Advancement of Construction Technology

SUBSTITUTION REQUEST

Project: Greer High School Roof Recover & Replacement
3000 E Gap Creek Rd, SC 29651

To: RAYMOND ENGINEERING-GEORGIA INC.
1035 Green Street, Suite A, Conyers, GA 30012

Re: Substitution Request for TPO membrane

Substitution Request Number:

From: Steven Wygand - Johns Manville

Date: 05/04/2023

A/E Project Number: GSP1010.072

Contract For: SECTION 07 54 23 - THERMOPLASTIC ROOFING

Specification Title: THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

Description: 2.1 Acceptable Roofing System Manufacturers:

Section: 075423 Page: 2

Article/Paragraph: 2.1

Proposed Substitution: JM TPO - 80 mil

Manufacturer: Johns Manville Address: 717 17th st Denver, CO Phone: 1-800-922-5922

Trade Name: Thermoplastic Polyvinyl Chloride Membrane Model No.:

Installer: TBD Address: Phone:

History: ☐ New product ☐ 2-5 years old ☐ 5-10 yrs old ☒ More than 10 years old

Differences between proposed substitution and specified product: None

☒ Point-by-point comparative data attached - REQUIRED BY A/E

Reason for not providing specified item:

Similar Installation:

Project: Southern First Bank
Address: 6 Verdae Blvd
Greenville, SC 29607

Architect:

Owner:

Date Installed: 05/03/2022

Proposed substitution affects other parts of Work: ☒ No ☐ Yes; explain

Supporting Data Attached: ☐ Drawings ☒ Product Data ☐ Samples ☐ Tests ☐ Reports ☐

SUBSTITUTION REQUEST
(Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: Steven Wygand

Signed by: Steven Wyagnd

Firm: Johns Manville

Address: 717 17th St
Denver, CO

Telephone: (864)867-3328

Attachments: Substitution Request letter, Comparison Chart, and Product Data Sheets

A/E's REVIEW AND ACTION

☒ Substitution approved - Make submittals in accordance with Specification Section 01330.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: Dylan Johnson Digitally signed by Dylan Johnson Date: 2023.05.05 10:37:18-04'00' Date: 5/5/2023

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ _____

Manufacturer accepted. All specification requirements still apply.

Johns Manville
A Berkshire Hathaway Company

Technical Services

10100 W. Ute Ave.
Littleton, CO 80127
303.978.5200
RSSpecServices@jm.com
www.jm.com

Re: Greer High School – Roof Recover & Replacement
Greer, SC

4/26/2023

To Whom It May Concern:

Johns Manville (a Berkshire Hathaway Company) has been a Roofing Systems solution provider for over 160 years and we take pride in the systems and products that we offer to the market. The JM TPO roofing solution has over 12 years of commercial experience and is utilized on many different building types including educational facilities, office building, airports, retail, industrial, and others.

We are submitting a pre-bid system approval request for roofing materials tailored to the above referenced project, to provide a JM TPO 80-mil roofing system.

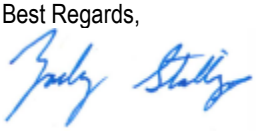
Addressing Product Offering

- Johns Manville is proposing the following TPO roofing system that meets the criteria and intention of the specified roofing assembly:
- The roof assembly shall be composed of the following JM components:
  - Membrane: **JM TPO 80**, **adhered with JM Membrane Bonding Adhesive (TPO & EPDM)**
  - Cover Board: **DensDeck Prime Roof Board**, **adhered with Roofing Systems Urethane Adhesive (RSUA)**
  - Insulation: **ENRGY 3**, **adhered with Roofing Systems Urethane Adhesive (RSUA)**
  - Deck:**steel, tectum**
  - Wind uplift and coverage riders require approved attachment rates from JM Technical Services: 72
- These assemblies will be eligible for a **30 year No Dollar Limit Johns Manville Peak Advantage® Guarantee** once a Johns Manville Technical Representative inspects and approves the installed JM roofing system.
- Johns Manville is a Denver, Colorado based corporation with operations in North America and abroad.

Johns Manville Specifier Services
Johns Manville offers a number of resources for specification services to accurately assess and develop the proper roofing assembly including system selection, technical assistance, and specification review.

We look forward to your favorable review and approval of this substitution request. If you should have any further questions, please do not hesitate to contact me at 800-922-5922 Opt. #3.

Best Regards,



Zac Stallings
Technical Specialist, Roofing Systems Group

Specifier Services Representative, Johns Manville

Cc: Sales Rep/Agent, Johns Manville

Att: Product Comparison Table
Data Sheets
Sample Warranty

Property	ASTM Test Method	Unit of Measure	ASTM 6878 Requirement	JM TPO 80	GAF EverGuard® 80	Firestone UltraPly™ TPO Platinum™ 80	Carlisle Spectro-Weld™ 80
Overall Sheet Thickness	D751	inches	0.039 in.	0.079	0.080	0.080±10%	0.080±10%
Thickness Over Reinforcement	D7635	inches	0.015 in.	0.033	0.0314	0.033	0.034
Breaking Strength	D751	lbf	> 220 lbf	464 / 439	335 / 320	460	350 min, 425 typ
Breaking Strength - Post Heat Aged (MD/XMD)	D751	% of initial	> 90%	> 90% / > 90%	100.0%	> 90%	90.0%
Elongation at Break (MD/XMD)	D751	%	> 15%	29% / 31%	30%	25.0%	15% min, 25% typ
Elongation at Break - Post Heat Aged (MD/XMD)	D751	% of initial	> 90%	> 90% / > 90%	100.0%	> 90%	90.0%
Tearing Strength (MD/XMD)	D751	lbf	> 55 lbf	65 / 179	65 / 160	120	55 min, 130 typ
Tearing Strength - Post Heat Aged	D751	% of initial	> 60%	> 60% / > 60%	Not Listed	> 60%	60.0%
Brittleness Point @ -40C	D2137	C	Pass	Pass	Pass	Pass	-40 max, -50 typ
Ozone Resistance	D1149	-	0 Rating	Pass	Pass	Pass	Pass
Heat Aging	D573	-	224 days @240 F	Pass	Current ASTM Not Listed	Current ASTM Not Listed	Pass
Weight Change - Post Heat Aged	D751	%	+/- 1% Max.	0.22	Not Listed	<1%	Not Listed
Linear Dimension Change - Post Heat Aged	D1204	%	+/- 1% Max.	< 0.1%	0.40%	<1%	+/- 1%, -0.2 typ
Water Absorption	D471	%	+/- 3% Max.	0.03%	0.70%	<3%	3.0% max, .9 typ
Factory Seam Strength	D751	lbf	> 66 lbf	137	160	Not Listed	66 min
Field Seam Strength	D1876	lbf	N/A	Not Listed	Not Listed	Not Listed	40 min, 70 typ
Post Xenon Visual Inspection	G151 & G155	kJ/m2	10,080	>20,160	>25,000	> 20,160	27,720
Impact Resistance	D3746	0 = no damage 2 = indentations 4 = cracks/splits	NA	2 (indentations)	Not listed	Not Listed	Not Listed
Dynamic Puncture	D5635	Joules	N/A	35	Not Listed	Pass (MD 60 x CD 60)	Not Listed
Static Puncture @ 44 lb	D5602	-	N/A	Pass	Not Listed	25	Not Listed
Puncture Resistance	FTMS 101C, Method 2031	lbs	N/A	526	> 380	450	400 min, 450 typ
LEED Initial Reflectance	E903	-	N/A	Not Listed	Not Listed	0.81	Not Listed
LEED Initial Emittance	E408	-	N/A	Not Listed	Not Listed	0.95	Not Listed
LEED Initial Solar Reflective Index (SRI)	E1980	-	N/A	95	94	90	111
CRRC Initial Reflectance	C1549, E1918, E903	-	N/A	0.77	0.76	0.79	0.88
CRRC Aged Reflectance	C1549, E1918, E903	-	N/A	0.68	0.68	0.68	0.75
CRRC Initial Emittance	C1371	-	N/A	0.87	0.90	0.85	0.89
CRRC Aged Emittance	C1371	-	N/A	0.87	0.83	0.83	0.9
Aged Emittance	C1371	-	N/A	Not Listed	Not Listed	Not Listed	Not Listed
Aged Solar Reflective Index (SRI)	E1980	-	N/A	Not Listed	Not Listed	Not Listed	Not Listed
Fungi Resistance	G21	-	N/A	Pass	Not Listed	Not Listed	Not Listed
Microbial Growth	D3274	1 - 10 scale (high - no growth)	N/A	Not Listed	Not Listed	Not Listed	Not Listed
Moisture Vapor Transimission	E96	Perms	N/A	0.00	0.08	Not Listed	0.10 max, 0.05 typ
Hydrostatic Resistance	D751	psi	N/A	602	430	Not Listed	Not Listed

JM TPO – 80 mil

Thermoplastic Polyolefin Membrane

Meets or exceeds the requirements of ASTM D 6878

Features and Components

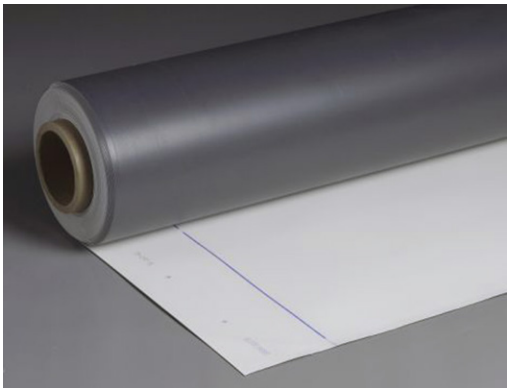
Thickness Over Scrim: Optimized and tested on a continual basis with a state-of-the-art thickness gauge to verify that the thickness valued by our customers is incorporated into the sheet.

One of the Widest Melt Windows: Promotes better welds over a wider variety of speeds and temperatures, and leads to a softer, more flexible and workable sheet.

Reinforced fabric scrim layer and top-ply thickness: Lends to durable physical properties including:

- Long-term weathering, UV resistance and heat-aging properties
- High breaking and tearing strength

Optimized TPO formulation: delivers high-performance ozone resistance, cool roof reflectivity and overall weather resistance.



Component
M
Membrane
Single Ply

Colors

Grey*	White	Tan*

**Grey and Tan lead times are subject to availability and may require an upcharge for smaller projects.*

System Compatibility

This product may be used as a component in the following systems. Please reference product application for specific installation methods and information.

Multi-Ply	BUR	APP		SBS				
	HA	CA	HW	HA	CA	HW	SA	MF
	Do not use with multi-ply systems							

Single Ply	TPO				PVC			EPDM		
	MF	AD	SA	IW	MF	AD	IW	MF	AD	BA
	Compatible with the selected single ply systems above									

Key: **HA** = Hot Applied **CA** = Cold Applied **HW** = Heat Weldable **SA** = Self Adhered **MF** = Mechanically Fastened **IW** = Induction Weld **BA** = Ballasted **AD** = Adhered

Energy and the Environment

Standard			Reflectivity	Emissivity
CRRC®	White	Initial	0.77	0.87
		3 Yr. Aged	0.70	0.86
	Tan	Initial	0.67	0.87
		3 Yr. Aged	0.62	0.90
	Gray	Initial	0.35	0.87
		3 Yr. Aged	0.34	0.90
CA Title 24	White	Pass	0.77	0.87
	Tan	Pass 3 Yr. Aged	SRI=75	
LEED® (SRI)	White	Initial	95	
		3 Yr. Aged	85	
	Tan	Initial	81	
		3 Yr. Aged	75	
	Gray	Initial	39	
		3 Yr. Aged	37	
Recycled Content	Post-consumer		0%	
	Post-industrial		5%	

The LEED® Solar Reflectance Index (SRI) is calculated per ASTM E1980.

Peak Advantage® Guarantee Information

Product	Guarantee Term
JM TPO 80 mil	5, 10, 15, 20, 25, or 30 yrs

Codes and Approvals

CLASSIFIED UL C US

FM APPROVED

MIAMI-DADE COUNTY APPROVED
Miami-Dade County Product Control Approved

Installation/Application

Refer to JM TPO application guides and detail drawings for instructions.

Packaging and Dimensions

Roll Widths	5' (1.52 m)	6' (1.83 m)	8' (2.44m)	10' (3.05m)	12' (3.66 m)
Roll Lengths	100' (30.48 m)	75' (22.86 m)	100' (30.48 m)	100' (30.48 m)	75' (22.86 m)
Roll Coverage	500 ft² (46.45 m²)	450 ft² (41.81m²)	800 ft² (74.32 m²)	1000 ft² (92.9 m²)	900 ft² (83.61 m²)
Rolls per Pallet	4	8	4	4	8
Pallet Weight	980 lb (444.5 kg)	1768 lb (801.9 kg)	1572 lb (713 kg)	1964 lb (890.9 kg)	3536 lb (1603.9 kg)
Pallets per Truck*	28-32	22-26	18-20	14-16	11-13
Producing Location	Scottsboro, AL				

*Assumes 48' flatbed truck and does not reflect pallets of accessories or impact of mixed sizes.

JM TPO – 80 mil

Thermoplastic Polyolefin Membrane

Meets or exceeds the requirements of ASTM D 6878

Tested Physical Properties

Physical Properties		ASTM Test Method	Standard for ASTM D 6878 (Min.)	JM TPO – 80 mil	
				MD*	XMD**
Strength	Breaking Strength, min, lbf (N)	D 751	220 (976)	464 (2,064)	439 (1,953)
	Elongation at Break, min %	D 751	15	29	31
	Tearing Strength, min, lbf (N)	D 751	45 (200)	65 (289)	179 (796)
	Factory Seam Strength, min, lbf (N)	D 751	66 (290)	137 (609)	
Longevity	Thickness, min, in.	D 751	+/- 10% from Nominal	0.080 (Nominal)	
	Thickness Over Scrim, min, in. (mm)	D 7635	0.015	0.033 (0.84)	
	Water Absorption, max, %	D 471	3.0	0.03	
	Brittleness Point, max, -40°F	D 2137	No Cracks	Pass	
	Ozone Resistance	D1149	No Cracks	Pass	
Heat Aged Performance	Properties after Heat Aging @ 240°F	D 573	Pass/Fail	Pass	
	Breaking Strength, % (after aging)	D 751	90	>90	>90
	Elongation, % (after aging)	D 751	90	>90	>90
	Tearing Strength, % (after aging)	D 751	60	>60	>60
	Weight Change, max, % (after aging)	D 751	±1.0	0.22	
	Linear Dimensional Change, max, % (after 6 hrs @ 158°F)	D 1204	±1.0	<0.1	
Weather Performance	Accelerated Weathering, min	G 151 & G 155	10,080 kj/m²•nm @ 340 nm (4,000 hrs @ 0.70 W)	>20,160 kj/m² (>8,000 hrs)	
	Cracking (@ 7x magnification)	G 155	No Cracks	Pass	

*MD = Machine Direction **XMD = Cross-Machine Direction Note: All data represents tested values.

Supplemental Testing

Physical Properties	ASTM Test Method	Standard for ASTM D 6878 (Min.)	JM TPO – 80 mil Result
Dynamic Puncture	D 5635	N/A	Pass @ 25 Joules
Static Puncture	D 5602	N/A	Pass @ 44 lb (20 kg)
Impact Resistance of Bituminous Roofing Systems	D 3746	N/A	Pass - minor indentations
Reflectance	C 1549	N/A	78%
	E 903	N/A	80%
Emittance	C 1371	N/A	0.87
	E 408	N/A	0.96
SRI	E 1980	N/A	95
Resistance of Synthetic Polymer Material to Fungi	G 21	N/A	0 rating
Puncture Resistance (FTMS 101C, Method 2031)	N/A	N/A	526 lb (239 kg)
Moisture Vapor Transmission	E 96	N/A	0 g/m² per 24 hours
Hydrostatic Resistance, Mullen	D 751	N/A	474 PSI (3268 kPa)
Standard Test Method for Air Permeance of Building Materials	E 2178	N/A	Pass @ <0.0005 L/(s·m²) (Pass @ <0.0001 CFM/ft²)

Technical specifications as shown in this literature are intended to be used as general guidelines only. Please refer to the Safety Data Sheet and product label prior to using this product. The Safety Data Sheet is available by calling (800) 922-5922 or on the web at www.jm.com/roofing. The physical and chemical properties of the product listed herein represent typical, average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Check with the regional sales representative nearest you for current information.

RS-8634 8-21 (Replaces 4-21)

JM Membrane Bonding Adhesive

(TPO & EPDM)

Features and Components

Use: For adhering JM TPO and EPDM membranes to approved substrates. *Do not use on fleece-backed membranes.*

Type: One-part, synthetic polymer-based membrane adhesive, two-sided application.

Substrates: Compatible with insulation boards; metal, wood and other decking materials.

Color: Yellow

Component
AD Adhesive

Type
M Membrane
Single Ply

System Compatibility

This product may be used as a component in the following systems. Please reference product application for specific installation methods and information.

Multi-Ply	BUR	APP		SBS											
	HA	CA	HW	HA	CA	HW	SA	MF							
	Do not use in multi-ply systems														
Single Ply	TPO				PVC				EPDM						
	MF	AD	SA	IW	MF	AD	IW		MF	AD	BA				
	Used to adhere membranes in the selected single ply systems above														

Key: **HA** = Hot Applied **CA** = Cold Applied **HW** = Heat Weldable **SA** = Self Adhered **MF** = Mechanically Fastened **IW** = Induction Weld **BA** = Ballasted **AD** = Adhered

Energy and the Environment

Maximum VOC	660 g/l (EPA Method 24)

Physical Properties

Property	JM TPO Membrane Adhesive (Solvent Based)
Weight per Unit *(approx.)*	7.3 lb/gal (0.87 kg/l)
Specific Gravity	0.865 - 0.87

Precautions

This product is flammable. Adhesive contains ingredients which could be harmful if mishandled. Contact with skin and eyes should be avoided, and the recommended personal protective equipment should be worn.

Exposure Window

Johns Manville recommends immediate and complete use upon opening. Use open containers within 48 hours of opening. Replace lid on can when not in use. Adhesive that has changed color or viscosity is no longer usable.

Storage

Shelf Life	12 months from manufacture date
Storage Conditions	Clean, dry, indoor environment in an unopened container
Temperature Range	60°F – 80°F (16°C – 27°C) - Protect from freezing

Installation/Application

Long Nap Roller

- Ambient Temperature Ranges:
  - Apply when ambient temperature is 25°F and rising
  - Do NOT apply when dew point is within 10°F or closer to ambient.
- Adhesive Temperature Ranges:
  - Adhesive must be greater than 32°F.
  - If adhesive falls below 32°F, place back in warm area until temperature is 60°F or greater. Apply when the ambient and substrate temperature is 40°F (5°C) and rising.
- Do not apply adhesive near seams or splices where a hot-air welder or seam tape will be used.
- Do Not Thin.

Packaging and Coverage

Container Size	5 gal (18.9 l) pail
Shipping Weight *(approx.)*	39 lb (16.6 kg)
Coverage Rate* *(2-sided)*	50 - 90 ft²/gallon (1.23 - 2.03 m²/l)

* Coverage, open and dry time rates can vary dramatically depending on the particular substrate and environmental conditions. Coverage rates stated herein are approximate only. If FM Global® or UL® approval is required, consult specific RoofNav℠ or the UL Certifications Directory for specific application rates.

RS-7845 6-21 (Replaces 2-18)

DensDeck® Prime Roof Board

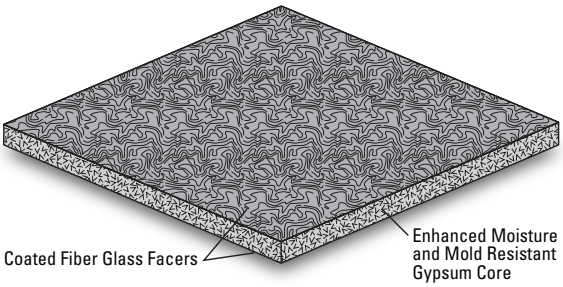
Enhanced Coated Glass Mat Faced Gypsum Cover Board

Meets the requirements of ASTM C 1177

Features and Components

Enhanced Face Mat: Coated fiberglass facer ideal for fully adhered systems provides a broader compatibility and higher performance with roofing adhesives.

Fire Performance: FM Class 1 for fire barrier requirements and UL Class A unlimited slope with excellent surface burning characteristics. 5/8" thickness meets the requirements of Type X per ASTM C 1177.



Component
B Cover Board
Multi-Ply
Single Ply

Type
GY Gypsum
LT Low Thermal

System Compatibility

This product may be used as a component in the following systems. Please reference product application for specific installation methods and information.

Multi-Ply	BUR		APP		SBS			
	HA	CA	CA	HW	HA	CA	HW	SA
	Compatible with all Multi-Ply systems							

Single Ply	TPO		PVC		EPDM		
	MF	FA	MF	FA	MF	FA	BA
	Compatible with the selected Single Ply systems above						

Key: **HA** = Hot Applied **CA** = Cold Applied **HW** = Heat Weldable **SA** = Self Adhered **MF** = Mechanically Fastened **FA** = Fully Adhered **BA** = Ballasted

Peak Advantage® Guarantee Information

Systems	Guarantee Term*
When used in most multi-ply and single ply systems	10, 15, or 20 years

* Contact JM Technical Services for specific systems or terms over 20 years.

Codes and Approvals

Miami-Dade County Product Control Approved

Installation/Application

Refer to the Application Guides and Detail Drawings for instructions.

Packaging and Dimensions

Size	4' x 4' (1.22 m x 1.22 m)		
Thickness, nom	¼" (6.4 mm)	½" (12.7 mm)	⅝" (15.9mm)
Weight/Board, nom	19 lb (8.6 kg)	32 lb (14.5 kg)	40 lb (18.2 kg)
Coverage/Pallet	960 ft² (89 m²)	800 ft² (74 m²)	640 ft² (59 m²)
Boards/Pallet	60	50	40
Pallet Weight	1,140 lb (517 kg)	1,600 lb (726 kg)	1,600 (726 kg)
Pallets per Truck*	40	29	27
Size	4' x 8' (1.22 m x 2.44 m)		
Thickness, nom	¼" (6.4 mm)	½" (12.7 mm)	⅝" (15.9 mm)
Weight/Board, nom	38 lb (17.2 kg)	64 lb (29.0 kg)	80 lb (36.3 kg)
Coverage/Pallet	1,344 ft² (125 m²)	960 ft² (89 m²)	960 ft² (89 m²)
Boards/Pallet	42	30	30
Pallet Weight	1,596 lb (724 kg)	1,920 lb (871 kg)	2,400 lb (1089 kg)
Pallets per Truck*	28	24	18

* Assumes 48' flatbed truck. Number of units per truck may vary per shipping location and can be verified at time of order placement.

DensDeck® Prime Roof Board

Enhanced Coated Glass Mat Faced Gypsum Cover Board

Meets the requirements of ASTM C 1177

Typical Physical Properties

Test		ASTM	DensDeck Prime Roof Board		
			¼" (6.4 mm)	½" (12.7 mm)	⅝" (15.9 mm)
Strength	Compressive Strength, psi (kPa), *nom*	C 473	900 (6,205)		
	Flexural Strength, lb, parallel, *min*	C 473	40	80	100
	Bending Radius, ft (m), *max*	NA	4 (1.2)	6 (1.8)	8 (2.4)
Moisture	Moisture Vapor Permeance, perms (ng/(Pa•s•m²), *min*	E 96	30 (1,710)	23 (1,300)	17 (970)
	Water Absorption, % by wt, *max*	C 1177	5		
	Surface Water Absorption, grams, *nom*	C 473 method B	1		
	Mold Resistance	D 3273	10		
Installation	Flute Span, in (cm), *max*	E 661	2 ⅝ (6.7)	5 (12.7)	8 (20.3)
	Weight, lb/ft² (kg/m²), *nom*	NA	1.2 (5.9)	2.0 (9.8)	2.5 (12.2)

Thermal Performance

Thickness		Nominal R-Value (Resistance)	
in.	mm	(hr•ft²•°F)/BTU	m²•°C/W
¼	6.4	0.28	0.049
½	12.7	0.56	0.099
⅝	15.9	0.67	0.118

Test	ASTM	DensDeck Prime Roof Board
Flame Spread	E 84	0
Smoke Developed	E 84	0
Non combustible in accordance with ASTM E 136		

Technical specifications as shown in this literature are intended to be used as general guidelines only. Please refer to the Safety Data Sheet and product label prior to using this product. The Safety Data Sheet is available by calling (800) 922-5922 or on the web at www.jm.com/roofing. The physical and chemical properties of the product listed herein represent typical, average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Check with the regional sales representative nearest you for current information.

RS-5595 4-21 (Replaces 2-20)

JM ROOFING SYSTEM URETHANE ADHESIVE

Features and Components

Use: JM Roofing System Urethane Adhesive is a two-component polyurethane adhesive used for attaching fleece-backed single ply membranes to insulation boards or various deck types as well as insulation boards to the roof deck or to other insulation boards.

Type: Two-part, cold application insulation adhesive.

Substrates: Compatible with the following insulations, cover boards, and substrates[1]: polyisocyanurate; HD wood fiber; perlite; Invinsa® Roof Board; gypsum; concrete[2] *(Lightweight structural, poured-in-place structural, precast, and insulating)*; treated plywood *(5/8" [1.58 cm] min. thickness)*; cementitious wood fiber; gypsum; smooth or granulated BUR, APP or SBS.

1. Ensure that all insulation boards are 4' x 4' or smaller.
2. Ensure that the concrete is adequately dry for adhesion.

Color: Part 1 - Brown, Part 2 - Colorless, Combined/foamed adhesive - Light Amber

Features: Solvent free, and HCFC or CFC free.

Universal adhesive for adhering fleece-backed membranes and insulation boards.

Sets in minutes.

Component
AD Adhesive

Type
I Insulation
B Cover Board
Multi-Ply
Single Ply
M Membrane
Single Ply

System Compatibility

This product may be used as a component in the following systems. Please reference product application for specific installation methods and information.

Multi-Ply	BUR	APP		SBS				
	HA	CA	HW	HA	CA	HW	SA	MF
	*Used to adhere insulation in all multi-ply systems**							

Single Ply	TPO				PVC			EPDM		
	MF	AD	SA	IW	MF	AD	IW	MF	AD	BA
	*Used to adhere insulation in all single ply systems***									

Key: **HA** = Hot Applied **CA** = Cold Applied **HW** = Heat Weldable **SA** = Self Adhered **MF** = Mechanically Fastened **IW** = Induction Weld **BA** = Ballasted **AD** = Adhered

* For smooth modified membranes contact JM Technical Services for specific approval. ** May also be used to adhere fleece-backed TPO and PVC Membranes to Insulation and Cover Boards.

Energy and the Environment

Maximum VOC	32 g/l as applied after mixing (EPA method 24)

Physical Properties

Property		ASTM Test Method	JM Roofing System Urethane Adhesive
Weight *(liquid components)*	Part 1	–	10.18 lb/gal (1.2 kg/l)
	Part 2	–	8.34 lb/gal (1.0 kg/l)
Viscosity *(liquid components)*	Part 1	–	250 cps
	Part 2	–	370 cps

Codes and Approvals

CLASSIFIED UL US

FM APPROVED

MIAMI-DADE COUNTY APPROVED
Miami-Dade County Product Control Approved

Precautions

First Aid *– In case of contact with eyes, immediately flush eyes with running water for at least 15 minutes. Call a physician immediately. In case of contact with skin, wash affected area with soap and water. Remove all contaminated clothing and shoes. Wash clothing before reuse and discard contaminated shoes. If swallowed, drink large amounts of water to dilute. If vomiting occurs, drink more water and call a physician immediately.*

Environmental Hazard *– PMDI in Part 1 component may cause pollution. Do not discharge into lakes, streams, ponds or public waters. For guidance, contact your regional office of the U.S. Environmental Protection Agency.*

Disposal *– Neutralize and dispose of spilled material, unused contents and empty containers in accordance with local, state and federal regulations.*

Safety *– Wear proper clothing and safety equipment.*

Refer to the Safety Data Sheet and product label prior to using this product. The Safety Data Sheet is available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

Installation/Application

Bead

- Apply when ambient temperature is 25°F (-3.9°C) and rising.
- Ensure all insulation boards are 4' x 4' (1.22 m x 1.22 m) or smaller.
- Ensure all surfaces are dry and free of any debris, dirt, oil and grease before using JM Roofing System Urethane Adhesive.
- Refer to the application instructions and guidelines for proper utilization and coverages rates of this adhesive.

Packaging and Coverage

	Container Type			
	Cartridges	5 gal (18.9 l) Boxes	15 gal (57 l) Drums	50 gal (189 l) Drums
Items per Case/Set*	4 per case with 5 mixing tips	1 Set with 5 mixing tips	1 Drum	1 Drum
Shipping Weight (approx.)	20 lb (9 kg)	Part 1 = 54 lb (24.5 kg) Part 2 = 46 lb (21 kg)	Part 1 = 155 lb (70 kg) Part 2 = 132 lb (60 kg)	Part 1 = 552 lb (250 kg) Part 2 = 472 lb (214 kg)
Cases/Sets per Pallet	48 Cases	18 Sets	4 Sets	2 Sets
Coverage	See tables on back page			

* A set is defined as an equal Part 1 and Part 2.

Storage

Shelf Life	18 months from manufacture date
Storage Conditions	Clean, dry, well-ventilated indoor environment in an unopened container. 24 hours prior to use, store between 60°F (16°C) and 85°F (29°C).
Temperature Range	45°F to 95°F (7°C to 35°C) - Protect from freezing

JM ROOFING SYSTEM URETHANE ADHESIVE

Coverage – Fleece Backed Membranes

Bead spacing: 12" o.c. • Applied bead size: ¾" min.

Packaging	Typical Coverage Rates*		
	per package	ft²/gal	gal/100 ft²
Cartridge	600 ft²/case	189	0.4
5 gal box	2,500 ft²/set**	250	
15 gal drum	7,500 ft²/set**		
50 gal drum	25,000 ft²/set**		

Bead spacing: 6" o.c. • Applied bead size: ¾" min.

Packaging	Typical Coverage Rates*		
	per package	ft²/gal	gal/100 ft²
Cartridge	300 ft²/case	94	1.1
5 gal box	1,250 ft²/set**	125	0.8
15 gal drum	3,750 ft²/set**		
50 gal drum	12,500 ft²/set**		

Bead spacing: 4" o.c. • Applied bead size: ¾" min.

Packaging	Typical Coverage Rates*		
	per package	ft²/gal	gal/100 ft²
Cartridge	200 ft²/case	63	1.59
5 gal box	833 ft²/set**	83	1.2
15 gal drum	2,500 ft²/set**		
50 gal drum	8,333 ft²/set**		

Coverage – Board Stock

Bead spacing: 12" o.c. • Applied bead size: ½" - ¾" min.

Packaging	Typical Coverage Rates*		
	per package	ft²/gal	gal/100 ft²
Cartridge	600-800 ft²/case	189-252	0.33-0.4
5 gal box	2,500-3,000 ft²/set**	250-300	
15 gal drum	7,500-9,000 ft²/set**		
50 gal drum	25,000-30,000 ft²/set**		

Bead spacing: 6" o.c. • Applied bead size: ½" - ¾" min.

Packaging	Typical Coverage Rates*		
	per package	ft²/gal	gal/100 ft²
Cartridge	300-400 ft²/case	94-126	0.8-1.1
5 gal box	1,250-1,500 ft²/set**	125-150	0.66-0.8
15 gal drum	3,750-4,500 ft²/set**		
50 gal drum	12,500-15,000 ft²/set**		

Bead spacing: 4" o.c. • Applied bead size: ½" - ¾" min.

Packaging	Typical Coverage Rates*		
	per package	ft²/gal	gal/100 ft²
Cartridge	200-266 ft²/case	63-84	1.19-1.59
5 gal box	833-1,000 ft²/set**	83-100	1.0-1.2
15 gal drum	2,500-3,000 ft²/set**		
50 gal drum	8,333-10,000 ft²/set**		

* Coverage rates are approximate and may vary based on substrate type and application. Approved substrates include structural concrete decks, JM Vapor Barrier SA, ENRGY 3, RetroPlus, DuraBoard, Invinsa, Securock, DensDeck, DensDeck Prime, smooth modified asphalt membranes and granulated asphalt membranes. Please contact JM Technical Services for other approved substrates.

** A set is defined as an equal Part 1 and Part 2.

Refer to the Safety Data Sheet and product label prior to using this product. The Safety Data Sheet is available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

Flat & Tapered ENRGY 3®

Polyisocyanurate Roof Insulation

Meets the requirements of ASTM C 1289, Type II, Class 1, Grade 2 (20 psi)

- **ENRGY 3 / Tapered ENRGY 3**

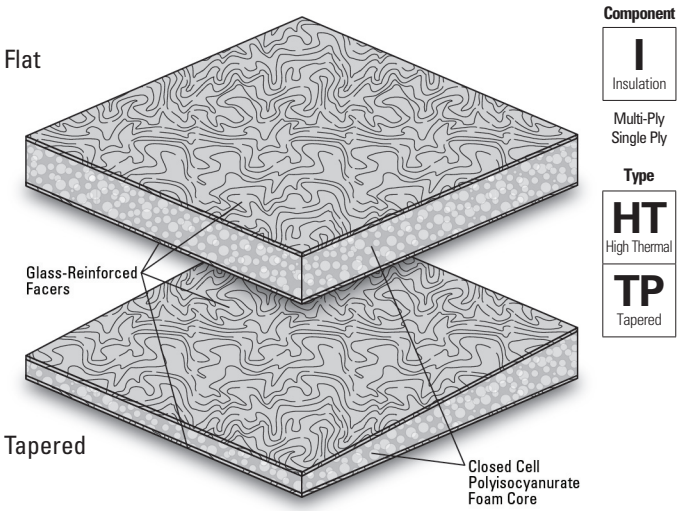
Grade 3 (25 psi)

- **ENRGY 3 25 PSI / Tapered ENRGY 3 25 PSI**

Features and Components

Glass-Reinforced Facers: Provides rigidity and resistance to indentation and crushing, and are compatible with BUR, modified bitumen and single ply membrane systems.

Closed Cell Polyisocyanurate Foam Core: Provides high R-value per inch in built-up, modified bitumen, metal roof and single ply roof systems, and approved for direct application to steel decks.



System Compatibility

This product may be used as a component in the following systems. Please reference product application for specific installation methods and information.

Multi-Ply	BUR	APP		SBS				
	HA	CA	HW	HA	CA	HW	SA	MF
	Compatible with the selected Multi-Ply systems above							

Single Ply	TPO				PVC			EPDM		
	MF	AD	SA	IW	MF	AD	IW	MF	AD	BA
	Compatible with all Single Ply systems									

Key: **HA** = Hot Applied **CA** = Cold Applied **HW** = Heat Weldable **SA** = Self Adhered **MF** = Mechanically Fastened **IW** = Induction Weld **BA** = Ballasted **AD** = Adhered

Energy and the Environment

LEED®	Recycled Content	Varies with thickness, see *Product Data and Packaging* table on next page.
Produced with a pentane blowing agent with zero ozone depletion and virtually no global warming potential.		

Peak Advantage® Guarantee Information

Systems
For use in approved JM Peak Advantage Roofing Guarantees

Codes and Approvals

- FM® Standards 4450/4470 Approvals (refer to FM RoofNav℠)
- UL® Standard 790, 263 and 1256 (refer to UL Roofing Materials system directory)
- Meets the requirements of CAN/ULC S704, Type 2 & 3, Class 3
- California Code of Regulations, Title 24, Insulation Quality Standard License #TI-1341
- Third-party certification with the PIMA Quality Mark™ for Long-Term Thermal Resistance (LTTR) values

Installation/Application

Refer to the application instructions guidelines for proper utilization of this product.

Flute Span:

Width of Rib Opening:	Up to 2 5/8" (6.67 cm)	Up to 3 3/8" (8.57 cm)	Up to 4 3/8" (11.11 cm)
Insulation Thickness (min):	1.0" (2.54 cm)	1.2" (3.05 cm)	≥1.3" (3.30 cm)

Packaging and Dimensions

Flat Sizes[1]	4' x 4' (1.22 m x 1.22 m)	4' x 8' (1.22 m x 2.44 m)	
Tapered Size[2]	4' x 4' (1.22 m x 1.22 m)		
Producing Locations	Bremen, IN Hazleton, PA	Cornwall, ONT Jacksonville, FL	Fernley, NV Hillsboro, TX

1. For available thicknesses, see *Product Data and Packaging* table on page 2 of this data sheet. Other sizes available by special request, some sizes are not stocked but can be special ordered with minimum order quantities. Contact your JM Sales Representative for details.
2. Tapered ENRGY 3 and Tapered ENRGY 3 25 PSI are available in thicknesses of 1/2" to 4". Available profiles are shown on page 3 of this data sheet. In some regions extended panels are also available.

Johns Manville

Flat ENRGY 3®

Polyisocyanurate Roof Insulation

Typical Physical Properties

Test		ASTM	Values
Strength	Tensile Strength	C 209	500 psf (24 kPa) *(min)*, 730 psf (35 kPa) *(nom)*
	Compressive Resistance 10% Consolidation	D 1621	Grade 2: 20 psi (138 kPa), Grade 3: 25 psi (172 kPa) *(min)*
	Dimensional Stability Change, *(length & width)*	D 2126	0.5% *(nom)*, 2% *(max)*
Moisture	Moisture Vapor Permeance	E 96	<1 perm, 57.5 ng/(Pa•s•m^2)
	Water Absorption	C 209	1.0% *(max)*
Insulation	Service Temperature	D 1623	-100°F – 250°F (-73°C – 121°C)
	Flame Spread, *(foam core)*	E 84	20 - 30 *(nom)*, 75 *(max)*
	Smoke Developed, *(foam core)*	E 84	55 - 250 *(nom)*, 450 *(max)*

Product Data and Packaging

Thickness		Long-Term Thermal Resistance (LTTR) Values[1]		Recycled Content[2] 20 PSI / 25 PSI			Boards per Pallet	Square Feet per Pallet		Pallets per Truck[3]	
in.	mm	(hr•ft^2•°F)/BTU	m^2•°C/W	% Pre-Consumer	% Post-Consumer	% Total	4x4 and 4x8	4x4	4x8	4x4	4x8
1.0	25.4	5.7	1.00	5.3 / 5.2	31.8 / 29.9	37.1 / 35.1	48	768	1536	48	24
1.1	27.9	6.3	1.10	5.2 / 5.2	30.0 / 28.1	35.3 / 33.3	41	656	1312		
1.2	30.5	6.8	1.20	5.2 / 5.2	28.4 / 26.6	33.6 / 31.76	38	608	1216		
1.25	31.8	7.1	1.25	5.2 / 5.2	27.7 / 25.8	32.9 / 31.0	35	560	1120		
1.3	33.0	7.4	1.30	5.3 / 5.3	27.0 / 25.2	32.3 / 30.4	35	560	1120		
1.4	35.6	8.0	1.41	5.3 / 5.2	25.7 / 23.9	31.0 / 29.2	32	512	1024		
1.5	38.1	8.6	1.51	5.2 / 5.2	24.5 / 22.8	29.8 /28.0	32	512	1024		
1.6	40.6	9.1	1.61	5.2 / 5.2	23.4 / 21.7	28.7 / 27.0	28	448	896		
1.7	43.2	9.7	1.71	5.2 / 5.2	22.4 / 20.8	27.7 / 26.0	27	432	864		
1.75	44.5	10.0	1.76	5.2 / 5.2	22.0 / 20.4	27.2 / 25.6	27	432	864		
1.8	45.7	10.3	1.81	5.2 / 5.2	21.5 / 19.9	26.7 / 25.1	25	400	800		
1.9	48.3	10.8	1.91	5.2 / 5.2	20.7 / 19.1	25.9 / 24.3	24	384	768		
2.0	50.8	11.4	2.01	5.2 / 5.2	19.9 / 18.4	25.1 / 23.6	24	384	768		
2.1	53.3	12.0	2.11	5.2 / 5.2	19.2 / 17.7	24.4 / 22.9	21	336	672		
2.2	55.9	12.6	2.22	5.2 / 5.2	18.5 / 17.1	23.7 / 22.3	21	336	672		
2.3	58.4	13.2	2.32	5.2 / 5.2	17.9 / 16.5	23.1 / 21.7	20	320	640		
2.4	61.0	13.8	2.43	5.2 / 5.2	17.3 / 16.0	22.5 / 21.1	19	304	608		
2.5	63.5	14.4	2.53	5.2 / 5.2	16.8 / 15.4	22.0 / 20.6	19	304	608		
2.6	66.0	15.0	2.64	5.2 / 5.1	16.3 / 15.0	21.4 / 20.1	18	288	576		
2.7	68.6	15.6	2.74	5.2 / 5.1	15.8 / 14.5	21.0 / 19.7	17	272	544		
2.8	71.1	16.2	2.85	5.2 / 5.1	15.3 /14.1	20.5 / 19.2	16	256	512		
2.9	73.7	16.8	2.96	5.2 / 5.1	14.9 / 13.7	20.1 / 18.8	16	256	512		
3.0	76.2	17.4	3.06	5.2 / 5.1	14.5 / 13.3	19.7 / 18.4	16	256	512		
3.1	78.7	18.0	3.17	5.1 / 5.1	14.1 / 12.9	19.3 / 18.1	14	224	448		
3.2	81.3	18.6	3.28	5.1 / 5.1	13.8 / 12.6	18.9 / 17.7	14	224	448		
3.25	82.6	18.9	3.33	5.1 / 5.1	13.6 / 12.4	18.7 / 17.6	14	224	448		
3.3	83.8	19.2	3.39	5.1 / 5.1	13.4 / 12.3	18.6 / 17.4	14	224	448		
3.4	86.4	19.9	3.50	5.1 / 5.1	13.1 / 12.0	18.2 / 17.1	13	208	416		
3.5	88.9	20.5	3.61	5.1 / 5.1	12.8 / 11.7	17.9 / 16.8	13	208	416		
3.6	91.4	21.1	3.72	5.1 / 5.1	12.5 / 11.4	17.6 / 16.5	12	192	384		
3.7	94.0	21.7	3.82	5.1 / 5.1	12.2 / 11.1	17.3 / 16.3	12	192	384		
3.75	95.3	22.0	3.88	5.1 / 5.1	12.0 / 11.0	17.2 / 16.1	12	192	384		
3.8	96.5	22.3	3.94	5.1 / 5.1	11.9 / 10.9	17.0 / 16.0	12	192	384		
3.9	99.1	23.0	4.05	5.1 / 5.1	11.7 / 10.7	16.8 / 15.8	12	192	384		
4.0	101.6	23.6	4.16	5.1 / 5.1	11.4 / 10.4	16.5 / 15.5	12	192	384		
4.1	104.0	24.2	4.26	5.1 / 5.1	11.2 / 10.2	16.3 / 15.3	11	176	352		
4.2	107.0	24.9	4.39	5.1 / 5.1	10.9 / 10.0	16.0 / 15.1	11	176	352		
4.3	109.0	25.5	4.49	5.1 / 5.1	10.7 / 9.8	15.8 / 14.9	11	176	352		
4.4	112.0	26.1	4.60	5.1 / 5.1	10.5 / 9.6	15.6 / 14.7	10	160	320		
4.5	114.0	26.8	4.72	5.1 / 5.1	10.3 / 9.4	15.4 / 14.5	10	160	320		

1. The Long-Term Thermal Resistance (LTTR) values were determined in accordance with CAN/ULC S770 at 75°F (24°C). The ultimate R-Value of these products will depend on individual installation circumstances.

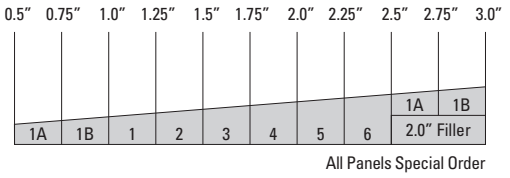
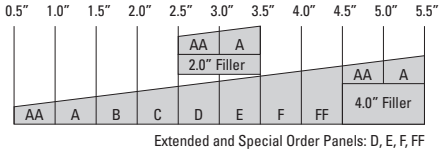
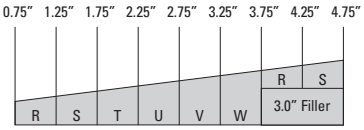
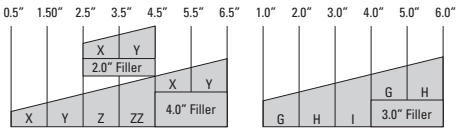
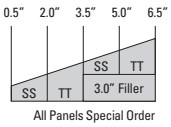
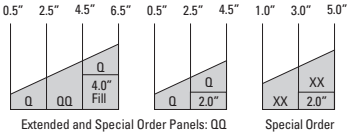
2. Value represents average results (Grade 2/Grade 3). 3. Assumes 48' flatbed truck.

Tapered ENRGY 3®

Polyisocyanurate Roof Insulation

Johns Manville Tapered Polyiso Offerings

Please refer to the previous page for typical physical properties.

Panel Desig.	Slope	Dimension		LTTR* Value Nominal	Pieces per Unit	Square Foot per Unit	Brd Ft per Unit	Slope Profiles
		Thin	Thick					
1/16 in/ft (5.2 mm/m)								
1A	1/16	0.5	0.75	3.6	70	1120	700	 All Panels Special Order
1B	1/16	0.75	1	5.0	50	800	700	
1	1/16	1	1.25	6.4	38	608	684	
2	1/16	1.25	1.5	7.8	32	512	704	
3	1/16	1.5	1.75	9.3	28	448	728	
4	1/16	1.75	2	10.7	22	352	660	
5	1/16	2	2.25	12.1	20	320	680	
6	1/16	2.25	2.5	13.6	18	288	684	
1/8 in/ft (10.4 mm/m)								
AA	1/8	0.5	1	4.3	64	1024	768	 Extended and Special Order Panels: D, E, F, FF
A	1/8	1	1.5	7.1	38	608	760	
B	1/8	1.5	2	10.0	26	416	728	
C	1/8	2	2.5	12.9	20	320	720	
D**	1/8	2.5	3	15.9	16	256	704	
E**	1/8	3	3.5	18.9	14	224	728	
F**	1/8	3.5	4	22.1	12	192	720	
FF**	1/8	4	4.5	25.3	10	160	680	
R	1/8	0.75	1.25	5.7	44	704	704	 All Panels Special Order
S	1/8	1.25	1.75	8.6	30	480	720	
T	1/8	1.75	2.25	11.4	22	352	704	
U	1/8	2.25	2.75	14.4	16	256	640	
V	1/8	2.75	3.25	17.4	14	224	672	
W	1/8	3.25	3.75	20.5	12	192	672	
3/16 in/ft (15.6 mm/m)								
J	3/16	1	1.75	7.8	32	512	704	
K	3/16	1.75	2.5	12.1	20	320	680	
L**	3/16	2.5	3.25	16.6	16	256	736	
M**	3/16	3.25	4	21.2	12	192	696	
JJ	3/16	0.5	1.25	5.0	52	832	728	
KK	3/16	1.25	2	9.3	28	448	728	
LL**	3/16	2	2.75	13.6	18	288	691	
MM**	3/16	2.75	3.5	18.2	14	224	694	
1/4 in/ft (20.8 mm/m)								
G	1/4	1	2	8.6	32	512	768	
H	1/4	2	3	14.4	18	288	720	
I**	1/4	3	4	20.5	12	192	672	
X	1/4	0.5	1.5	5.7	48	768	768	
Y	1/4	1.5	2.5	11.4	24	384	768	
Z**	1/4	2.5	3.5	17.4	16	256	768	
ZZ**	1/4	3.5	4.5	23.6	12	192	768	
3/8 in/ft (31.2 mm/m)								
SS	3/8	0.5	2	7.1	36	576	720	
TT**	3/8	2	3.5	15.9	16	256	704	
1/2 in/ft (41.6 mm/m)								
Q	1/2	0.5	2.5	8.6	32	512	768	
QQ**	1/2	2.5	4.5	20.5	12	192	672	
XX	1/2	1	3	11.4	22	352	704	

* (hr•ft²•°F/Btu)

** Extended panels require less adhesive and less labor.

Tapered Recycle Content:

Recycled content is dependent upon average thickness. To calculate, match the average thickness of Tapered ENRGY 3 to the thickness of Flat ENRGY 3. Use the number from Flat ENRGY 3 as your recycled content.

Johns Manville
A Berkshire Hathaway Company

Peak Advantage Guarantee

PEAK ADVANTAGE Johns Manville

Building Owner:
Name - SAMPLE
Address - SAMPLE
City, State Zip - SAMPLE

Building Name:
Name - SAMPLE
Address - SAMPLE
City, State Zip - SAMPLE

Approved Roofing Contractor:
Name - SAMPLE
Address - SAMPLE
City, State Zip - SAMPLE

Guarantee Number: *Sample - not issued*
Expiration Date: *Sample - not issued*
Job Name: *Sample - not issued*

Date of Completion: *Sample - not issued*

Terms & Maximum Monetary Obligation to Maintain a Watertight Roofing System.

Years: 20 Year **$** No Dollar Limit

Coverage:
The components of the Roofing System covered by this Guarantee are:

Total Squares: XXX

Sec.	Sqs.	Roof Type	Membrane Spec.	Insulation Type Layer 1	Layer 2	Layer 3	Cover Board
1	XXX	XXXX	XXXXX	XXX	XXX	XXX	XXX

Accessories:

Type	Product Name	Quantity	
Expand-O-Flash (1) Style:		0	lin. ft.
Expand-O-Flash (2) Style:		0	lin. ft.
Expand-O-Flash (3) Style:		0	lin. ft.
Fascia Style:		0	lin. ft.
Copings Style:		0	lin. ft.
Gravel Stop Style:		0	lin. ft.
Drains (1) Style:		0	ea.
Drains (2) Style:		0	ea.
Vents Style:		0	ea.
Skylight System:		0	ea.
Enrgy Anchor		0	ea.

These Johns Manville Guaranteed components are referred to above as the "Roofing System" and ALL OTHER NON-JM COMPONENTS OF THE OWNER'S BUILDING ARE EXCLUDED FROM THE TERMS OF THIS GUARANTEE, including any amendments thereto.

Johns Manville* guarantees to the original Building Owner that during the Term commencing with the Date of Completion (as defined above), JM will pay for the materials and labor reasonably required in Johns Manville's sole and absolute discretion to repair the Roofing System to return it to a watertight condition if leaks occur due to: ordinary wear and tear, or deficiencies in any or all of the Johns Manville component materials of the Roofing System, or workmanship deficiencies only to the extent they arise solely out of the application of the Roofing System. Non-leaking blisters are specifically excluded from coverage. Should any investigation or inspection reveal the cause of a reported leak to be outside the scope of coverage under this Guarantee, then all such investigation and inspection costs shall be borne solely by the Building Owner.

WHAT TO DO IF YOUR ROOF LEAKS

If you should have a roof leak please refer to directions on the Maintenance Program page within this document.

LIMITATIONS AND EXCLUSIONS

This Guarantee is not a maintenance agreement or an insurance policy; therefore, routine inspections and maintenance are the Building Owner's sole responsibility (see Maintenance Program page of this document). This Guarantee does not obligate JM to repair or replace the Roofing System, or any part of the Roofing System, for leaks or appearance issues resulting, in whole or in part, from one or more of the following (a) natural disasters including but not limited to the direct or indirect effect of lightning, flood, hail storm, earthquake, tornados, hurricanes or other extraordinary natural occurrences and/or wind speeds in excess of 55 miles per hour; (b) misuse, abuse, neglect or negligence; (c) Failure by the Building Owner to use reasonable care in maintaining the roofing system, said maintenance which is recommended to include those items listed on the Maintenance Program page of this Guarantee; (d) installation or material failures other than those involving the component materials expressly defined above as the Roofing System or exposure of the Roofing System components to damaging substances such as oil, fertilizers, or solvents or to damaging conditions such as vermin; (e) any and all (I) changes, alterations, repairs to the Roofing System, including, but not limited to, structures, penetrations, fixtures or utilities (including vegetative and solar overlays) based upon or through the Roofing System as well as any (II) changes to the Building's usage that are not pre-approved in writing by JM; (f) failure of the Building substrate (mechanical, structural, or otherwise and whether resulting from Building movement, design defects or other causes) or improper drainage; (g) defects in or faulty/improper design, specification construction or engineering of the Building or any area over which the Roofing System is installed; (h) defects in or faulty/improper architectural, engineering or design flaws of the Roofing System or Building, including, but not limited to, design issues arising out of improper climate or building code compliance; or (i) in instances of a recover project, Johns Manville is not responsible for the performance of pre-existing materials that predated the recover. Instead, Johns Manville's sole responsibility in recover systems where JM materials are adhered to existing materials is limited to the installed recover JM Roofing materials up to the wind speed listed herein. Guarantee coverage is limited to replacing recover JM Roofing materials only (and not the pre-existing materials – which is the Owner's responsibility) as required to return the roofing system to a watertight condition due to a claim covered under the terms and conditions herein. Johns Manville is not responsible for leaks, injuries or damages resulting from any water entry from any portion of the Building structure not a part of the Roofing System, including, but not limited to, deterioration of the roofing substrate, walls, mortar joints, HVAC units and all other non-Johns Manville materials and metal components. Moreover, the Building Owner is solely and absolutely responsible for any removal and/or replacement of any overburdens, super-strata or overlays, in any form whatsoever, as reasonably necessary to expose the Roofing System for inspection and/or repair.

This Guarantee becomes effective when (1) it is delivered to Owner; and (2) all bills for installation, materials, and services have been paid in full to the Approved Roofing contractor and to JM. Until that time, this Guarantee is not in force, has no effect – and JM is under no obligation whatsoever to perform any services/work.

The Parties agree that any controversy or claims relating to this Guarantee shall be first submitted to mediation under the Construction Industry Arbitration and Mediation Rules of the American Arbitration Association (Regular Track Procedures) or to such other mediation arrangement as the parties mutually agree. No court or other tribunal shall have jurisdiction until the mediation is completed. In any action or proceeding brought against the Building Owner to enforce this Guarantee or to collect costs due hereunder, Johns Manville shall be entitled to recover its reasonable costs, expenses and fees (including expert witness' fees) incurred in any such action or proceeding, including, without limitation, attorneys' fees and expenses, and the Building Owner shall pay it.

TO THE FULLEST EXTENT PERMITTED BY LAW, JM DISCLAIMS ANY IMPLIED WARRANTY, INCLUDING THE WARRANTY OF MERCHANTABILITY AND THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, AND LIMITS SUCH WARRANTY TO THE DURATION AND TO THE EXTENT OF THE EXPRESS WARRANTY CONTAINED IN THIS GUARANTEE.

THE EXCLUSIVE RESPONSIBILITY AND LIABILITY OF JM UNDER THIS GUARANTEE IS TO MAKE REPAIRS NECESSARY TO MAINTAIN THE ROOFING SYSTEM IN A WATERTIGHT CONDITION IN ACCORDANCE WITH THE OBLIGATIONS OF JM UNDER THIS GUARANTEE. JM AND ITS AFFILIATES WILL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES TO THE BUILDING STRUCTURE (UPON WHICH THE ROOFING SYSTEM IS AFFIXED) OR ITS CONTENTS AND OR OCCUPANTS, LOSS OF TIME OR PROFITS OR ANY INCONVENIENCE, INJURY. JM SHALL NOT BE LIABLE FOR ANY CLAIM MADE AGAINST THE BUILDING OWNER BY ANY THIRD PARTY AND THE BUILDING OWNER SHALL INDEMNIFY AND DEFEND JM AGAINST ANY CLAIM BROUGHT BY ANY THIRD PARTY AGAINST JM RELATING TO OR ARISING OUT OF THE ROOFING SYSTEM OR JM'S OBLIGATIONS UNDER THIS GUARANTEE. JM AND ITS AFFILIATES SHALL NOT BE LIABLE FOR ANY DAMAGES WHICH ARE BASED UPON NEGLIGENCE, BREACH OF WARRANTY, STRICT LIABILITY OR ANY OTHER THEORY OF LIABILITY OTHER THAN THE EXCLUSIVE LIABILITY SET FORTH IN THIS GUARANTEE. THIS GUARANTEE DOES NOT COVER, AND EXPLICITLY EXCLUDES, ANY AND ALL INJURIES, CLAIMS AND/OR DAMAGES RESULTING, IN WHOLE OR IN PART, FROM ANY WATER ENTRY FROM ANY PORTION OF THE BUILDING STRUCTURE INCLUDING, BUT NOT LIMITED TO, THE ROOFING SYSTEM.

No one is authorized to change, alter, or modify the provision of this Guarantee other than the Regional Service Manager, or authorized delegate. JM's delay or failure in enforcing the terms and conditions contained in this Guarantee shall not operate as a waiver of such terms and conditions. This Guarantee is solely for the benefit of the Building Owner identified above and Building Owner's rights hereunder are not assignable. Upon sale or other transfer of the Building, Building Owner may request transfer of this Guarantee to the new owner, and JM will transfer this Guarantee, only after completing JM's transfer requirements including JM receiving satisfactory information and payment of a transfer fee, which must be paid no later than 30 days after the date of Building ownership transfer.

In the event JM pays for repairs which are required due to the acts or omissions of others, JM shall be subrogated to all rights of recovery of the Building Owner to the extent of the amount of the repairs.

Because JM does not practice Engineering or Architecture, neither the issuance of this Guarantee nor any review of the Building's construction or inspection of roof plans (or the Building's roof deck) by JM representatives shall constitute any warranty by JM of such plans, specifications, and construction or in any way constitute an extension of the terms and conditions of this Guarantee. Any roof inspections are solely for the benefit of JM.

JM does not supervise nor is it responsible for a roofing contractor's work except to the extent stated herein, and roofing contractors are not agents of JM.

*JOHNS MANVILLE ("JM") is a Delaware corporation.

This guarantee has been amended to include wind speeds up to 72 mph under the terms and conditions herein.

SAMPLE ONLY – NOT ISSUED

By: Joseph Smith
Title: President Roofing Systems

Addendum(s)

Maintenance Program

The following Maintenance Program is recommended and should be implemented and followed:

1. Building Owner must notify JM's Owner Services Group (see below) immediately upon discovery of the leak and in no event later than thirty (30) days after initial discovery of the leak, time being of the essence. Failure of the Building Owner to provide timely notice to JM Guarantee Services of any leak is a material ground for termination of the Guarantee.

2. In response to timely notice, JM will arrange to inspect the Roofing System, and
   (i) If, in JM's opinion, the leak(s) is/are the responsibility of JM under this Guarantee (see Limitations and Exclusions), then JM will take prompt appropriate action to return the Roofing system to a watertight condition, or
   (ii) If, in JM's opinion, the leak(s) is/are not the responsibility of JM under this Guarantee, then JM will advise the Building Owner within a reasonable time of the minimum repairs that JM believes are required to return the Roofing System to a watertight condition. If the Building Owner, at his expense, promptly and timely makes such repairs to the Roofing System (time being of the essence) then this Guarantee will remain in effect for the unexpired portion of its Term. Failure to make any of these repairs in a timely and reasonable fashion will void any further obligation of JM under this Guarantee as to the damaged portion of the Roofing System as well as any other areas of the Roofing System impacted by such failure.

3. In the event an emergency condition exists which requires immediate repair to avoid damage to the Building, its contents or occupants, then Building Owner may make reasonable, essential temporary repairs. JM will reimburse Building Owner for those reasonable repair expenses only to the extent such expenses would have been the responsibility of JM under the Guarantee.

There are a number of items not covered by this Guarantee that are the sole, exclusive responsibility of the Building Owner. In order to ensure that your new roof will continue to perform its function and to continue JM's obligations under the Guarantee, you should examine and maintain the items below on a regular basis. All damage or leak investigation findings that are the direct result of non-covered maintenance items are the sole responsibility of the owner.

- Maintain a file for your records on this Roofing System, including, but not limited to, this Guarantee, invoices, and subsequent logs of all inspections performed and repairs that are made to the Roofing System.
- Inspect your Roofing System at least semi-annually. This is best done in the spring, after the Roofing System has been exposed to the harsh winter conditions, and, in the Fall after a long hot summer. It is also a good idea to examine the Roofing System for damage after severe weather conditions such as hailstorms, heavy rains, high winds, etc.
- Since these types of Roofing Systems typically have a low slope, they are easily examined. However, care must be taken to prevent falling and other accidents. JM expressly disclaims and assumes no liability for any inspections performed on the Roofing System.

When checking the Roofing System:

- Remove any debris such as leaves, small branches, dirt, rocks, etc. that have accumulated.
- Clean gutters, down spouts, drains and the surrounding areas. Make certain they allow water to flow off the Roofing System. Positive drainage is essential.
- Examine all metal flashings for rust and damage that may have been caused by wind or traffic on the Roofing System, and make certain they are well attached and sealed. Any damaged materials due to foot traffic or service work, loose clamps at penetrations, or poorly sealed materials at drains or penetrations pockets must be repaired by a JM Approved Roofing Contractor only.
- Examine the areas that abut the Roofing System. Damaged masonry, poorly mounted counter flashing, loose caulking, bad mortar joints, and any loose stone or tile coping can appear to be a membrane leak. Have these items repaired if found to be defective.
- Examine the edges of the Roofing System. Wind damage often occurs in these areas. Materials that have been lifted by the wind need to be corrected by a JM Approved Roofing Contractor.
- Examine any roof top equipment such as air conditioners, evaporative coolers, antennas, etc. Make certain they do not move excessively or cause a roof problem by leaking materials onto the Roofing System.
- Check the building exterior for settlement or movement. Structural movement can cause cracks and other problems which in turn may lead to leaks in your Roofing System.
- Examine protective coatings; any cracked, flaking, or blistered areas must be recoated.

Protecting your investment:

- Avoid unnecessary roof top traffic.
- If you allow equipment servicemen to go onto the Roofing System, advise them to be careful. Dropped tools, heavy equipment, etc. can damage the membrane. It is recommended to keep a log of all such trips to the Roofing System.
- Do not allow service personnel to make penetrations into the Roofing System; these are to be made only by a JM Approved Roofing Contractor.

All the terms and conditions of this Guarantee shall be construed under the internal law of the state of Colorado without regard to its conflicts of law principles. Invalidity or unenforceability of any provisions herein shall not affect the validity or enforceability of any other provision which shall remain in full force and effect to the extent the main intent of the document is preserved.

This form is not to be copied or reproduced in any manner. This Guarantee is valid only in the United States of America.

Owner Services Group
(800) 922-5922
E-mail: OwnerServices@jm.com
www.jm.com/roofing