layer		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
	Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
40	-	-	--	--	Base Ply: JM DynaFast 180S Membrane: JM PVC Fleece Backed	1.8 in. Twin-Loc-Nail without integrated plate fastened 6-inch OC along Straight Line Batten Bar within min. 4-inch heat welded side laps and in one intermediate row centered between side laps	60.0	A	3/4:12

**TABLE 8: ADHERED LIGHTWEIGHT CONCRETE ASSEMBLIES OVER CONCRETE DECK (New or Existing)**

System No.	LWIC	Insulation Layer/Cover Board		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Attach	Type	Attach		Class	Maximum Incline
41	Min. 250 pis Elastizell with Zell-Crete Fibers installed over DynaBase HW over ASTM D41 primed concrete	--	-	JM PVC Fleece-Backed	JM Roofing System Urethane Adhesive applied 6-inch OC	75.0	A	1/2:12
42	Min. 250 pis Elastizell with Zell-Crete Fibers installed over DynaBase HW over ASTM D41 primed concrete	--	-	JM PVC Fleece-Backed	JM Roofing System Urethane Adhesive applied 12-inch OC	85.0	A	1/2:12
43	Min. 330 psi LWIC	-	-	JM PVC Fleece-Backed	JM PVC Membrane Adhesive (Water Based) applied 1 gal/100 ft <sup>2</sup>	90.0	A	1:12
44	Min. 383.5 psi Celcore MF with HS Rheology Admixture installed over OPTIONAL JM Vapor Barrier SA or DynaBase HW over ASTM D41 primed concrete	-	-	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 6-inch OC	92.5	A	1/2:12
45	Min. 383.5 psi Celcore MF with HS Rheology Admixture installed over OPTIONAL JM Vapor Barrier SA or DynaBase HW over ASTM D41 primed concrete	-	-	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 12-inch OC	102.5	A	1/2:12
46	Mi. 160 psi Elastizell	Base Layer: Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, any combination  Top Layer: Invinsa or Invinsa FR Roof Board	Base Layer: JM Urethane Insulation Adhesive at 6-inch OC or JM Two Part Urethane Insulation Adhesive at 12-inch OC  Top Layer: JM Two Part Urethane Insulation Adhesive at 12-inch OC	JM PVC	JM PVC Membrane Adhesive (Low VOC) applied 0.83 gal/100 ft <sup>2</sup>  JM PVC Membrane Adhesive (Water Based) applied 0.67 gal/100 ft <sup>2</sup>	112.5	A	1:12
47	Min. 250 Elastizell with Zell-Crete Fibers	-	-	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 12-inch OC	117.5	A	1/2:12
48	Min 475 psi Celcore MF with HS Rheology Admixture installed over OPTIONAL DynaBase HW			JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 12-inch OC	167.5	A	1/2:12

**TABLE 8: ADHERED LIGHTWEIGHT CONCRETE ASSEMBLIES OVER CONCRETE DECK (New or Existing) (cont)**

System No.	LWIC	Insulation Layer/Cover Board		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Attach	Type	Attach		Class	Maximum Incline
49	Min. 375 psi Concrecel	-	-	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 12-inch OC	147.5	A	1/2:12
50	Min. 375 psi Concrecel	-	-	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 6-inch OC	172.5	A	1/2:12
51	Min. 550 psi Elastizell with Zell-fibers	-	-	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 12-inch OC	177.5	A	1/2:12
52	Min. 300 psi LWIC	Min. 0.25-inch Securock Gypsum-Fiber Roof Board	JM Two Part Urethane Insulation Adhesive ribbons at 12-inch OC	JM PVC	JM PVC Membrane Adhesive (Water Based) applied 0.67 gal/100 ft <sup>2</sup>	210.0	A	1:12
53	Min. 550 psi Elastizell with Zell-Fibers	-	-	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 6-inch OC	225.0	A	1/2:12
54	Min. 383.5 psi Celcore MF with HS Rheology Admixture (NO EPS Board) installed over DynaBase HW over ASMT D 41 primed concrete	-	-	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 6-inch OC	262.0	A	1/2:12
55	Min. 250 Elstizell with Zell-Crete Fibers (no EPS board)	-	-	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 6-inch OC	290.0	A	1/2:12
56	Celcore MF with HS Rheology Admixture (min. 49 pcf wet cast density)	-	-	JM PVC Fleece Backed	JM PVC Membrane Adhesive (Water Based) applied 1 gal/100 ft <sup>2</sup>	367.5	A	1:12
57	Min. 370 psi Concrecel (No EPS board)	-	-	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 12-inch OC	375.0	A	1/2:12

**TABLE 8: ADHERED LIGHTWEIGHT CONCRETE ASSEMBLIES OVER CONCRETE DECK (New or Existing) (cont)**

System No.	LWIC	Insulation Layer/Cover Board		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Attach	Type	Attach		Class	Maximum Incline
58	Min. 383.5 psi Celcore MF with HS Rheology Admixture (No EPS board) installed over ASTM D41 primed concrete	-	-	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 12-inch OC	417.5	A	1/2:12
59	Min. 370 psi Concrecel (No EPS board)	-	-	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 6-inch OC	480.0	A	1/2:12
60	Min. 383.5 psi Celcore MF with HS Rheology Admixture (No EPS board)	-	-	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 6-inch OC	502.5	A	1/2:12

**TABLE 9: MECHANICALLY FASTENED LIGHTWEIGHT CONCRETE ASSEMBLIES OVER CONCRETE DECK (New, Existing or Recover)**

System No.	LWIC	Insulation Layer/Cover Board		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Attach	Type	Attach		Class	Maximum Incline
61	Min. 475 psi Celcore MF with HS Rheology	-	-	Base Ply: JM DynaFast 180S Membrane: JM PVC Fleece Backed	1.8 in. Twin-Loc-Nail without integrated plate fastened 6-inch OC along Straight Line Batten Bar within min. 4-inch heat welded side laps and in one intermediate row centered between side laps	60.0	A	3/4:12

**TABLE 10: ADHERED LIGHTWEIGHT CONCRETE ASSEMBLIES OVER STEEL DECK (New or Existing)**

System No.	Deck	LWC	Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
			Type	Attach		Class	Maximum Incline
62	Min. 22 ga., Grade 33 steel (P, L5, S15)	Min. 475 psi Celcore MF with HS Rheology	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 12-inch OC	60.0	A	1/2:12
63	Min. 22 ga., Grade 80 steel (P, L5, S15)	Min. 475 psi Celcore MF with HS Rheology Admixture	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 12-inch OC	75.0	A	1/2:12
64	Min. 22 ga., Grade 80 steel (P, L5, S15)	Min. 475 psi Celcore MF with HS Rheology Admixture	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 6-inch OC	75.0	A	1/2:12
65	Min. 22 ga., Grade 80 steel (P, L5, S12)	Min. 370 Concrecel	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 12-inch OC	97.5	A	1/2:12
66	Min. 22 ga., Grade 80 steel (P, L5, S15)	Min. 250 psi Elastizell with Zell-Crete Fibers	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 12-inch OC	97.5	A	1/2:12
67	Min. 22 ga., Grade 80 steel (P, L5, S15)	Min. 250 psi Elastizell with Zell-Crete Fibers	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 6-inch OC	75.0	A	1/2:12

**TABLE 11: MECHANICALLY FASTENED LIGHTWEIGHT CONCRETE ASSEMBLIES OVER STEEL DECK (New, Existing or Recover)**

System No.	Deck	LWC	Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
			Type	Attach		Class	Maximum Incline
68	Min. 22 ga., type WR, Grade 33 steel (P, L5, S15)	Min. 475 psi Celcore MF with HS Rheology	Base Ply: DynaFast 180S Membrane: JM PVC Fleece Backed	1.8 in. Twin-Loc-Nail without integrated plate fastened 6-inch OC along Straight Line Batten Bar within min. 4-inch heat welded side laps and in one intermediate row centered between side laps	60.0	A	3/4:12

**TABLE 12: ADHERED RECOVER ASSEMBLIES**

System No.	Deck	Insulation Layer			Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Fasteners	Attach	Type	Attach		Class	Maximum Incline
69	Concrete Deck	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	All Purpose Fasteners and UltraFast Plates (square)	1 per 2 ft <sup>2</sup>	JM PVC Fleece Backed	JM PVC Membrane Adhesive (Water Based) applied 1 gal/100 ft <sup>2</sup>	45.0	A	1:12
						ASTM D312 type IV Asphalt		A	2:12
70	BUR or Mod-Bit Roofing with Mineral Surfacing	-	-	-	JM PVC Fleece Backed	JM Roofing System Urethane Adhesive applied 12-inch OC	45.0	A, B or C	3/4:12
71	Concrete Deck	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	All Purpose Fasteners and UltraFast Plates (square)	1 per 1.78 ft <sup>2</sup>	JM PVC Fleece Backed	JM PVC Membrane Adhesive (Water Based) applied 1 gal/100 ft <sup>2</sup>	52.5	A	1:12
						ASTM D312 type IV Asphalt			2:12
					JM PVC	JM PVC Membrane Adhesive (Low VOC) applied 1.67 gal/100 ft <sup>2</sup>			1:12
						ASTM D312 type IV Asphalt			1:12

**TABLE 12: ADHERED RECOVER ASSEMBLIES (cont)**

System No.	Deck	Insulation Layer			Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Fasteners	Attach	Type	Attach		Class	Maximum Incline
72	BUR over Concrete Deck	Base Layer: Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, any combination  Top Layer: (Optional) Invinsa	Base Layer: JM Urethane Insulation Adhesive  Top Layer: JM Two Part Urethane Insulation Adhesive	Base Layer: 12-inch OC  Top Layer: 12-inch OC	JM PVC Fleece Backed	JM PVC Membrane Adhesive (Water Based) applied 1 gal/100 ft <sup>2</sup>	105.0	A	1:12
						ASTM D312 type IV Asphalt			2:12
					JM PVC	JM PVC Membrane Adhesive (Low VOC) applied 1.67 gal/100 ft <sup>2</sup>			1:12
73	BUR over Concrete Deck	Base Layer: Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, any combination  Top Layer: (Optional) Invinsa or Invinsa FR Roof Board	Base Layer: JM Urethane Insulation Adhesive or JM Two Part Urethane Insulation Adhesive  Top Layer: JM Two Part Urethane Insulation Adhesive	Base Layer: 6-inch OC or 12-inch OC  Top Layer: 12-inch OC	JM PVC	JM PVC Membrane Adhesive (Low VOC) applied 0.83 gal/100 ft <sup>2</sup>	112.5	A	1:12
						JM PVC Membrane Adhesive (Water Based) applied 0.67 gal/100 ft <sup>2</sup>			1:12
74	BUR over Concrete Deck	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, any combination	JM Two Part Urethane Insulation Adhesive	12-inch OC	JM PVC Fleece Backed	ASTM D312 type IV Asphalt	217.5	A	2:12
					JM PVC	JM PVC Membrane Adhesive (Low VOC) applied 0.83 gal/100 ft <sup>2</sup>			1:12



**TABLE 13: MECHANICALLY FASTENED RECOVER ASSEMBLIES**

System No.	Deck	Base Insulation Layer		Top Insulation or Base Ply		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
75	Min. 22 ga., type WR, Grade 33 steel (P, L6, S24) or Concrete Deck	Optional INSULATION	Prelim. Attached or with top layer attached	Min. 0.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination or Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. Attached	JM PVC SD Plus	Attached in-lap 6-inch OC with HL Fasteners & Plates; min. 6-inch oc wide side laps; fastener rows max. 114-inch oc	45.0	A	2:12
76	Min. 22 ga., type WR, Grade 33 steel (F1, L6, S24) or Concrete Deck	Optional INSULATION	Prelim. Attached or with top layer attached	Min. 0.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination or Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. Attached	JM PVC SD Plus	Attached in-lap 12-inch OC with HL Fasteners & Plates; min. 6-inch oc wide side laps; fastener rows max. 54-inch oc	45.0	A	2:12
77	Min. 22 ga., type WR, Grade 33 steel (F1, L6) or Concrete Deck	Optional INSULATION	Prelim. Attached or with top layer attached	Min. 0.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination or Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. Attached	Base Ply: JM DynaFast 180S Membrane: JM PVC Fleece Backed	HL Fasteners & Plates spaced 6-inch oc within each min. 4-inch heat welded side laps in rows max. 70-inch oc	52.5	A	3/4:12
78	Min. 22 ga., type WR, Grade 33 steel (F1, L6, S24) or Concrete Deck	Optional INSULATION	Prelim. Attached or with top layer attached	Min. 0.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination or Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. Attached	JM PVC SD Plus	Attached in-lap 6-inch OC with HL Fasteners & Plates; min. 6-inch oc wide side laps; fastener rows max. 54-inch oc	60.0	A	2:12
79	LWIC over Min. 22 ga., type WR, Grade 33 steel (F1, L5, S12) or Concrete Deck	Optional INSULATION	Prelim. Attached or with top layer attached	Min. 0.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination or Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. Attached	JM PVC Fleece Backed	Attached in-lap 6-inch OC with HL Fasteners & Plates; fastener rows max. 114-inch oc	60.0	A	1:12

**TABLE 13: MECHANICALLY FASTENED RECOVER ASSEMBLIES (cont)**

System No.	Deck	Base Insulation Layer		Top Insulation or Base Ply		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
80	Min. 22 ga., type WR, Grade 33 steel (P, L6)	Optional INSULATION	Prelim. Attached or with top layer attached	Min. 0.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination or Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. Attached	Base Ply: JM DynaFast 180S Membrane: JM PVC Fleece Backed	High Load LH Fasteners and Polymer Membrane Batten OR High Load Fasteners and Deep Well Batten strip spaced 6-inch oc within min. 4-inch heat welded side laps in rows max. 71-inch oc	60.0	A	3/4:12
81	Min. 22 ga., type WR, Grade 33 steel (F1, L6) or Concrete Deck	Optional INSULATION	Prelim. Attached or with top layer attached	Min. 0.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination or Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. Attached	Base Ply: JM DynaFast 180S Membrane: JM PVC Fleece Backed	APB Fasteners & Plates spaced 6-inch oc within each min. 4-inch heat welded side lap	60.0	A	3/4:12
82	Min. 22 ga., type WR, Grade 33 steel (F1 or P, L6) or Concrete Deck	Optional INSULATION	Prelim. Attached or with top layer attached	Min. 0.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination or Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. Attached	Base Ply: JM DynaFast 180S Membrane: JM PVC Fleece Backed	HL Fasteners & Plates spaced 12-inch oc within each min. 4-inch heat welded side lap	60.0	A	3/4:12

**TABLE 14: INDUCTION WELDED RECOVER ASSEMBLIES**

System No.	Existing Roof	Base Insulation Layer		Top Insulation or Base Ply		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
83	Min. 22 ga., type WR, Grade 33 steel ( L6) or Concrete Deck	Optional INSULATION	Prelim. Attached or with top layer attached	Min. 0.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination or Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. Attached	JM PVC SD Plus (min 60 mil)	Induction welded to JM PVC RhinoPlates palced max. 12-inch oc in rows max. 72-inch oc	37.5	A	2:12
84	Min. 22 ga., type WR, Grade 33 steel (F1, L6, S24) or Concrete Deck	Optional INSULATION	Prelim. Attached or with top layer attached	Min. 0.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination or Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. Attached	JM PVC SD Plus (min 60 mil)	Induction welded to JM PVC RhinoPlates placed max. 12-inch oc in rows max. 60-inch oc	45.0	A	2:12
85	Existing metal roof having min. 16 ga. Steel purlins at max. 5 ft oc	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination or Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	JM Purlin Fasteners and JM PVC RhinoPlates secured to structural supports 6-inch oc; fastener rows max. 120-inch oc	JM PVC (min 60 mil)	Induction welded to JM PVC RhinoPlates	45.0	A	2:12
86	Existing metal roof having min. 16 ga. Steel purlins at max. 5 ft oc	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination or Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	JM Purlin Fasteners and JM PVC RhinoPlates secured to structural supports 18-inch oc; fastener rows max. 60-inch oc	JM PVC (min 60 mil)	Induction welded to JM PVC RhinoPlates	45.0	A	2:12

**TABLE 14: INDUCTION WELDED RECOVER ASSEMBLIES (cont)**

System No.	Existing Roof	Base Insulation Layer		Top Insulation or Base Ply		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
87	Min. 22 ga., type WR, Grade 33 steel (F1, L6, S24) or Concrete Deck	Optional INSULATION	Prelim. Attached or with top layer attached	Min. 0.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination or Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Attached with High Load Fasteners and JM PVC RhinoPlates at a rate of 8 per 4-ft x 8-ft board (staggered) (1 fastener per 4.0 ft <sup>2</sup> )	JM PVC SD Plus (min 60 mil)	Induction welded to JM PVC RhinoPlates	45.0	A	2:12
88	Concrete Deck	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	Optional Min. 0.25-inch Gypsum-Fiber Roof Board	JM All Purpose Fasteners and JM PVC RhinoPlates secured at a rate of 8 per 4-ft x 8-ft board (1 fastener per 4.0 ft <sup>2</sup> )	JM PVC (min 60 mil)	Induction welded to JM PVC RhinoPlates	67.5	A	2:12
89	Existing metal roof having min. 16 ga. Steel purlins at max. 5 ft oc	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination or Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	JM Purlin Fasteners and JM PVC RhinoPlates secured to structural supports 12-inch oc; fastener rows max. 60-inch oc	JM PVC SD Plus (min 60 mil)	Induction welded to JM PVC RhinoPlates	67.5	A	2:12
90	Min. 22 ga., type WR, Grade 33 steel (F1, L6, S24) or Concrete Deck	Optional INSULATION	Prelim. Attached or with top layer attached	Min. 0.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination or Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. Attached <sup>2</sup>	JM PVC SD Plus (min 60 mil)	Induction welded to JM PVC RhinoPlates placed max. 6-inch oc in rows max. 72-inch oc	82.5	A	2:12
91	Min. 22 ga., type WR, Grade 33 steel (F1, L6, S24) or Concrete Deck	Optional INSULATION	Prelim. Attached or with top layer attached	Min. 0.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination or Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	Prelim. Attached <sup>2</sup>	JM PVC SD Plus (min 60 mil)	Induction welded to JM PVC RhinoPlates placed max. 6-inch oc in rows max. 60-inch oc	90.0	A	2:12

**TABLE 14: INDUCTION WELDED RECOVER ASSEMBLIES (cont)**

System No.	Existing Roof	Base Insulation Layer		Top Insulation or Base Ply		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
92	Existing metal roof having min. 16 ga. Steel purlins at max. 5 ft oc	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	Min. 1-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination or Min. 0.25-inch Gypsum-Fiber Roof Board, Invinsa, or Invinsa FR Roof Board	JM Purlin Fasteners and JM PVC RhinoPlates secured to structural supports 6-inch oc; fastener rows max. 60-inch oc	JM PVC (min 60 mil)	Induction welded to JM PVC RhinoPlates	67.5	A	2:12

**TABLE 15: ADHERED ASSEMBLIES OVER STEEL DECK (New, Existing or Recover)**

System No.	Deck	Base Insulation Layer		Top Insulation or Base Ply			Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Attach	Type	Fastener	Attach	Type	Attach		Class	Maximum Incline
93	Min. 22 ga., type WR, Grade 33 steel (F1, L6, S24)	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Simultaneously secured with top layer attached	Min. 0.25-inch Gypsum-Fiber Roof Board	UltraFast Fasteners and Plates (Square)	1 fastener per 1.33 ft <sup>2</sup>	JM PVC	JM PVC Membrane Adhesive (Low VOC) applied 1-1.1 gal/100 ft <sup>2</sup>	52.5	A	1:12
							JM PVC Fleece Backed	JM PVC Membrane Adhesive (Water Based) applied 1 gal/100 ft <sup>2</sup>			1:12
94	Min. 22 ga., type WR, Grade 33 steel (F2, L6, S24)	Min. 1.5-inch thick ENRGY 3	UltraFast Fasteners and Plates (round or square) secured 1 fastener per 1.33 ft <sup>2</sup>	Min. 0.25-inch Gypsum-Fiber Roof Board	JM Two Part Urethane Insulation Adhesive	12-inch oc	JM PVC	JM PVC Membrane Adhesive (Low VOC) applied 1-1.1 gal/100 ft <sup>2</sup>	52.5	A	1:12
							JM PVC Fleece Backed	JM PVC Membrane Adhesive (Water Based) applied 1 gal/100 ft <sup>2</sup>			1:12
95	Min. 22 ga., type WR, Grade 33 steel (F2, L6, S24)	Optional INSULATION	Simultaneously secured with top layer attached	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	UltraFast Fasteners and Plates (round or square)	1 per 1.78 ft <sup>2</sup>	JM PVC Fleece Backed	ASTM D312 Type IV Asphalt	52.5	A	2:12
96	Min. 22 ga., type WR, Grade 33 steel (F2, L6, S24)	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Simultaneously secured with top layer attached	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	UltraFast Fasteners and Plates (round or square)	1 per 1.78 ft <sup>2</sup>	JM PVC Fleece Backed	ASTM D312 Type IV Asphalt	52.5	A	2:12
97	Min. 22 ga., type WR, Grade 33 steel (F2, L6, S24)	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Simultaneously secured with top layer attached	Min. 0.25-inch Gypsum-Fiber Roof Board	UltraFast Fasteners and Plates (round or square)	1 per 1.00 ft <sup>2</sup>	JM PVC	JM PVC Membrane Adhesive (Low VOC) applied 1-1.1 gal/100 ft <sup>2</sup>	60.0	A	1:12
							JM PVC Fleece Backed	JM PVC Membrane Adhesive (Water Based) applied 1 gal/100 ft <sup>2</sup>			1:12

**TABLE 15: ADHERED ASSEMBLIES OVER STEEL DECK (New, Existing or Recover) (cont)**

System No.	Deck	Base Insulation Layer		Top Insulation or Base Ply			Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Attach	Type	Fastener	Attach	Type	Attach		Class	Maximum Incline
98	Min. 22 ga., type WR, Grade 33 steel (F2, L6, S24)	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	Min. 0.25-inch Gypsum-Fiber Roof Board, RetroPlus Roof Board or Invinsa or Invinsa FR Roof Board	JM Urethane Insulation Adhesive or JM Two Part Urethane Insulation Adhesive	6-inch oc	JM PVC Fleece Backed	JM Urethane Insulation Adhesive applied 12-inch OC	67.5	A	1/2:12

**TABLE 16: MECHANICALLY FASTENED ASSEMBLIES OVER STEEL DECK (New, Existing or Recover)**

System No.	Deck	Base Insulation Layer		Top Insulation or Base Ply		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
99	Min. 22 ga., type WR, Grade 33 steel (L6)	Min. 1.0-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	JM PVC	Attached in-lap 6-inch oc with Extra HL Fastener & Plates; min. 6-inch wide side laps; fastener rows max. 114-inch oc	37.5	A	2:12
100	Min. 22 ga., type WR, Grade 33 steel (F1, or P, L6, S24)	Min. 1.0-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	JM PVC	Attached in-lap 6-inch oc with HL Fastener & Plates; min. 6-inch wide side laps; fastener rows max. 114-inch oc	45.0	A	2:12
						JM PVC SD Plus				2:12
101	Min. 22 ga., type WR, Grade 33 steel (F1, P, L6, S24)	Min. 1.0-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	JM PVC SD Plus	Attached in-lap 12-inch oc with HL Fastener & Plates; min. 6-inch wide side laps; fastener rows max. 54-inch oc	45.0	A	2:12
102	Min. 22 ga., type WR, Grade 33 steel (F1 or P, L6, S24)	Min. 1.0-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	JM PVC	Attached in-lap 6-inch oc with HL Fastener & Plates; min. 6-inch wide side laps; fastener rows max. 114-inch oc	45.0	A	2:12

**TABLE 16: MECHANICALLY FASTENED ASSEMBLIES OVER STEEL DECK (New, Existing or Recover) (cont)**

System No.	Deck	Base Insulation Layer		Top Insulation or Base Ply		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
103	Min. 22 ga., type WR, Grade 80 steel (F1 or P, L6, S24)	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	JM PVC	Attached in-lap 12-inch oc with HL Fastener & Plates; min. 5-inch wide side laps; fastener rows max. 73-inch oc	45.0	A	2:12
104	Min. 22 ga., type WR, Grade 33 steel P, L6)	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	JM PVC	Attached in-lap 6-inch oc with HL Fastener & Plates; min. 6-inch wide side laps; fastener rows max. 72-inch oc	45.0	A	2:12
105	Min. 22 ga., type WR, Grade 80 steel (F1, L6, S30)	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	JM PVC (min 60 mil)	Attached in-lap 12-inch oc with HL Fastener & Plates; min. 2-inch wide side laps; fastener rows max. 73-inch oc	52.5	A	2:12
106	Min. 22 ga., type WR, Grade 33 steel (F1, L6, S24)	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	Base Ply: JM DynaFast 180S Membrane: JM PVC Fleece Backed	Attached in-lap 12-inch oc with HL Fastener & Plates; min. 5-inch wide side laps; fastener rows max. 73-inch oc	45.0	A	3/4:12
107	Min. 22 ga., type WR, Grade 33 steel (F1, L6, S24)	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	JM PVC SD Plus	Attached in-lap 6-inch oc with HL Fastener & Plates; min. 6-inch wide side laps; fastener rows max. 54-inch oc	60.0	A	2:12
108	Min. 22 ga., type WR, Grade 80 steel (F1, L6, S30)	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	JM PVC	Attached in-lap 6-inch oc with HL Fastener & Plates; min. 5-inch wide side laps; fastener rows max. 73-inch oc	60.0	A	2:12



**TABLE 16: MECHANICALLY FASTENED ASSEMBLIES OVER STEEL DECK (New, Existing or Recover) (cont)**

System No.	Deck	Base Insulation Layer		Top Insulation or Base Ply		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
109	Min. 22 ga., type WR, Grade 80 steel (F1, L6, S30)	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	JM PVC	Attached in-lap 6-inch oc with HL Fastener & Plates; min.4.5-inch wide side laps with min. 2-inch wide heat weld; fastener rows max. 114-inch oc	60.0	A	2:12
						JM PVC Fleece Backed				2:12
110	Min. 22 ga., type WR, Grade 80 steel (F1, L6, S30)	Min. 1.5-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	JM PVC	Attached in-lap 6-inch oc with HL Fastener & Plates; min.5.5-inch wide side laps with min. 2-inch wide heat weld; fastener rows max. 114-inch oc	60.0	A	2:12
111	Min. 22 ga., type WR, Grade 80 steel (F1, L6, S24)	Min. 1.0-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	JM PVC	Attached in-lap 6-inch oc with Extra High Load Fastener & OMG Super XHD 2-3/4 Barbed Plates; min.5.5-inch wide side laps with min. 2-inch wide heat weld; fastener rows max. 114-inch oc	60.0	A	2:12
112	Min. 22 ga., type WR, Grade 33 steel (P, L6)	Min. 1.0-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	Base Ply: JM DynaFast 180S Membrane: JM PVC Fleece Backed	APB Fasteners & Plates spaced 6-inch oc within each min. 4-inch wide heat welded side lap	60.0	A	3/4:12
113	Min. 22 ga., type WR, Grade 33 steel (P, L6)	Min. 1.0-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	Base Ply: JM DynaFast 180S Membrane: JM PVC Fleece Backed	HL Fasteners & Plates spaced 12-inch oc within each min. 4-inch wide heat welded side lap	60.0	A	3/4:12

**TABLE 16: MECHANICALLY FASTENED ASSEMBLIES OVER STEEL DECK (New, Existing or Recover) (cont)**

System No.	Deck	Base Insulation Layer		Top Insulation or Base Ply		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
114	Min. 22 ga., type WR, Grade 33 steel (P, L6)	Min. 1.0-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	Base Ply: JM DynaFast 180S Membrane: JM PVC Fleece Backed	High Load LH Fasteners and Polymer Membrane Batten or High Load Fasteners and Deep Well Batten strip spaced spaced 6-inch oc within each min. 4-inch wide heat welded side laps in row max. 71-inch oc	60.0	A	3/4:12
115	Min. 22 ga., type WR, Grade 80 steel (F1, L6, S30)	Min. 1.0-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	JM PVC (min. 60 mil)	Attached in-lap 6-inch oc with HL Fasteners & Plates; min. 6-inch wide side laps with min. 2-inch wide heat welds; fastener rows max. 72-inch oc	75.0	A	2:12

**TABLE 17: INDUCTION WELDED ASSEMBLIES OVER STEEL DECK (New, Existing or Recover)**

System No.	Deck	Base Insulation Layer		Top Insulation or Base Ply		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
116	Min. 22 ga., type WR, Grade 33 steel (L6)	Min. 1.0-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	JM PVC SD Plus (min. 60 mil)	Induction welded to JM PVC RhinoPlates with High Load Fasteners placed max. 12-inch on in rows max. 72-inch oc	37.5	A	2:12
117	Min. 22 ga., type WR, Grade 33 steel (F1, L6, S24)	Min. 1.0-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	JM PVC SD Plus (min. 60 mil)	Induction welded to JM PVC RhinoPlates with High Load Fasteners placed max. 12-inch on in rows max. 60-inch oc	45.0	A	2:12
118	Min. 22 ga., type WR, Grade 33 steel (P, L6, S24)	Min. 1.0-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Attached with High Load Fasteners and JM PVC RhinoPlates at a rate of 8 per 4-ft by 8-ft board (staggered) (1 fastener per 4.0-ft <sup>2</sup> )	JM PVC SD Plus (min. 60 mil)	Induction welded to JM PVC RhinoPlates	52.5	A	2:12
119	Min. 22 ga., type WR, Grade 33 steel (F1, L6, S18)	Min. 1.0-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Attached with High Load Fasteners and JM PVC RhinoPlates at a rate of 8 per 4-ft by 8-ft board (staggered) (1 fastener per 4.0-ft <sup>2</sup> )	JM PVC (min. 60 mil)	Induction welded to JM PVC RhinoPlates	67.5	A	1:12
120	Min. 22 ga., type WR, Grade 33 steel (F1, L6, S24)	Min. 1.0-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	JM PVC SD Plus (min. 60 mil)	Induction welded to JM PVC RhinoPlates with High Load Fasteners placed max. 6-inch on in rows max. 72-inch oc	82.5	A	2:12
121	Min. 22 ga., type WR, Grade 33 steel (F1, L6, S24)	Min. 1.0-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Prelim. Attached	JM PVC SD Plus (min. 60 mil)	Induction welded to JM PVC RhinoPlates with High Load Fasteners placed max. 6-inch on in rows max. 60-inch oc	90.0	A	2:12

**TABLE 17: INDUCTION WELDED ASSEMBLIES OVER STEEL DECK (New, Existing or Recover) (cont)**

System No.	Deck	Base Insulation Layer		Top Insulation or Base Ply		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
		Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
122	Min. 22 ga., type WR, Grade 33 steel (F2W, L6)	Min. 1.0-inch thick, one or more layers, ENRGY 3, ENRGY 3 AGF, ENRGY 3 CGF, ENRGY 3 FR any combination	Prelim. Attached or with top layer attached	(Optional) Min. 0.25-inch Gypsum-Fiber Roof Board, or Invinsa or Invinsa FR Roof Board	Attached with High Load Fasteners and JM PVC RhinoPlates at a rate of 15 per 4-ft by 8-ft board (staggered) (1 fastener per 2.13-ft <sup>2</sup> )	JM PVC (min. 60 mil)	Induction welded to JM PVC RhinoPlates	90.0	A	2:12

**TABLE 18: MECHANICALLY FASTENED ASSEMBLIES OVER WOOD DECK (New or Existing)**

System No.	Deck	Thermal Barrier	Base Insulation Layer		Top Insulation or Base Ply		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
			Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
123	Min. 19/32 in. plywood at 24 in. spans with blocking at supported joint attached with min. 0.113 in. x 2-3/8 in. ring shank nails spaced 6-in. oc at perimeter and intermediate supports	As required	Min. 0.25-inch Insulation INSULATION	Prelim. Attached or with top layer attached	Min. 0.25-inch Gypsum-Fiber Roof Board	Prelim. Attached	JM PVC	Attached in-lap 6-inch oc with HL Fasteners & Plates; fastener rows max. 72-inch oc	37.5	A	2:12
124	Min. 15/32 in. plywood at 24 in. spans with blocking at supported joint attached with min. 0.113 in./ x 2-3/8 in. ring shank nails spaced 6-in. oc at perimeter and intermediate supports	As required	Min. 0.25-inch Insulation INSULATION	Prelim. Attached or with top layer attached	Min. 0.25-inch Gypsum-Fiber Roof Board	Prelim. Attached	JM PVC	Attached in-lap 12-inch oc with All Purpose Fasteners and High Load Plates through deck into wood supports; fastener shall have sufficient length to penetrate min. 1.5-inch into wood supports; fastener rows max. 72-inch oc	45.0	A	2:12

**TABLE 19: INDUCTION WELDED ASSEMBLIES OVER WOOD DECK (New or Existing)**

System No.	Deck	Thermal Barrier	Base Insulation Layer		Top Insulation or Base Ply		Roof Cover		MDP (psf)	FIRE RATING UL790/ASTM E108	
			Type	Attach	Type	Attach	Type	Attach		Class	Maximum Incline
125	Min. 15/32 in. plywood at 24 in. spans with blocking at supported joint attached with min. 0.113 in. x 2-3/8 in. ring shank nails spaced 6-in. oc at perimeter and intermediate supports	As required	Min. 0.25-inch Insulation INSULATION	Prelim. Attached or with top layer attached	Min. 0.25-inch Gypsum-Fiber Roof Board	Min. 2.25-inch JM All Purpose Fastener and JM PVC RhinoPlates secured max. 24-inch oc through sheathing into wood structural supports in rows max. 24-inch oc	JM PVC	Induction welded to JM PVC RhinoPlates	52.5	A	2:12

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