



ECONOMICS



ENVIRONMENT



ENERGY

JM E³co.

The JM Eco-leadership™ Company

The JM Sustainability Advantage



Energy, Environment and Advanced Roofing Engineering

We Created JM E³co. Specifically to Provide Sustainable Solutions

As a Berkshire Hathaway company, we have the strength and stability to invest in the next generation of roofing options. As part of our commitment to an environmentally sound future, we created JM E³co., the eco-leadership™ company.

This new JM endeavor is dedicated to newly emerging roofing technologies that will reduce environmental impact, accelerate energy savings and extend the life cycle of the roof. The JM E³co. mission is to bring our considerable resources to:

- *Reflective “cool” roofing systems*
- *Vegetative roofing systems*
- *Solar solutions*

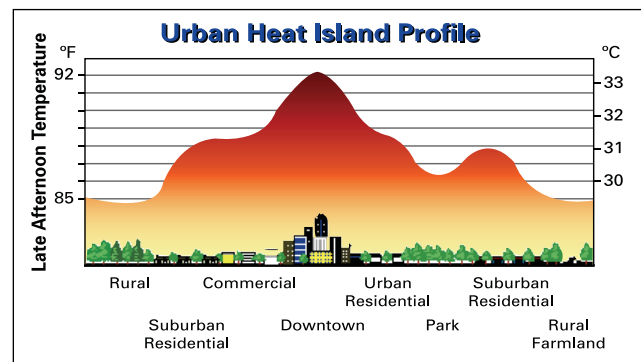
Our fundamental approach is to develop a clear understanding of three critical dimensions: the economic benefits, the positive environmental impact and the energy-saving results. Our goal is to help you achieve a real-world balance across all three elements. Most importantly, since each roof you design or specify is unique, we can help you optimize your choices from a wide range of solutions.

LEED® Eligible and Government Preferred

Choosing a JM roofing system has several additional values. First, our products can help you earn a significant number of LEED (Leadership in Energy and Environmental Design) credits in multiple categories. In fact, using a JM membrane with an SRI (Solar Reflectance Index) of 78 or higher will earn credit SS 7.2 completely. Secondly, for those specifying under a government contract, many of our products may already qualify under the U.S. EPA’s Significant New Alternatives Policy (SNAP) and may allow for easier acceptance under various federal and state procurement regulations such as the U.S. EPA’s Comprehensive Procurement Guidelines (CPG) and California’s South Coast Air Quality Management District (CA SCAQMD).

Reflective “Cool” Roofs Can Save Energy and Costs

Cool roofs represent a critical line of defense against the transfer of heat from the sun to a building’s interior. A highly reflective and emissive roofing surface, combined with proper insulation, can significantly reduce the heat transferred into and/or out of a building, keeping occupants more comfortable year-round, requiring less cooling load in the summer months and reducing peak-period energy demands in urban areas.



Source: Illustration is a composite drawing of data obtained from Southern California Edison Company, Greg Sharp, AIA, IES.

Reflectivity and Emissivity Are the Keys to Cool Roofs

Keeping a roofing surface cool and allowing less heat to penetrate into a building are functions of the reflectivity, emissivity and insulation of a roofing system.

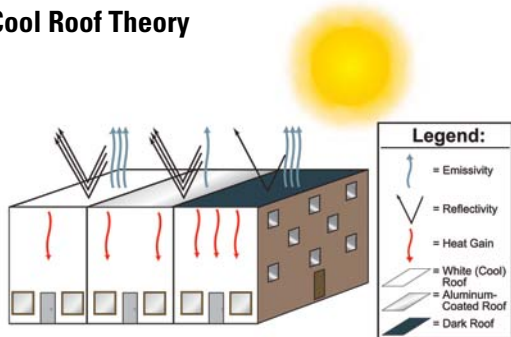
Reflectivity measures the amount of solar energy that is reflected by a surface back into the sky. White membranes have much higher reflectivity than black membranes.

Emissivity refers to a surface’s ability to shed its heat as infrared radiation. High emissivity helps keep surfaces cool. White or black surfaces have similar high emissivity, while a metallic surface has low emissivity and retains its heat for considerable periods.

Reflectivity and emissivity are combined to create a surface’s SRI.



Cool Roof Theory



This simple graphic illustrates the theory of cool roofs. There are many complex and related variables to consider when selecting the correct roofing product for these applications.

JM Provides a Host of Options for Cool Roof Systems

JM features a variety of systems and products that contribute to cool roof solutions.

- Reflective white and light-colored single ply roofing systems.
- Bituminous built-up roofing (BUR) with a GlasKap® CR white cap sheet or TopGard® acrylic coatings.
- SBS (Styrene-Butadiene-Styrene) systems with SBS CR reflective cap sheets or TopGard coatings.

These are just some of the JM products that meet the cool roof standards of every rating system and can help generate significant energy savings in certain ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) climate zones.

JM Meets the Important Criteria for Sustainable Roofing Systems

A LEED Designation Can Enhance Your Building and Your Reputation

The U.S. and Canada Green Building Councils' (USGBC and CaGBC) LEED Rating Systems recognize the design and construction of energy-efficient, environmentally responsible buildings. Points are earned in seven different categories, with totals leading to four levels of certification.

A LEED-certified building may provide a better working environment and costs less to operate. In many states, LEED certification is required for municipal construction projects, and many branches of the federal government also encourage LEED certification for their projects. In addition, more and more companies and consumers prefer to do business with organizations that demonstrate a concern for the environment. A LEED designation for your building is a clear symbol that you support sustainability goals.

At JM, we understand that following the accreditation process can be complicated. That is why we make product information such as recycled content, energy performance, solar reflectance index, stormwater control, renewable energy, plus rapidly renewable and/or VOC content easily accessible. We have LEED-knowledgeable engineers on staff to assist roofing system project designers. Working with JM can give you a competitive edge in designing for corporations, universities and government agencies seeking energy-efficient, green buildings.

ENERGY STAR® Identifies and Promotes Energy-Efficient Products

The U.S. EPA's ENERGY STAR program specifically identifies roofing products that promote energy efficiency by meeting certain performance standards.

Recognizing these products helps roof owners and designers know that they are using components that will increase building comfort and reduce operating costs, as well as comply with mandatory standards or rating systems.

With their high reflective properties that help improve the energy efficiency of buildings, a list of JM roofing products that have earned the ENERGY STAR label includes but is not limited to:

- JM TPO white single ply roofing systems: help secure heat island credits with systems that have ENERGY STAR ratings and high emissivity ratings.
- TopGard 4000 and TopGard 5000 acrylic coatings: to secure heat island and energy-performance credits with systems that have ENERGY STAR ratings and high emissivity ratings.
- GlasKap CR BUR and SBS CR reflective cap sheets.

How JM Systems Can Qualify for LEED Points

Below are scenarios of JM cool roof options and the LEED credits that can be earned based on the specific products that are selected.

	Points					
Sustainable Sites Credit 5.1 Site Development – Protect or Restore Habitat <i>restore or protect ≥ 20% of total site area with native or adaptive vegetation</i>	1	<u>Vegetated Roof</u> extensive				
Sustainable Sites Credit 5.2 Site Development – Maximize Open Space <i>vegetated open space exceeds local zoning requirements by 25% or vegetated open space equals 20% of project site area</i>	1	<u>Vegetated Roof</u> extensive				
Sustainable Sites Credit 6.1 Stormwater Design – Quantity Control <i>postdevelopment peak discharge rates & quantities < pre-development levels or 25% decrease in stormwater runoff volume</i>	1	<u>Vegetated Roof</u> extensive				
Sustainable Sites Credit 6.2 Stormwater Design – Quality Control <i>reduce impervious surfaces, increase infiltration/capture, and treat stormwater runoff</i>	1	<u>Vegetated Roof</u> extensive				
Sustainable Sites Credit 7.1 Heat Island Effect – Nonroof <i>≥ 50% of parking spaces under roof with a SRI¹ ≥ 29, vegetated, or contains solar panels</i>	1	TPO 101	Glaskap CR 93	DynaWeld FR CR 92	<u>Vegetated Roof</u> extensive	Renewable Energy photovoltaics
Sustainable Sites Credit 7.2 Heat Island Effect – Roof <i>≥ 75% of roof uses low-slope roof materials with a SRI¹ ≥ 78 or ≥ 50% of roof covered by vegetation</i>	1	TPO 101	Glaskap CR 93	DynaWeld FR CR 92	<u>Vegetated Roof</u> extensive	
Energy & Atmosphere Prerequisite 2 Minimum Energy Performance <i>design building to comply with ASHRAE 90.1-2007 section 5.4²</i>	required	<u>1/4" Invinsa</u> R-1.0	<u>1/2" DuraBoard</u> R-1.2	<u>3/4" Fesco</u> R-2.1	<u>2" ENRGY 3 (x2)</u> R-24.2	
Energy & Atmosphere Credit 1 Optimize Energy Performance <i>increase level of energy performance versus Energy & Atmosphere Prerequisite 2</i>	1-19	<u>1/4" Invinsa</u> R-1.0	<u>1/2" DuraBoard</u> R-1.2	<u>3/4" Fesco</u> R-2.1	<u>2" ENRGY 3 (x2)</u> R-24.2	
Energy & Atmosphere Credit 2 On-site Renewable Energy <i>on-site renewable energy systems to offset building's energy costs</i>	1-7	<u>Renewable Energy</u> photovoltaics				
Materials & Resources Credit 4 Recycled Content <i>10% or 20% recycled content (postconsumer + 1/2 preconsumer) in building materials³</i>	1-2	<u>2" ENRGY 3 (x2)</u> 23.5% total 15% pre 16% post	<u>UltraFast and High Load Fasteners</u> 25% total 0% pre 25% post	<u>3/4" Fesco</u> 32% total 0% pre 32% post	<u>1/2" DuraBoard</u> 37% total 0% pre 37% post	
Materials & Resources Credit 6 Rapidly Renewable Materials <i>2.5% of building products contain rapidly renewable materials³</i>	1	<u>3/4" Fesco</u> 4%	<u>1/2" DuraBoard</u> R-1.2	<u>JM Green Two-Part Urethane Insulation Adhesive</u> 12.5%		
Indoor Environmental Quality Credit 4.1 Low-Emitting Materials – Adhesives and Sealants <i>plastic foam adhesive VOC limit of 50 g/L⁴</i>	1	<u>JM Green Two-Part Urethane Insulation Adhesive</u> < 10 g/L				

1 – SRI = Solar Reflectance Index

2 – minimum R-20 roof insulation in climate zones 2-8

3 – by total value of all building materials used in project, based on cost

4 – comply with California's South Coast Air Quality Management District Rule #1168



Vegetative Roofs Provide a New Roof Utilization

Today many municipalities are beginning to mandate the use of vegetative roofs on many buildings to reduce the environmental impact from stormwater runoff and to reduce carbon emissions.

While the vegetation may take many aesthetically pleasing forms, it is imperative to choose the appropriate roofing system to install underneath a rooftop vegetative system. Johns Manville and JM E³co. can provide the expertise, options and guarantee for your roofing system and overburden, so you can help the environment while benefiting from a visually compelling, protective and high-performance roof.

A Rooftop “Vision of Green” in Louisville, Ky.

A Johns Manville roofing system allowed the American Accident and Life Insurance building to safely and effectively install Kentucky’s largest privately owned vegetative roof system.

Louisville-based American Roofing and Metal specified a JM system with tapered polyisocyanurate insulation, ½"-thick DuraBoard® and a three-ply polymer modified bitumen roof.

This effective JM membrane system supports the multilayered vegetative cover, allowing it to fulfill the cool roof goal of the owner and the vision of the building’s architect, Mies van der Rohe, who saw the building as an extension of the adjacent public park.



Planter Tray w/
Spacer Pads

JM Polyester
Protection Sheet

JM PVC 80 Mil

Invinsa® Roof Board

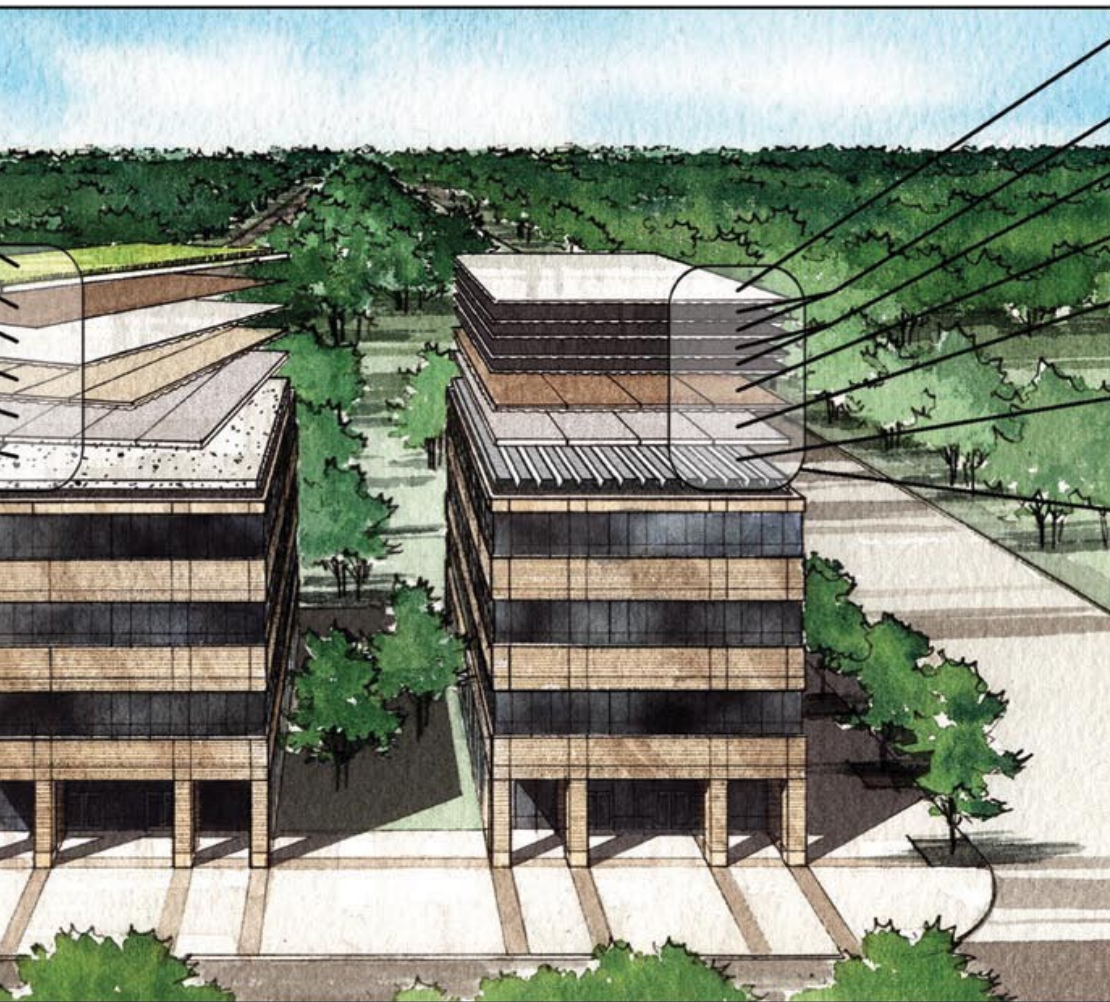
ENRGY 3®
Roof Insulation

Concrete Roof Deck



JM's Commitment to Sustainability

Johns Manville is committed to achieving and maintaining sustainable operations that continue to meet the needs of the current generation of stakeholders without sacrificing the needs of future generations. The company fulfills this commitment by driving sustainability principles within its business culture and decision-making processes and by measuring success more broadly than just the essential financial bottom line; instead, JM judges its overall success by a triple bottom line that includes social and environmental performance along with traditional financial considerations. Through thoughtful incorporation of sustainability principles, the company also ensures full implementation and the proper balance of JM's six fundamental business pillars — *operational excellence, financial strength, environmental respect, customer satisfaction, employee commitment and integrity.*



— GlasKap® CR
Cool Roof Cap Sheet

— GlasyPly® Premier

— GlasyPly® Premier

— Fesco® Roof Board

— ENRGY 3®
Roof Insulation

— Steel Roof Deck





A Photovoltaic Solar Roof Could Significantly Reduce Your Energy Costs

Your roof could become a valuable business asset with either a thin film or crystalline photovoltaic (PV) system that is capable of generating its own energy for your building.

Single-source integration of the roof and PV system is the key to successful installation. JM E³co.'s expertise means we have several solutions for incorporating PV systems into built-up, modified bitumen or single ply roofs. In every case, it is critical that the PV component be integrated into the roof without penetrations or attachments that can compromise the roof integrity. For maximum value, the installed life of the roof should also be at least equal to the life of the PV system.

We would first do a site-specific analysis of your roof, climate and location to determine its energy potential and the protective roof/PV system that is appropriate to your needs.

Plan Your Next Building With JM E³co., the eco-leadership company!





Not Just Products, but Proven, Integrated Systems

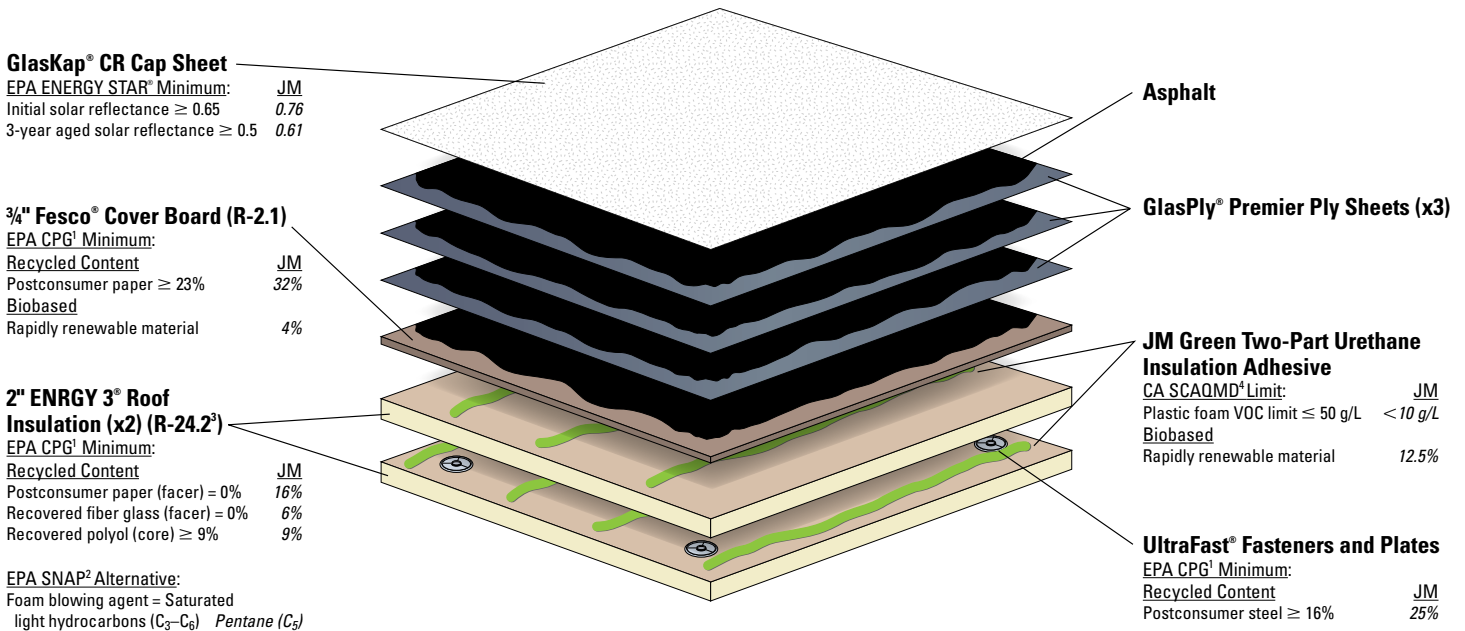
Unlike many manufacturers, JM provides complete, sustainable roofing systems, not just isolated products. That means that the components are designed to fit and function together as an integrated system. You have a single source for technical support, performance responsibility and a guarantee that covers the entire system.

Taken in total, JM systems offer these key sustainable advantages:

- High energy efficiency
- Low VOCs
- Renewable materials
- Recycled content
- No ozone-depleting chemicals
- Durability with longer roof life, guarantees up to 20 years

Here are three examples of JM cool roof systems:

Hot Asphalt Built-Up Roofing System (Specification 4GIC-CR)



¹ CPG = Comprehensive Procurement Guidelines
² SNAP = Significant New Alternatives Policy (ozone-layer-depleting substances)
³ Minimum R20 required by ASHRAE 90.1-2007 in climate zones 2-8
⁴ CA SCAQMD = California's South Coast Air Quality Management District

Peak Advantage® Guarantee up to 20 years

Mechanically Fastened Single Ply Roofing System (Specification ST8RM)

JM TPO Membrane 80 mil White

EPA ENERGY STAR[®] Minimum: JM
 Initial solar reflectance ≥ 0.65 0.78
 3-year aged solar reflectance ≥ 0.5 0.68

1/4" Invinsa[®] Roof Board (R-1.0)

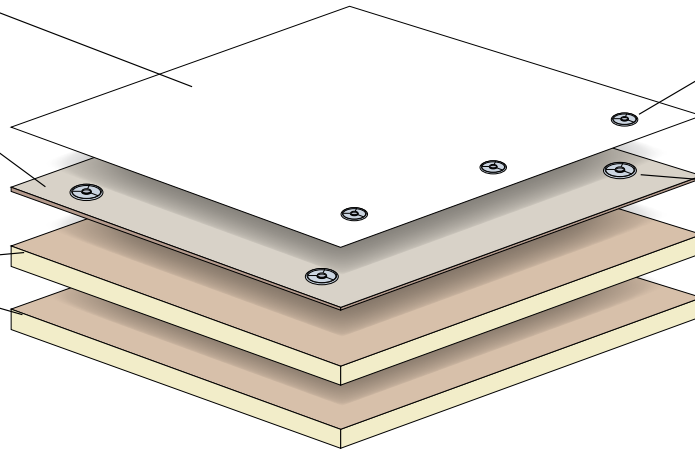
EPA SNAP² Alternative: JM
 Foam blowing agent = Saturated
 light hydrocarbons (C₃-C₆) *Pentane (C₅)*

2" ENRGY 3[®] Roof Insulation (x2) (R-24.2³)

EPA CPG¹ Minimum: JM
Recycled Content
 Postconsumer paper (facers) = 0% 16%
 Recovered fiber glass (facers) = 0% 6%
 Recovered polyol (core) $\geq 9\%$ 9%

EPA SNAP² Alternative:

Foam blowing agent = Saturated
 light hydrocarbons (C₃-C₆) *Pentane (C₅)*



High Load Fasteners and Plates

EPA CPG¹ Minimum: JM
Recycled Content
 Postconsumer steel $\geq 16\%$ 25%

UltraFast[®] Fasteners and Plates

EPA CPG¹ Minimum: JM
Recycled Content
 Postconsumer steel $\geq 16\%$ 25%

¹ CPG = Comprehensive Procurement Guidelines

² SNAP = Significant New Alternatives Policy (ozone-layer-depleting substances)

³ Minimum R20 required by ASHRAE 90.1-2007 in climate zones 2-8

Peak Advantage[®] Guarantee up to 20 years

Modified Bitumen Roofing System (Specification 3FID-HW CR)

DynaWeld[®] FR CR Cap Sheet

EPA ENERGY STAR[®] Minimum: JM
 Initial solar reflectance ≥ 0.65 0.76
 3 year aged solar reflectance ≥ 0.5 0.61

1/2" DuraBoard[®] Cover Board (R-1.2)

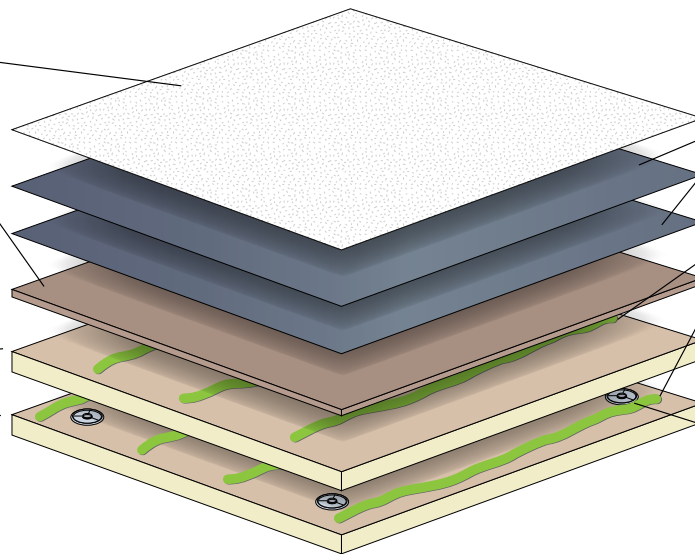
EPA CPG¹ Minimum: JM
Recycled Content
 Postconsumer paper $\geq 23\%$ 37%
Biobased
 Rapidly renewable material 5.5%

2" ENRGY 3[®] Roof Insulation (x2) (R-24.2³)

EPA CPG¹ Minimum: JM
Recycled Content
 Postconsumer paper (facers) = 0% 16%
 Recovered fiber glass (facers) = 0% 6%
 Recovered polyol (core) $\geq 9\%$ 9%

EPA SNAP² Alternative:

Foam blowing agent = Saturated
 light hydrocarbons (C₃-C₆) *Pentane (C₅)*



DynaWeld[®] Base Sheet (x2)

JM Green Two-Part Urethane Insulation Adhesive

CA SCAQMD⁴ Limit: JM
 Plastic foam VOC limit ≤ 50 g/L < 10 g/L
Biobased
 Rapidly renewable material 12.5%

UltraFast[®] Fasteners and Plates

EPA CPG¹ Minimum: JM
Recycled Content
 Postconsumer steel $\geq 16\%$ 25%

¹ CPG = Comprehensive Procurement Guidelines

² SNAP = Significant New Alternatives Policy (ozone-layer-depleting substances)

³ Minimum R20 required by ASHRAE 90.1-2007 in climate zones 2-8

⁴ CA SCAQMD = California's South Coast Air Quality Management District

Peak Advantage[®] Guarantee up to 20 years

PRODUCT WARRANTIES

JM E³co. designs roofing products that work together to provide a one-source comprehensive roofing system solution. Total roofing system guarantees are available. To learn more about our standard guarantee terms and conditions, visit our Web site at www.jm.com/roofing or talk to your local JM E³co. sales representative.

JM guarantees are available only on qualified JM E³co. roofing systems containing JM E³co. roofing products. JM E³co. standard product terms and conditions will apply to all sales, including a one-year limited product warranty and limitation of liability. Limited product warranty and limitation of liability information is available at www.specjm.com/aboutjm.asp.



E C O N O M I C S



E N V I R O N M E N T



E N E R G Y



JM E³ Co.
717 17th St.
Denver, CO 80202
(800) 922-5922
roofingsustainability@jm.com