# 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**

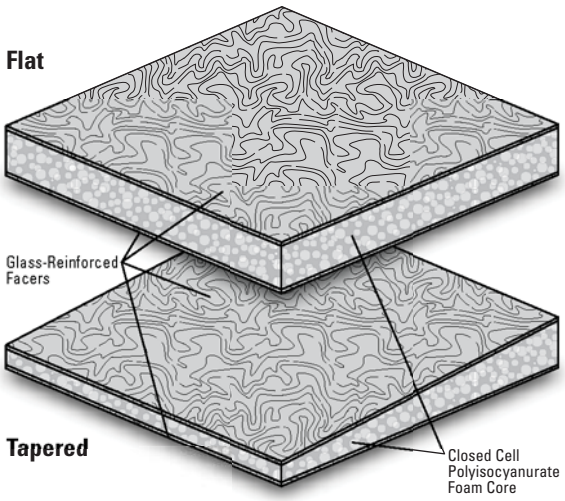
**Grade 3 (25 psi)**

- **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 | CA | HW | HA | CA | HW | SA |
| | *Compatible with the selected Multi-Ply systems above* | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Single Ply | TPO | | PVC | | EPDM | | |
| | MF | FA | MF | FA | MF | FA | BA |
| | *Compatible with all Single Ply systems* | | | | | | |

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

## 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

Refer to the Safe for Use instructions and product label prior to using this product. The Safe for Use instructions are available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

Note: Technical information on this data sheet is intended to be used as a general guideline only and is subject to change without notice. Contact your JM Sales Representative for further details.

## 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<br>Hazleton, PA | Cornwall, ONT<br>Jacksonville, FL | Fernley, NV |
| Stocking Locations[3] | Grand Prairie, TX | Southgate, CA | Tracy, CA |

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 and special order 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.
3. Not all sizes, thicknesses, and products are stocked at all locations, please call Customer Service at 1-877-766-3295.

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, 57.2 ng/(Pa•s•m$^2$) *(nom)*, 1.5 perm, 85.8 ng/(Pa•s•m$^2$) *(max)* |
| | 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 | | |
| 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 | 20 | 320 | 640 | | |
| 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) LAYERS | |
| 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 | 48 | 24 |
| 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.

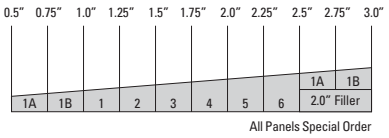
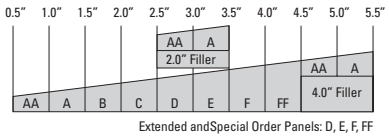
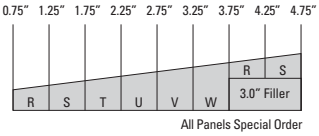
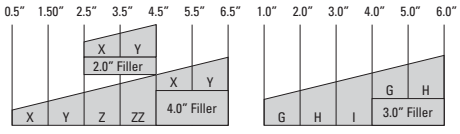
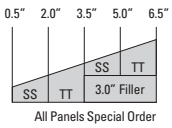
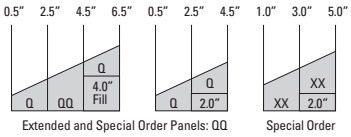
Refer to the Safe for Use instructions and product label prior to using this product. The Safe for Use instructions are available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

# 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 | 416 | 676 | |
| 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 andSpecial 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 |   All Panels Special Order |
| FF | 1/8 | 4 | 4.5 | 25.3 | 10 | 160 | 680 | |
| R | 1/8 | 0.75 | 1.25 | 5.7 | 44 | 704 | 704 | |
| 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 | All Panels Special Order All Panels Special Order |
| 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 | |
| KK | 3/16 | 1.25 | 2 | 9.3 | 28 | 448 | 728 | |
| JJ | 3/16 | 0.5 | 1.25 | 5.0 | 52 | 832 | 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 | 30 | 480 | 720 |   Extended and Special Order Panels: Z, ZZ All Panels Special Order |
| H | 1/4 | 2 | 3 | 14.4 | 16 | 256 | 640 | |
| 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 |   All Panels Special Order |
| 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 |   Extended and Special Order Panels: QQ Special Order |
| QQ | 1/2 | 2.5 | 4.5 | 20.5 | 12 | 192 | 672 | |
| XX | 1/2 | 1 | 3 | 11.4 | 22 | 352 | 704 | |

## 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.

Refer to the Safe for Use instructions and product label prior to using this product. The Safe for Use instructions are available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

## SECTION 0. GENERAL INFORMATION

This item meets the definition of article in the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

## SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

| | | |
|---|---|---|
| Trade name | : | ENRGY 3®.E |
| Chemical nature | : | Under certain conditions, such as cutting or sawing, product may release article components. Consult Section 8 for occupational exposure limits. |

Manufacturer or supplier's details

| | | |
|---|---|---|
| Company | : | Johns Manville |
| Address | : | P.O. Box 5108<br>Denver, CO USA 80127 |
| Telephone | : | 303-978-2000 8:00AM-5:00PM M-F |
| Emergency telephone number | : | 1-800-424-9300 (Chemtrec, in English) |
| Prepared by | : | productsafety@jm.com |

## SECTION 2. HAZARDS IDENTIFICATION

### GHS Classification

Not a hazardous substance or mixture.

### Label elements

Not a hazardous substance or mixture.

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

### Hazardous components

Non hazardous as per 29 CFR 1910.1200, when used as intended.

### Article Components

| Chemical Name | CAS-No. | Concentration (%) |
|---|---|---|
| Polyisocyanurate | 9063-78-9 | 71 % |
| cellulose fiber | 9004-34-6 | 21 % |
| Pentane isomers | | 5 % |
| Continuous Filament Glass Fibers | | 3 % |

## SECTION 4. FIRST AID MEASURES

| | | |
|---|---|---|
| If inhaled | : | If unconscious place in recovery position and seek medical advice. |

If symptoms persist, call a physician.

| | | |
|---|---|---|
| In case of eye contact | : | Remove contact lenses.<br>Protect unharmed eye.<br>If eye irritation persists, consult a specialist.<br>Rinse with water. |
| If swallowed | : | Keep respiratory tract clear.<br>Never give anything by mouth to an unconscious person.<br>If symptoms persist, call a physician. |
| Protection of first-aiders | : | Do not leave the victim unattended. |

## SECTION 5. FIREFIGHTING MEASURES

| | | |
|---|---|---|
| Hazardous combustion products | : | No hazardous combustion products are known |
| Specific extinguishing methods | : | Standard procedure for chemical fires. |
| Special protective equipment for firefighters | : | Wear self contained breathing apparatus for fire fighting if necessary. |

## SECTION 6. ACCIDENTAL RELEASE MEASURES

| | | |
|---|---|---|
| Personal precautions, protective equipment and emergency procedures | : | Avoid dust formation. |
| Methods and materials for containment and cleaning up | : | Pick up and arrange disposal without creating dust.<br>Sweep up and shovel.<br>Keep in suitable, closed containers for disposal. |

## SECTION 7. HANDLING AND STORAGE

| | | |
|---|---|---|
| Advice on safe handling | : | For personal protection see section 8.<br>Smoking, eating and drinking should be prohibited in the application area. |
| Conditions for safe storage | : | Keep in a dry, cool place. |

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Components with workplace control parameters**

| Components | CAS-No. | Form of | Permissible | Basis<br>Update |
|---|---|---|---|---|

| | | exposure | concentration | |
|---|---|---|---|---|
| cellulose fiber | 9004-34-6 | TWA | 10 mg/m3 | ACGIH (2007-01-01) |
| | | TWA (Respirable) | 5 mg/m3 | NIOSH REL (2005-09-01) |
| | | TWA (total) | 10 mg/m3 | NIOSH REL (2005-09-01) |
| | | TWA (total dust) | 15 mg/m3 | OSHA (2007-01-01) |
| | | TWA (respirable fraction) | 5 mg/m3 | OSHA (2007-01-01) |
| | | TWA (Total) | 15 mg/m3 | OSHA (1989-01-19) |
| | | TWA (Respirable fraction) | 5 mg/m3 | OSHA (1989-01-19) |
| Pentane isomers | | TWA | 600 ppm | ACGIH (2007) |
| Continuous Filament Glass Fibers | | TWA (Total dust) | 10 mg/m3 | ACGIH (2010-03-01) |
| | | TWA (Total dust) | 15 mg/m3 | OSHA |
| | | TWA (Respirable dust) | 5 mg/m3 | OSHA |
| | | TWA (Respirable dust) | 5 mg/m3 | ACGIH |

*Any OSHA PELs with Issue Date 1989: Vacated by court of appeals in 1992.

**Personal protective equipment**

Respiratory protection : No personal respiratory protective equipment normally required.

Hand protection
Remarks : For prolonged or repeated contact use protective gloves.

Eye protection : Safety glasses

Skin and body protection : If used and stored as directed, no special protective equipment is necessary.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.
Written instructions for handling must be available at the work place.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : FOAM, BOARD

| | | |
|---|---|---|
| Colour | : | tan |
| Odour | : | odourless |
| Odour Threshold | : | not applicable |
| pH | : | not applicable |
| | : | not applicable |
| | : | not applicable |
| Flash point | : | not applicable |
| Evaporation rate | : | not applicable |
| Upper explosion limit | : | not applicable |
| Lower explosion limit | : | not applicable |
| Relative vapour density | : | not applicable |
| Solubility(ies) | | |
| Water solubility | : | insoluble |
| Viscosity | | |
| Viscosity, dynamic | : | not applicable |
| Viscosity, kinematic | : | not applicable |

## SECTION 10. STABILITY AND REACTIVITY

| | | |
|---|---|---|
| Reactivity | : | No decomposition if stored and applied as directed. |
| Chemical stability | : | No decomposition if stored and applied as directed. |
| Possibility of hazardous reactions | : | Stable under recommended storage conditions. No hazards to be specially mentioned. |
| Conditions to avoid | : | Heat, flames and sparks. |
| Hazardous decomposition products | : | Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke). |

## SECTION 11. TOXICOLOGICAL INFORMATION

This item meets the definition of article in the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**Further information**

no data available

## SECTION 12. ECOLOGICAL INFORMATION

This item meets the definition of article in the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**Further information**

no data available

## SECTION 13. DISPOSAL CONSIDERATIONS

**Disposal methods**

Contaminated packaging : Packaging that can not be reused after cleaning must be disposed or recycled in accordance with all federal, national and local regulations.

## SECTION 14. TRANSPORT INFORMATION

**International transport regulations**

These products are not classified as dangerous goods according to international transport regulations.

## SECTION 15. REGULATORY INFORMATION

**EPCRA - Emergency Planning and Community Right-to-Know Act**

**CERCLA Reportable Quantity**

This material does not contain any components with a CERCLA RQ.

**SARA304 Reportable Quantity**

This material does not contain any components with a section 304 EHS RQ.

**SARA 302** : SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**SARA 313** : SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

**California Prop 65** This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

**The components of this product are reported in the following inventories:**

**TSCA** Listed on TSCA

**DSL** All components of this product are on the Canadian DSL.

## SECTION 16. OTHER INFORMATION

### Further information

Prepared by productsafety@jm.com

The information provided in this Safe Use Instruction is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

CANNONDESIGN

# SUBMITTAL IDENTIFICATION SHEET

**To be completed by Contractor/CM**

WEBSTER UNIVERSITY ISB
PROJECT NAME

8274 BIG BEND BLVD
ADDRESS

NUMBER

WEBSTER UNIVERSITY
OWNER

CANNON DESIGN
ARCHITECT / ENGINEER

DEVIN D GATES
SUBMITTED BY

075323-001
CONTRACTOR / CM SUBMITTAL NO.

CANNON DESIGN SUBMITTAL NO.

DRAWING / DETAIL REFERENCE

075323
SPECIFICATION SECTION / PARAGRAPH

MANUFACTURER / SUPPLIER

ITEM / PRODUCT ID

REQUIRED DATE

PRIORITY

CRITICAL

ITEM BEING SUBMITTED (check only one)

- ○ Shop Drawings
- ○ Samples ( _____ copies)
- ○ LEED Submittal
- ○ Certification / Qualifications
- ○ Record Documents
- ○ Product Data
- ○ Coordination Drawing
- ○ Calculations
- ○ Schedules
- ○ O&M Manuals
- ○ Other _____

ITEM BEING SUBMITTED FOR (check only one)

○ Action ○ Information Only ○ Record

REMARKS OR DEVIATIONS

Email correspondence with KWA provided clarifications for requested information and warranty letter attached.

CONTRACTOR / CM CERTIFICATION
(SUBMITTALS NOT CERTIFIED WILL BE RETURNED WITHOUT REVIEW)

PARIC

PARIC CORPORATION
SUBMITTAL STAMP

THIS SHOP DRAWING HAS BEEN REVIEWED BY PARIC CORPORATION

Subcontractor remains responsible for dimensions, quantities, coordination with other trades and compliance with contract documents.

By:
Devin D. Gates

DEVIN D GATES — 10/11/16
REVIEWED BY — DATE

**To be completed by Reviewer**

07 5323-001 REV002
CANNON DESIGN SUBMITTAL NUMBER

10/11/16
RECEIVED DATE

- ○ A. No Exceptions Taken
  No further review of submittal is required.
- ● B. Make Corrections Noted
  Incorporate corrections in work; resubmission is not required.
- ○ C. Revise and Resubmit
  Revise as noted, and resubmit for review.
- ○ D. Rejected
  Submittal is not in compliance with Contract Documents; provide new submittal.
- ○ E. For Record / Information Only
  Submittal was reviewed for Record / Information purposes only.
- ○ F. Not Required for Review
  Submittal is not required by Contract Documents and has not been reviewed.

Review is for conformance with the design concept of this project and for general compliance with contract documents. Contractor is responsible for quantities, dimensions and compliance with contract documents and for information that pertains to fabrication processes, construction techniques and coordination of this work with all trades which will be af
This review is null and void if submittal deviates from contra
and does not indicate or note deviations.

A/E COMMENTS ○ See attached sheet(s) for additional comments

Final warranty must meet specification section 1.10. 2. requirements: wind speed coverage of that indicated on structural drawings (90 mph minimum), hail coverage for up to 2 inch diameter, and accidental puncture coverage of 16 man hours per year of warranty.

see comments below

Kathy Williams — 10/11/16
REVIEWED BY — DATE

## Gates, Devin

**From:** Scott Klingsick <scott@kwastl.com>
**Sent:** Friday, October 07, 2016 7:00 AM
**To:** Gates, Devin
**Cc:** kpatel@cannondesign.com
**Subject:** RE: Clarifications on returned EPDM shop drawings

**Follow Up Flag:** Follow up
**Flag Status:** Flagged

Yes this will be acceptable. We need the rest of the information revised and it to be resubmitted so we can approve submittal 075323-001. Thanks

**Scott Klingsick,** LEED Green Associate
Project Manager
9721 Litzsinger Rd.
St. Louis, MO 63124
(p) 314.962.2560 (f) 314.962.4057
scott@kwastl.com

KWA architecture / landscape architecture / interiors
KWA Architects

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---

**From:** Gates, Devin [mailto:ddgates@paric.com]
**Sent:** Thursday, October 06, 2016 4:59 PM
**To:** Scott Klingsick
**Cc:** kpatel@cannondesign.com
**Subject:** RE: Clarifications on returned EPDM shop drawings

Kelvin/Scott,

Were you able to take a look at this and does this resolve the impact resistance needs? I can resubmit formally as needed but with the back and forth I wanted to ensure we are all on the same page.

Thanks,

DEVIN GATES
SENIOR PROJECT ENGINEER

**Cell:** 314-348-8828
**Main:** 636-561-9500

- - - - - -
77 Westport Plaza, Suite 250
St. Louis, MO 63146

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**From:** Aaron Hammerstone [mailto:aaron.hammerstone@kirberg.com]
**Sent:** Tuesday, October 04, 2016 7:10 AM
**To:** Gates, Devin; scott@kwastl.com
**Cc:** kpatel@cannondesign.com
**Subject:** FW: Clarifications on returned EPDM shop drawings

All,

Please see the two attachments, as well as the information in the below email in regards to the ASTM testing on JM EPDM membrane.

Thanks

---

**Aaron Hammerstone | Project Manager**

314.333.4710 Direct | aaron.hammerstone@kirberg.com

314.792.3777 Mobile

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---

**From:** Mark Tucker [mailto:Mark@D7Reps.com]
**Sent:** Monday, October 03, 2016 4:12 PM
**To:** Aaron Hammerstone

**Cc:** James Nunns; zac.stallings@jm.com; Jim Schriefer
**Subject:** RE: Clarifications on returned EPDM shop drawings

Aaron,

This JM EPDM 90NR data sheet shows we meet ASTM 4637 for EPDM. It's the same testing All EPDM is to meet, requiring minimum test results for numerous categories. There are three major manufacturers of EPDM: Johns Manville, Firestone, and Carlisle. NOTE: of the three, the latter two, have private label products, targeting a different market segment of contractors. The 3 major manufacturers are also, the only three members of the EPDM Roofing Association (ERA): http://www.epdmroofs.org/about-era/members . The goal of this organization is collectively establish current and accurate data documenting of EPDM. http://www.epdmroofs.org/about-era/who-we-are .

Inside of **ASTM D 4637**, are individual tests for certain criteria. As a whole, make up ASTM D 4637.
Of which include the following:
**ASTM D 5635 – Dynamic Puncture Resistance, 5J, Type 1 – Passes**
**ASTM D 5602 Static Puncture Resistance, 44.1 lbf, Type 1 – Passes**

There are only two hail tests for the Single Ply Membranes (according to Jim D. Koontz- Crenshaw and Koontz). Of which, the one most recognized, is FM's test, for approved Roof Nav assemblies per FM 4470.
For this project, we supplied the following two FM Nav #'s:

Assembly Properties

| | | | |
|---|---|---|---|
| Assembly #: | **392147-0-0** | Slope: | 1.0000 |
| Roof System: | Single-Ply System | Wind Uplift*: | 90 |
| Application: | New Roof | Internal Fire: | 1 |
| Cover Securement: | Adhered | Exterior Fire: | A |
| Deck Type: | Steel | Hail: | SH |
| | For Use With Non-Combustible Walls: | | No |

AND

| | | | |
|---|---|---|---|
| Assembly #: | **374588-0-0** | Slope: | 1.0000 |
| Roof System: | Single-Ply System | Wind Uplift*: | 270 |
| Application: | New Roof | Internal Fire: | NC |
| Cover Securement: | Adhered | Exterior Fire: | A |
| Deck Type: | Structural Concrete | Hail: | SH |
| | For Use With Non-Combustible Walls: | | No |

The roofing specification for this project, states in Part 1, paragraph 1.5, line 3, That the manufacturer must meet "Tested and listed by FM for class specified in "Performance Requirements" Article in Part 2 of this Section". In Part 2, **we met** Part 2, paragraph 2.2, A1. As noted, A2 criteria is for Modified Roofing. As such, A2 should be eliminated from requirements of the submittal, as **Part 2, 2.2, D.2** requires a Hail Resistance: SH. Of which, is met with both of the approved JOHNS MANVILLE Roof Nav Assembly numbers provided.

As for UL 2818, again is not a test used in the Single Ply industry. It is used primarily in the residential steep slope roofing market (shingles, tile, slate, metal roofs). The test requirementfor this, is to test roof slopes at 6" in 12" or greater. This test was a realized in 1996, by Major Property Insurers, the Institute of

Business and Home Safety (IBHS), and with United Laboratory. They developed ASMT 2218, to set a national standard, for roof impact resistance, for the residential steep slope market.

- 
- A scope/ description, for the use of ASTM 2218, from the UL ASTM 2218 web page: http://www.comm-2000.com/ProductDetail.aspx?UniqueKey=20884 click on “scope”.
- 1 Scope

  1.1 This test method provides impact resistance data for the evaluation of prepared roof covering materials. For purposes of this Standard prepared roof covering materials are considered to be small units, sheets or panels designed for installation with multiple layers of such materials installed in **overlapping rows normally on inclines exceeding 25 percent**.

We did a quick research of other manufacturers web sites, and on hand manufacturers data. Not one in the Single Ply manufacturing business, list or utilize the UL 2218 test. In fact, all manufacturers use the same testing, as it relates to the ASTM (see above for Static and Dynamic Puncturing) for that membrane. In this project instance, is EPDM (ASTM D 4637).

It appears to us, that there seems to be a mix of an EPDM specification, and a Modified/ Residential specification.

If this information does not satisfy the needs of the BID Documents, please let me know.

Mark

---

**From:** Aaron Hammerstone [mailto:aaron.hammerstone@kirberg.com]
**Sent:** Friday, September 30, 2016 2:25 PM
**To:** Mark Tucker <Mark@D7Reps.com>
**Subject:** Fwd: Clarifications on returned EPDM shop drawings

Thanks,

Aaron Hammerstone

Project Manager
Kirberg Company
(314)792-3777

Begin forwarded message:

> **From:** Scott Klingsick <scott@kwastl.com>
> **Date:** September 30, 2016 at 2:24:29 PM CDT
> **To:** Aaron Hammerstone <aaron.hammerstone@kirberg.com>, "Gates, Devin" <ddgates@paric.com>
> **Cc:** "Szachnieski, Jason" <JRSzachnieski@paric.com>, Kathy Williams <kathy@kwastl.com>
> **Subject: RE: Clarifications on returned EPDM shop drawings**
>
> Aaron,

Sorry for the confusion. The wrong ASTM number listed in the specification. It should have been ASTM D 4637-08 “Specification for EPDM Sheet Used in Single-ply Roof Membrane” and/or UL 2218 Standard for Impact Resistance of Prepared Roof Covering Materials. We need testing and product data to show compliance with the requirements impact resistance for the hail requirements on this project.

**Scott Klingsick,** LEED Green Associate
Project Manager
9721 Litzsinger Rd.
St. Louis, MO 63124
(p) 314.962.2560 (f) 314.962.4057
scott@kwastl.com

KWA Architects

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---

**From:** Aaron Hammerstone [mailto:aaron.hammerstone@kirberg.com]
**Sent:** Friday, September 30, 2016 12:13 PM
**To:** Gates, Devin; Scott Klingsick
**Cc:** Szachnieski, Jason
**Subject:** Re: Clarifications on returned EPDM shop drawings

ASTM D 3746 is for bituminous roofing. ASTM D 4272 is for plastic films.

This is an EPDM roof system. I think I'm missing something here.

Thanks,

Aaron Hammerstone

Project Manager
Kirberg Company
(314)792-3777

On Sep 30, 2016, at 11:26 AM, Gates, Devin <ddgates@paric.com> wrote:

> Aaron,
>
> See convo below regarding the shop drawing markups.
>
> DEVIN GATES
> SENIOR PROJECT ENGINEER
>
> **Direct:** 636-561-9592
> **Main:** 636-561-9500

**Cell:** 314-348-8828
- - - - - -
77 Westport Plaza, Suite 250
St. Louis, MO 63146

Sent from my iPhone

Begin forwarded message:

> **From:** "Patel, Kelvin" <kpatel@CANNONDESIGN.COM>
> **Date:** September 30, 2016 at 11:21:32 AM CDT
> **To:** "Gates, Devin" <ddgates@paric.com>, "Szachnieski, Jason" <JRSzachnieski@paric.com>
> **Cc:** "Grossman, Lynn" <lgrossman@CANNONDESIGN.COM>
> **Subject: FW: Clarifications on returned EPDM shop drawings**
>
> Devin,
>
> See clarification from KWA below.
>
> Thanks,
>
> Kelvin Patel, CDT, LEED AP BD+C
> Associate
> T 314.425.8756
>
> ---
>
> **From:** Scott Klingsick [mailto:scott@kwastl.com]
> **Sent:** Friday, September 30, 2016 11:13 AM
> **To:** Patel, Kelvin <kpatel@CANNONDESIGN.COM>; Kathy Williams <kathy@kwastl.com>
> **Cc:** Grossman, Lynn <lgrossman@CANNONDESIGN.COM>
> **Subject:** RE: Clarifications on returned EPDM shop drawings
>
> Kelvin,
>
> It is fine to show the building taller than 60' information. We do need submittal for the 2.2 A.2. Impact Resistance: Test reports and product data showing compliance with ASTM D 3746 or ASTM D 4272. Thanks
>
> **Scott Klingsick,** LEED Green Associate
> Project Manager
> 9721 Litzsinger Rd.
> St. Louis, MO 63124
> (p) 314.962.2560 (f) 314.962.4057
> scott@kwastl.com

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---

**From:** Patel, Kelvin [mailto:kpatel@CANNONDESIGN.COM]
**Sent:** Thursday, September 29, 2016 1:14 PM
**To:** Scott Klingsick; Kathy Williams
**Cc:** Grossman, Lynn
**Subject:** FW: Clarifications on returned EPDM shop drawings

Kathy / Scott,

Please review Paric's questions and provide comments.

Thanks,

Kelvin Patel, CDT, LEED AP BD+C
Associate
T 314.425.8756

---

**From:** Gates, Devin [mailto:ddgates@paric.com]
**Sent:** Thursday, September 29, 2016 1:04 PM
**To:** Patel, Kelvin <kpatel@CANNONDESIGN.COM>
**Cc:** Szachnieski, Jason <JRSzachnieski@paric.com>
**Subject:** Clarifications on returned EPDM shop drawings

Kelvin,

I have a couple of clarifications on two items from the attached rejected submittal.

1. On page 3 the perimeter and corner dimensions are crossed out for buildings taller than 60' however this building is higher than 60' in locations, is this note correct?
2. Can you please be more specific on what is being requested in the note "submit information for A2"? Johns Mansville did not feel like any of this section applies to the EPDM roof.

Thank you,

DEVIN GATES
SENIOR PROJECT ENGINEER

**Cell:** 314-348-8828
**Main:** 636-561-9500

- - - - - -

77 Westport Plaza, Suite 250
St. Louis, MO 63146

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