



Johns Manville

**LEED® VERSION 3 CREDITS GUIDE FOR JM PRODUCTS
NEW CONSTRUCTION AND MAJOR RENOVATION**



Join us in building a more sustainable future.



Products as innovative as your designs.

You want to create sustainable buildings—structures that preserve the natural environment, use less energy, last longer and are more comfortable to be in and around. Perhaps your next project will be certified under the Leadership in Energy and Environmental Design (LEED®) Green Building Rating System™, developed by the U.S. Green Building Council® (USGBC®) and the nationally accepted benchmark for the design, construction and operation of green buildings. We can help.

WHAT IS JM DOING TO HELP YOU BUILD GREEN?

We make roofing systems, thermal and acoustical building and mechanical insulations, interior wall coverings and materials used in carpets, ceiling tiles, and acoustic wall panels and partitions. Many of our products are fundamental to energy efficiency, an aspect of sustainable design that is becoming more and more important as the global demand for energy grows. But we're busy making our products and processes even better—for example using more recycled content and developing formulations that improve indoor air quality.

A BRIEF OVERVIEW OF WHAT WE CONTRIBUTE:

- Cool roofing products that reduce energy costs and mitigate the “heat island” effect of development
- The industry’s first complete line of certified Formaldehyde-free™ fiber glass building insulation that improves indoor air quality while it saves energy and controls sound
- Energy conservation and acoustic comfort solutions for air handling systems and commercial interiors
- Fiber glass building insulation products with a North American average of 25 percent certified recycled glass content
- Research and engineering support in partnership with other building product manufacturers to develop more sustainable, better performing interior finish materials
- Programs that teach architects, specifiers and builders about products and methods that conserve resources, lower costs, enhance the built environment and preserve the natural environment

DEDICATED TO DEVELOPING SUSTAINABLE PRODUCTS.

Our commitment doesn't stop here. As a charter member of USGBC, JM will continue developing better products to help you build green. Think of JM when you think of sustainable building. Together, we're building a greener future.

LEED Version 3 Credit Opportunities

Sustainable Sites	pp 3–4
Energy and Atmosphere	pp 5–6
Materials and Resources	pp 7–9
Innovation and Design	p 10
Indoor Environmental Quality	pp 11–12
Future LEED and Building Science	pp 13–14
Product Descriptions and LEED Credit Opportunities	pp 15–16

For credit opportunities under other LEED programs, contact us at JM.com/buildgreen.

COVER ART AND CASE STUDY

Solano County Government Center (p 4)

U.S. Environmental Protection Agency's Region 8 Headquarters (p 14)

RadioShack Riverfront Campus World Headquarters

Location:

Fort Worth, Texas

LEED certification level:

Silver

Architect:

HKS Inc.

Construction:

The Beck Group

Photograph by:

Blake Marvin, HKS Architecture

Located on 34 acres, the RadioShack Riverfront Campus World Headquarters is one of the largest projects in Texas to qualify for LEED certification. Indoor air quality was a major concern, so the architects used JM Formaldehyde-free™ fiber glass insulation to help minimize the amount of volatile organic compounds and promote the well-being and productivity of employees in the workplace.

Sustainable Sites (LEED v3)

JM IS YOUR PARTNER IN PROTECTING HABITAT AND MAXIMIZING OPEN SPACE.

Use Johns Manville's many roofing products when you need to contribute to Sustainable Sites credits. Whether you are planning a vegetated or reflective roof, we can help you meet regulations, lower building operation costs and achieve environmental goals.

SS Credit 5.1

Site Development: Protect or Restore Habitat

1 Point

Intent:

Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.

Requirements:

Case 2: Use native or adapted vegetation over 50% of the previously developed site area, including vegetated roof surface area

SS Credit 5.2

Site Development: Maximize Open Space

1 Point

Intent:

Provide a high ratio of open space to development footprint to promote biodiversity.

Requirements:

Case 1: Reduce the development footprint and/or provide vegetated open space—exceed local zoning open space requirement by 25% within project boundary

Case 2: Provide vegetated open space adjacent to the building equal to the building footprint

Case 3: Provide vegetated open space equal to 20% of the project's site area

All Cases:

For projects located in urban areas that earn SS Credit 2 (Development Density and Community Connectivity), vegetated roof areas can contribute to credit compliance.

SS Credits 7.1 and 7.2

Heat Island Effect: Non-roof and Roof

1 Point Each

Intent:

Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

Requirements:

SSc7.1

OPTION 2: Place a minimum of 50% of parking spaces under cover (defined as underground, under deck, under roof or under a building); any roof used to shade or cover parking must have a Solar Reflectance Index (SRI) of at least 29, be a vegetated green roof or be covered with solar panels to offset non-renewable resources used

SSc7.2

OPTION 1: Use roofing materials with an SRI of 78 for low-sloped roofs and 29 for steep-sloped roofs on at least 75% of the roof surface. If your roofing materials have a lower SRI than required, use the following formula: $(\text{Area Roof Meeting Minimum SRI} / \text{Total Roof Area}) \times (\text{SRI of Installed Roof} / \text{Required SRI}) \geq 75\%$

OPTION 2: Install a vegetated roof over at least 50% of the roof area

OPTION 3: Install a combination of high albedo and vegetated roof surfaces with the above SRI rating requirements on an area equal to or greater than the total roof area: $(\text{Area Roof Meeting Minimum SRI} / 0.75) + (\text{Area of Vegetated Roof} / 0.5) \geq \text{Total Roof Area}$; low-sloped roof ($\leq 2:12$) must have SRI of at least 78 or steep-sloped roof ($\geq 2:12$) must have SRI of at least 29.

JM Products That Help Earn Sustainable Sites Credits

When used as a part of a vegetated roof system, these JM products contribute to SSc5.1 Protect or Restore Habitat and SSc5.2 Maximize Open Space. And the reflective roofing membranes can be used to earn SSc7.1 Heat Island Effect: Non-roof and SSc7.2 Heat Island Effect: Roof.

Components of Vegetated and Reflective Roofs

½" Retro-Fit™ Board

RetroPlus™ Roof Board

DuraBoard®

ENRGY 3® (ENRGY 3® Foil Faced Roof Insulation, ENRGY 3® Roof Insulation, ENRGY 3® Plus Roof Insulation or ENRGY 3® 25 PSI)

FesCant Plus Cant Strip

Fesco® Board

Fesco® Board HD

Invinsa® Roof Board

Tapered ENRGY 3® Roof Insulation

Tapered Fesco® Board

Tapered Fesco® Edge Strip

Reflective Roofing Membranes

	Solar Reflectance Index
GlasKap® CR	SRI 92
DynaFlex® CR, DynaGlas® FR CR, DynaKap® FR CR, DynaLastic® 180 FR CR, DynaLastic® 250 FR CR, DynaWeld™ Cap FR CR	SRI 92
TRICOR™ M FR CR	SRI 92
JM PVC 50, 60, 60 MIN, 72 MIN, 80 and 80 mil MIN	SRI White 108 SRI Grey ES-80 SRI Sandstone ES-88
JM PVC Fleece Backed 50, 60, 60 MIN, 72 MIN, 80 and 80 mil MIN	SRI White 108 SRI Grey ES-80 SRI Sandstone ES-88
JM TPO 45, 60 and 80 mil, JM TPO FB115™, JM TPO FB135™	SRI 101

Reflective Roof Coatings

TopGard® 4000	SRI 104
TopGard® 5000	SRI 104

Did You Know?

If you're planning a vegetated roof to help earn SSc5.1 and SSc5.2, you can use modular planted trays over JM's built-up and modified bitumen cap sheets. The modular trays make maintenance easy.



CASE STUDY

Building:

Solano County Government Center

Location:

Fairfield, California

LEED certification level:

Certified

Architect:

Kaplan McLaughlin Diaz Architects

Construction:

Clark Design/Build of California, Inc.

Solano County officials knew what they wanted for their new government center—a building constructed with energy-efficient and sustainable materials that were feasible, proven and cost-effective.

They selected a hot-applied Johns Manville four-ply, built-up roof system, GlasKap® CR, that is Title 24-compliant and contributed toward LEED credits. The county and contractor worked with the Johns Manville Tapered Design Center to achieve maximum insulation value and positive drainage over a 64,000-square-foot roofing surface with a variety of configurations.

Energy and Atmosphere (LEED v3)

JM IS YOUR SOURCE FOR PRODUCTS THAT CONSERVE ENERGY.

We are experts in making products that optimize energy efficiency. Look to JM for a wide variety of roofing system, building insulation and mechanical insulation products that will contribute to LEED Energy and Atmosphere points.

EA Prerequisite 2 Minimum Energy Performance

Required

Intent:

Establish the minimum level of energy efficiency for the proposed building and systems to reduce environmental and economic impacts associated with excessive energy use.

Requirements:

- OPTION 1: Whole Building Energy Simulation. Demonstrate a 10% improvement in the proposed building performance rating for new buildings, or a 5% improvement in the proposed building performance rating for major renovations (compared to baseline performance rating). Schools must use EPA's Target Finder Rating Tool.
- OPTION 2: Prescriptive Compliance Path: ASHRAE Advanced Energy Design Guide. Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide appropriate to the project scope and climate zone. Schools must comply with K–12 school buildings criteria.
- OPTION 3: Prescriptive Compliance Path: Advanced Buildings™ Core Performance™ Guide developed by the New Building Institute.

EA Credit 1 Optimize Energy Performance

1–19 Points

Intent:

Achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

Requirements:

- OPTION 1: Whole Building Energy Simulation is performed to determine percentage improvement in the proposed building performance compared to the baseline building performance rating (1–19 for new construction and schools).
- NC and Schools: 12% minimum improvement
 - CS: 8% minimum improvement
- OPTION 2: Comply with ASHRAE Advanced Energy Design Guide appropriate to the project scope. Project scope is based on building size. (1 Point)
- OPTION 3: Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide. (1–3 Points)

EA Credit 2 On-site Renewable Energy (CS-4 points max., NC and Schools-7 points max.)

4–7 Points

Intent:

To encourage and recognize increasing levels of on-site renewable energy self-supply to reduce environmental and economic impacts associated with fossil fuel energy use.

Requirements:

Energy produced by the renewable system is expressed as annual energy savings. Minimum to qualify for NC, Schools and CS is 1% savings.

How do I promote energy efficiency in my building and systems?

Maximizing the R-values of your building insulation, roofing system and mechanical insulation is one of the most cost-effective ways to optimize your building's energy performance.

How do I document the improved energy efficiency of added mechanical insulation?












Exceeding code requirements for mechanical insulations can significantly improve the energy efficiency of buildings. To demonstrate the benefits of added mechanical insulation during LEED certification, you can supplement the Whole Building Energy Simulation with other modeling, like 3E Plus® from the North American Insulation Manufacturers Association (NAIMA).


Energy Consumption Reduction Chart

NC and Schools (%)	Points	CS (%)	Points
12	1	8	3
14	2	10	4
16	3	12	5
18	4	14	6
20	5	16	7
22	6	18	8
24	7	20	9
26	8	22	10
28	9	24	11
30	10	26	12
32	11	28	13
34	12	30	14
36	13	32	15
38	14	34	16
40	15	36	17
42	16	38	18
44	17	40	19
46	18	42	20
48	19	44	21

JM Products That Help Earn Energy and Atmosphere Credits

Using JM products that contribute to a reduced energy load for indoor HVAC equipment can help satisfy Energy and Atmosphere Prerequisite 2 Minimum Energy Performance and help earn EAc1 Optimize Energy Performance.

Building Insulation		Roofing System Products		Mechanical Insulation	
Batt and Roll Insulation		Roof Membranes		Pipe, Tank and Equipment Insulation	
	ComfortTherm® Plastic-wrapped Fiber Glass Insulation Batts and Rolls	GlasKap® CR		Micro-Flex® Large Diameter Pipe & Tank Insulation	
	FSK-25 Faced Fiber Glass Insulation Batts	DynaFlex® CR, DynaGlas® FR CR, DynaKap® FR CR, DynaLastic® 180 FR CR, DynaLastic® 250 FR CR, DynaWeld™ Cap FR CR		Micro-Lok® HP Pipe Insulation	
	Kraft-Faced Fiber Glass Insulation Batts and Rolls	TRICOR™ M FR CR		Micro-Lok® Pipe Insulation	
	MR® Faced Mold- and Mildew-resistant Fiber Glass Insulation Batts	JM PVC* 50, 60, 60 MIN, 72 MIN, 80 and 80 mil MIN		800 Series Spin-Glas® Duct & Equipment Insulation	
	Panel Deck FSK-25 & PSK Faced Fiber Glass Insulation Batts	JM PVC* Fleece Backed 50, 60, 60 MIN, 72 MIN, 80 and 80 mil MIN		1000 Series Spin-Glas® High Temperature Equipment Insulation	
	Unfaced Fiber Glass Insulation Batts and Rolls	JM TPO 45, 60 and 80 mil, JM TPO FB115™, JM TPO FB135™		Insulation for Rectangular Steel Ducts	
Blow-in and Spray-in Insulation		Reflective Roof Coatings		Linacoustic® RC Duct Liner	
	Climate Pro® Loose Fill Fiber Glass Insulation	TopGard® 4000		Linacoustic® HP Duct Liner	
	JM Spider® Spray-in Custom Fiber Glass Insulation and Delivery System	TopGard® 5000		Linacoustic® R-300 Rigid Duct Liner	
Rigid and Semi-rigid Boards and Rolls		Roof Insulations and Cover Boards		LinaTex® Duct Liner	
Insul-SHIELD® FSK-25 & PSK Panel Boards		½" Retro-Fit™ Board		Microlite® Duct Wrap	
Insul-SHIELD® Unfaced Boards		RetroPlus™ Roof Board			
		DuraBoard®		Microlite® XG™ Duct Wrap	
		ENRGY 3® (ENRGY 3® Foil Face Roof Insulation, ENRGY 3® Roof Insulation, ENRGY 3® Plus Roof Insulation or ENRGY 3® 25 PSI)		800 Series Spin-Glas® Duct & Equipment Insulation	
		Fesco® Board		Insulation for Round and Spiral Steel Ducts	
		Fesco® Board HD		Microlite® Duct Wrap	
		Invinsa® Roof Board			
		Tapered ENRGY 3® Roof Insulation		Microlite® XG™ Duct Wrap	
		Tapered Fesco® Board		Spiracoustic Plus™ Duct Liner	
				Self-insulated Duct Products	
					
				EnviroAire™ Duct Board	
				Mat-Faced Micro-Aire® Duct Board	
				SuperDuct® RC Duct Board	

 Certified Formaldehyde-free™ insulation products

*Energy Star compliant grey and sandstone color options available.

Fiber glass is safe.

In October 2001, the World Health Organization’s International Agency for Research on Cancer removed fiber glass insulation from its list of possible carcinogens.* Their action is consistent with the conclusion reached by the U.S. National Academy of Sciences, which in 2000 found “no significant association between fiber exposure and lung cancer or nonmalignant respiratory disease in the MVF [man-made vitreous fiber] manufacturing environment.” Fiber glass is safe for workers who make or install the product when they follow appropriate work practices to avoid temporary mechanical irritation. Fiber glass insulation is one of the most thoroughly tested building materials in use today. Over 50 years of research by government and independent research organizations support the conclusion that fiber glass building insulation is safe for use in your commercial and residential buildings.

*IARC Monograph, Man-Made Vitreous Fibres. International Agency for Research on Cancer, Vol. 81, 23 August 2002. <http://monographs.iarc.fr/ENG/Monographs/vol81/index.php>.

Materials and Resources (LEED v3)

AT JM, WE MAKE IT OUR BUSINESS TO USE RECYCLED CONTENT IN REGIONAL MANUFACTURING FACILITIES ACROSS THE U.S. AND CANADA.

Across our product lines, you'll find we incorporate substantial amounts of post-consumer and pre-consumer recycled content. With 30 manufacturing locations across the United States and Canada, we can help you purchase materials locally. And we use rapidly renewable materials in our innovative woven glass wall coverings.

MR Credit 4 Recycled Content

1–2 Points

Intent:

Increase demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.

Requirements:

Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10% or 20% (based on cost) of the total value of the materials in the project.

10% – 1 Point

20% – 2 Points

Do not include mechanical, electrical and plumbing components or appliances and equipment in the calculation for this credit.*

MR Credit 5 Regional Materials

1–2 Points

Intent:

Increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

Requirements:

Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10% or 20% (based on cost) of the total materials value.

10% – 1 Point

20% – 2 Points

Do not include mechanical, electrical and plumbing components or appliances and equipment in the calculation for this credit.*

Defining "Regional Materials"

To contribute toward Materials and Resources credits under LEED v3, products must be harvested or recovered and manufactured within 500 miles of your project site to be considered a regional material. Contact JM for extraction, processing and manufacturing details on products available near your project site.

Rapidly renewable materials in JM's woven glass wall coverings.

JM's woven glass textiles—Tassoglas[®], Scandatex[®] and Textra[™] wall coverings—are strong, lightweight, decorative wall coverings that contribute to MRc6 because they're made with 15 to 20 percent potato starch, a rapidly renewable material. In addition, about 70 percent of these wall coverings is glass made from sand, an abundant resource that is rapidly replenished. And JM wall coverings are durable—they remain breathable even after several repaintings, they strengthen the walls they cover and they are easy to maintain and repair.



5% Pre-consumer
20% Post-consumer
SCIENTIFIC CERTIFICATION SYSTEMS

SCS Certification applies to all fiber glass products listed in this brochure. See product data sheets for confirmation of SCS Certification.

*LEED Reference Guide for Green Building Design and Construction 2009 Edition.

MR Credit 6 Rapidly Renewable Materials

1 Point

Intent:

Reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with rapidly renewable materials.

Requirements:

























Use rapidly renewable building materials and products (made from plants that are typically harvested within a 10-year cycle or shorter) for 2.5% of the total value of all building materials and products used in the project, based on cost.

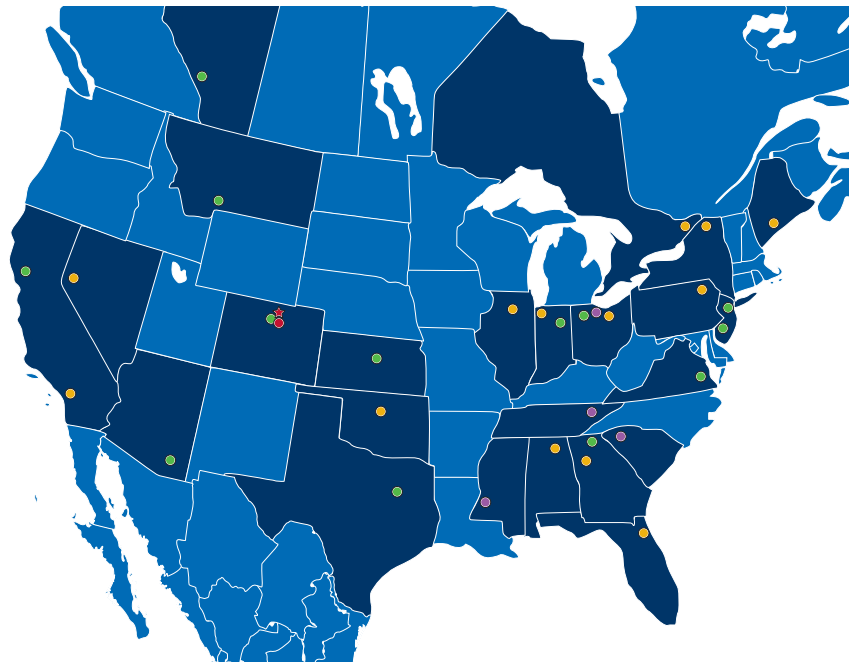
Do not include mechanical, electrical and plumbing components or appliances and equipment in the calculation for this credit.*

*LEED Reference Guide for Green Building Design and Construction 2009 Edition.

Manufacturing Locations

JM products are manufactured at locations across the U.S. and Canada, helping you earn MRc5.









- | | | | | | |
|---|-----------------------------------|---|--------------------|---|-------------------|
|  | Insulation Systems |  | Scottsboro, AL |  | Lewiston, ME |
|  | Roofing Systems |  | Tucson, AZ |  | Richland, MS |
|  | Engineered Products North America |  | South Gate, CA |  | Belgrade, MT |
|  | World Headquarters |  | Willows, CA |  | Edison, NJ |
|  | Technical Center |  | Cornwall, Canada |  | Penbryn, NJ |
| | |  | Innisfail, Canada |  | Fernly, NV |
| | |  | Denver, CO (HQ) |  | Plattsburgh, NY |
| | |  | Denver, CO |  | Defiance, OH |
| | |  | Littleton, CO (TC) |  | Milan, OH |
| | |  | Jacksonville, FL |  | Waterville, OH |
| | |  | Macon, GA |  | Oklahoma City, OK |
| | |  | Winder, GA |  | Hazleton, PA |
| | |  | Rockdale, IL |  | Spartanburg, SC |
| | |  | Bremen, IN |  | Etowah, TN |
| | |  | Richmond, IN |  | Cleburne, TX |
| | |  | McPherson, KS |  | Richmond, VA |




JM Products That Help Earn Materials and Resources Credits

Building Insulation

The recycled content of these JM products contributes to LEED MRc4 Recycled Content 10% and 20%.

	North America Post-consumer Recycled Content	Post-industrial (Pre-consumer) Recycled Content
Batt and Roll Insulation		
 ComfortTherm® Plastic-wrapped Fiber Glass Insulation Batts and Rolls	20	5
 FSK-25 Faced Fiber Glass Insulation Batts	20	5
 Kraft-Faced Fiber Glass Insulation Batts and Rolls	20	5
 MR® Faced Mold- and Mildew-resistant Fiber Glass Insulation Batts	20	5
 Panel Deck FSK-25 & PSK Faced Fiber Glass Insulation Batts	20	5
 Unfaced Fiber Glass Insulation Batts and Rolls	20	5
Blow-in and Spray-in Insulation		
 Climate Pro® Loose Fill Fiber Glass Insulation	20	5
 JM Spider® Spray-in Custom Fiber Glass Insulation and Delivery System	20	5
Rigid and Semi-rigid Boards and Rolls		
Insul-SHIELD® Coated Black Rolls	20	5
Insul-SHIELD® FSK-25 & PSK Panel Boards	20	5
Insul-SHIELD® Unfaced Boards	20	5

 Certified Formaldehyde-free™ insulation products

Roofing System Products

The recycled content of these JM products contributes to LEED MRc4 Recycled Content 10% and 20%.

	Post-consumer Recycled Content	Post-industrial (Pre-consumer) Recycled Content
½" Retro-Fit™ Board	29	1
RetroPlus™ Roof Board	40	1
DuraBoard®	25–28	0–3
ENRGY 3® (ENRGY 3® Foil Face Roof Insulation, ENRGY 3® Roof Insulation, ENRGY 3® Plus Roof Insulation or ENRGY 3® 25 PSI), Invinsa® Roof Board, Tapered ENRGY 3® Roof Insulation	8–26	9–13
Fesco® Board, Fesco® Board HD, FesCant Plus Cant Strip, Tapered Fesco® Board, Tapered Fesco® Edge Strip	28–33	2–3
JM PVC 50, 60, 60 MIN, 72 MIN, 80 and 80 mil MIN, JM PVC Fleece Backed 50, 60, 60 MIN, 72 MIN, 80 and 80 mil MIN		0–10
JM TPO 45, 60 and 80 mil JM TPO FB115™, JM TPO FB135™		11


Wall Coverings

JM glass textile decorative wall coverings can contribute to LEED MRc6 Rapidly Renewable Materials.

	Rapidly Renewable Materials Content
Scandatex® Wall Covering	15–20
Tassoglas® Wall Covering	15–20
Textra™ Wall Covering	15–20

Mechanical Insulation

Currently, insulation for mechanical systems does not contribute to MR credits under LEED, but these JM products do contribute to a more sustainable project.

	North America Post-consumer Recycled Content	Post-industrial (Pre-consumer) Recycled Content
Pipe, Tank & Equipment Insulation		
Micro-Flex® Large Diameter Pipe & Tank Insulation	20	5
Micro-Lok® HP Pipe Insulation	25	0
Insulation for Air Handling Ducts		
Linacoustic® RC Duct Liner	20	5
Linacoustic® HP Duct Liner	20	5
Linacoustic® R-300 Rigid Duct Liner	20	5
Spiracoustic Plus™ Duct Liner	20	5
LinaTex® Duct Liner		69–75
Microlite® Duct Wrap	20	5
 Microlite® XG™ Duct Wrap	20	5
Mat-Faced Micro-Aire® Duct Board	20	5
Super Duct® RC Duct Board	20	5
800 Series Spin-Glas® Duct & Equipment Insulation	20	5

Innovation and Design Process (LEED v3)

Acoustic Comfort: Noise Pollution Reduction

According to Innovation in Design Credit Interpretation Ruling (CIR) dated April 5, 2004:

“A point in innovation may be available if the project team demonstrates that they have significantly exceeded standard practice for acoustic comfort within this building type. Please provide standards used as a baseline if applicable. All occupied building spaces should be included in this strategy, including corridors, break rooms, etc.”

In office and educational environments, the HVAC system may be a significant contributor to noise. A critical strategy for noise reduction is to specify fiber glass acoustical duct liners or duct board to reduce noise transmission resulting from:

- Fans, dampers and equipment
- “Crosstalk” traveling from room to room
- Sheet metal contraction and expansion

Fiber glass duct insulation delivers superior control of mechanical noise, especially when you provide an increased liner thickness in the 20 feet of the duct leading to the vent or diffuser.

For more information on earning Innovation in Design credits, contact us at JM.com/buildgreen.

JM HELPS YOU EXCEED EXPECTATIONS.

To earn Innovation in Design LEED points, you need building materials that go beyond required performance minimums. At JM, we strive to develop next-generation products, such as our insulation made without formaldehyde, our factory-applied cool roof coating that reduces emissions during the construction process and our many products that provide acoustic comfort. Trust JM products to contribute to your innovative design strategies.

ID Credit 1 Innovation in Design

1–5 Points

Intent:

To provide design teams and projects the opportunity to be awarded points for exceptional performance above the requirements set by the LEED Green Building Rating System and/or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.

Suggested Strategy: Innovation in Design Comprehensive Formaldehyde Reduction

Intent:

Provide a safer and healthier environment for both construction teams and building occupants by reducing overall exposure to formaldehyde.

Requirements:

Meet the requirements of existing LEED credits associated with formaldehyde reduction AND comply with the additional measures outlined below in order to obtain a comprehensive formaldehyde reduction in the building. To accomplish this, the following are required:

- Specify no- or low-formaldehyde-emitting products and appliances for each of the following if/as incorporated in the project:
 - Composite wood and agrifiber—meet LEED IEQc4.4 requirements
 - Certified formaldehyde-free insulation
- Environmental Tobacco Smoke (ETS) Control—meet LEED IEQp2 requirements
- Thermal Comfort Design—meet LEED IEQc7.1 requirements
- Monitor Air Quality—install indoor VOC/formaldehyde sensors

Suggested Strategy: Innovation in Design Comprehensive Exterior VOC-emitting Materials Reduction

Intent:

Provide a safe and healthy outdoor environment for both construction teams and building occupants. Reduce outdoor pollution resulting from construction practices and material selection.

Requirements:

Significantly reduce the amount of VOCs released to the outdoor air through construction practices and materials selection by specifying low-VOC-emitting products for each of the following if/as incorporated in the project:

- Factory-applied cool roof coating (rather than field applied)
- No added urea-formaldehyde composite wood exterior doors
- Low-VOC siding materials (composite wood and cement products)
- Low-VOC pesticides and vegetation care products
- Heat island effect: roof—meet LEED SSC7.2 requirements
- VOC limits for concrete sealants and caulks, exterior paints, wood stains and sealers, and metal stains and sealers
- Describe the regional air quality context to justify the restriction of outdoor emissions of VOCs

Indoor Environmental Quality (LEED v3)

JM FORMALDEHYDE-FREE™ FIBER GLASS BUILDING INSULATION IMPROVES INDOOR AIR QUALITY.

The best way to reduce indoor air quality problems is to eliminate and reduce sources of formaldehyde. We offer a complete line of fiber glass building insulation that improves indoor air quality because it's made without formaldehyde. JM building insulation is certified by Scientific Certification Systems to be formaldehyde-free and to meet the requirements of the SCS Indoor Advantage Gold program. The SCS certification includes compliance with the February 2010 update to the California ES-1350 indoor air quality test, including both the new residential scenario and the most recent health-based formaldehyde limit. This certification is unique to Johns Manville. And JM is working to expand its Formaldehyde-free™ insulation offerings throughout its product line.

IEQ Credit 3.2

Construction IAQ Management Plan: Before Occupancy

1 Point

Intent:

Reduce indoor air quality problems resulting from the construction/renovation process in order to help sustain the comfort and well-being of construction workers and building occupants.

Requirements:

Develop and implement an Indoor Air Quality (IAQ) Management Plan for the post-construction and pre-occupancy phase.

OPTION 2: Air Testing (maximum LEED-allowed formaldehyde air concentration: 27 ppb)

INDOOR AIR QUALITY AND FIBER GLASS DUCT LINERS AND DUCT BOARD.

Many Johns Manville air duct products incorporate our exclusive Permacote® airstream surface system. This acrylic polymer surface helps guard against incursion of dust or dirt into the substrate, minimizing the potential for biological growth. Permacote coating is also formulated with an immobilized, U.S. EPA-registered agent to protect the coating from the potential growth of fungi and bacteria. Products incorporating the Permacote coating pass ASTM C1338 fungi testing as well as the more stringent ASTM G21 test.

According to the U.S. EPA, “Duct board and duct liner are widely used in duct systems because of their excellent acoustic, thermal, and condensation control properties. If the HVAC system is properly designed, fabricated, installed, operated and maintained, these duct systems pose no greater risk of mold growth than duct systems made of sheet metal or any other materials.”*

Studies of fiber glass duct liner and fiber glass duct board conducted over the last three decades demonstrate no significant fiber erosion on surfaces in typical HVAC systems. When properly installed, operated and maintained, these products do not increase airborne fiber levels in buildings.

*epa.gov/iaq/schooldesign/hvac.html.

JM Products That Help Earn Indoor Environmental Quality Credits

Earn IEQc3.2 Construction IAQ Management Plan, Option 2-Air Quality Testing, by using low-emitting building materials. Specifying JM certified Formaldehyde-free™ products means fewer sources of formaldehyde.

Building Insulation

Batt and Roll Insulation



ComfortTherm® Plastic-wrapped Fiber Glass Insulation Batts and Rolls



FSK-25 Faced Fiber Glass Insulation Batts



Kraft-Faced Fiber Glass Insulation Batts and Rolls



MR® Faced Mold- and Mildew-resistant Fiber Glass Insulation Batts



Panel Deck FSK-25 & PSK Faced Fiber Glass Insulation Batts



Unfaced Fiber Glass Insulation Batts and Rolls

Blow-in and Spray-in Insulation



Climate Pro® Loose Fill Fiber Glass Insulation



JM Spider® Spray-in Custom Fiber Glass Insulation and Delivery System

Mechanical Insulation

Insulation for Air Handling Ducts



EnviroAire™ Duct Board



Microlite® XG™ Duct Wrap

Wall Coverings

Scandatex® Wall Covering

Tassoglas® Wall Covering

Textra™ Wall Covering



Certified Formaldehyde-free™ insulation products

Additional Credits for Schools (LEED v3)

Did You Know?

JM's complete line of certified Formaldehyde-free™ insulation improves indoor air quality because it's made without formaldehyde. JM's line of certified Formaldehyde-free™ products can be used to eliminate or reduce VOCs in other manufacturers' products, too. Our fiber glass materials are used to eliminate a potential source of formaldehyde from acoustical panels, wall partitions, carpet tiles, water heaters and air conditioners.



In April 2007, USGBC launched the LEED for Schools program, basing it on LEED for New Construction certification. It addresses issues specific to K–12 schools, such as classroom acoustics, master planning, mold prevention and environmental site assessment. Several JM products can contribute toward Indoor Environmental Quality (IEQ) credits.

IEQ Credit 4.1

Low-emitting Materials: Adhesives and Sealants

1 Point

Intent:

To reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirements:

Adhesives and sealants used on the interior, inside of the weatherproofing and onsite must comply with stated LEED restrictions. Please see the LEED ratings guide appropriate for your project for specific limits.

IEQ Credit 4.2

Low-emitting Materials: Paints and Coatings

1 Point

Intent:

To reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirements:

Paints and coatings used on the interior of the building, inside of the weatherproofing system or applied onsite, must comply with stated LEED restrictions. Please see the LEED ratings guide appropriate for your project for specific limits.

IEQ Credit 4.6

Low-emitting Materials

1 Point

Intent:

Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirements:

OPTION 6: CEILING AND WALL SYSTEMS (1 Point) All gypsum board, insulation, acoustical ceiling systems and wall coverings installed in the building interior shall meet the testing and product requirements of the California Department of Health Services *Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-scale Environmental Chambers*, including 2004 Addenda.

IEQ Credit 9

Enhanced Acoustical Performance

1 Point

Intent:

Provide classrooms that facilitate better teacher-to-student and student-to-student communications.

Requirements:

Design building shell, classroom partitions and other core learning spaces to meet Sound Transmission Class (STC) requirements of ANSI Standard S12.60-2002, Acoustical Performance Criteria, Design Requirements and Guidelines for Schools, excepting windows, which must meet an STC rating of at least 35.

Future LEED and building science.

FORMALDEHYDE REDUCTION.

JM is working to have formaldehyde reduction recognized as a sustainability measure that is eligible for credit under the LEED green building certification program. We believe formaldehyde reduction is important because:

- *U.S. Environmental Protection Agency cautions against formaldehyde.*¹
The U.S. EPA recommends limiting exposure to formaldehyde as much as possible.
- *California EPA recommends using building materials made without formaldehyde.*²
The California Air Resources Board (CARB), a division of California's EPA, found that the air in most homes contains too much formaldehyde. CARB advises that homeowners, builders and architects use building materials made with no added formaldehyde when building or remodeling a home.

ACOUSTIC COMFORT.

In future LEED certification, your project may also be eligible for credit for increased acoustic comfort, depending on your building type. The new LEED for Schools Program recognizes that student academic performance may be significantly enhanced if noise is reduced to meet definable building acoustic performance levels. For this reason, the Collaborative for High Performance Schools specifically recommends the use of acoustic duct liners. Similarly, recent studies and surveys of noise reduction in office environments support incorporating acoustic performance into other LEED programs. Johns Manville has noise reduction solutions to address sources of noise throughout the building, and we believe that introducing acoustic performance for future LEED program versions is a critical next step.

BUILDING SCIENCE AND ENGINEERED MATERIALS.

In 2002, when JM eliminated formaldehyde from our fiber glass building insulation, we also developed a full line of other Formaldehyde-free™ materials. Some of these materials are used to reinforce carpet tiles, office panels, office furnishings, ceiling tiles and wall coverings. Others add cushioning or acoustical properties. Still other JM materials help make products that don't support mold growth.

Did You Know?

For years, Environment Canada's Environmental Choice Program (ECP) has awarded its EcoLogo™ to environmentally responsible products and services. Starting in 2005, only fiber glass batt insulation made without formaldehyde and with a high recycled content (our Canadian building insulation is at least 45% post-consumer glass) can earn the EcoLogo. JM Formaldehyde-free™ fiber glass insulation meets these more stringent requirements.



1. Comments of U.S. EPA on LEED-NC Version 2.2; Response to Comments on Draft Standard for Indoor Environmental Quality, Indoor Environmental Quality Prerequisite 1 at pp 71-72, Issue EQc4.3.14, <http://specJM.com/commercial/insulation.asp>.

2. California Air Resources Board *Report on Air Pollution in California*, www.arb.ca.gov/research/indoor/ab1173/ab1173.htm, and *Guideline: Formaldehyde in the Home*, www.arb.ca.gov/research/indoor/formaldehyde.htm.



CASE STUDY

Building:

U.S. Environmental Protection Agency's Region 8 Headquarters

Location:

Denver, Colorado

LEED certification level:

Gold

Architect:

Zimmer-Gunsul-Frasca

Construction:

OPUS Northwest, LLC

The U.S. EPA's Region 8 Headquarters received a LEED 2.1 Gold rating. The U.S. EPA demands that the building be energy-efficient and also obtain an ENERGY STAR label. The 250,000 gross-square-foot building contains a variety of JM Formaldehyde-free™ fiber glass building and duct insulation products in addition to JM pipe insulation and jacketing. JM products contributed to increased energy efficiency, recycled content, reduced VOCs and other building features that will support its LEED certification.



LEED v3 Criteria

Prerequisites or Credits Where
JM Products Contribute

JM products can also help earn credits under other LEED programs.
For more information, visit JM.com/buildgreen.

CREDIT 5.1	CREDIT 5.2	CREDIT 7.1	CREDIT 7.2	PREREQUISITE 2	CREDIT 1	CREDIT 4	CREDIT 5:10%	CREDIT 5:20%	CREDIT 6	CREDIT 1	CREDIT 3.2	CREDIT 4.1	SS	EA	MR	ID	IEQ

ROOFING SYSTEMS

Roofing Membranes																		
Glaskap® CR	SRI 92 Reflective, emissive white mineral-surfaced, acrylic-coated, fiber glass cap sheet that is CA Title 24-compliant and is eligible for LEED credits.	+	+	+	+	+		+	●		+							
DynaFlex® CR, DynaGlas® FR CR, DynaKap® FR CR, DynaLastic® 180 FR CR, DynaLastic® 250 FR CR, DynaWeld™ Cap FR CR	SRI 92 reflective, white mineral-surfaced, acrylic-coated cap sheets. ENERGY STAR approved, CRRC member and eligible for LEED credits.				+	+												+
TRICOR™ M FR CR	SRI 92 reflective, white mineral-surfaced, acrylic-coated cap sheets. ENERGY STAR approved, CRRC member and eligible for LEED credits.				+	+												+
JM PVC* 50, 60, 60 MIN, 72 MIN, 80 and 80 mil MIN	SRI 108 Flexible, thermoplastic membrane of UV-resistant PVC and Elvaloy® ketone ethylene ester. Reinforced with non-wicking polyester fabric (needs no edge sealant).	+	+	+	+	+	+	+	+	+	+	+						
JM PVC* Fleece Backed 50, 60, 60 MIN, 72 MIN, 80 and 80 mil MIN	SRI 108 Flexible, thermoplastic membrane of UV-resistant PVC and Elvaloy® ketone ethylene ester, reinforced with polyester fabric and backed with lightweight polyester fleece.	+	+	+	+	+	+	+	+	+	+	+						
JM TPO 45, 60, and 80 mil, JM TPO FB115™ JM TPO FB135™	SRI 101 Thermoplastic polyolefin (TPO) membranes reinforced with polyester fabric, and designed for use in mechanically fastened and adhered roofing applications.	+	+	+	+	+	+	+	+	+	+	+						
Cements and Coatings																		
TopGard® 4000	SRI 104 Reflective, 100% acrylic, elastomeric, bleed-blocking coating for use over asphalt, single-ply and metal roofing.	+	+	+	+	+		+	+	+	+							
TopGard® 5000	SRI 104 Reflective, 100% acrylic, elastomeric coating for smooth or granulated surfaced roofing systems in colder climates.	+	+	+	+	+		+	+	+	+							
Roof Insulation																		
½" Retro-Fit™ Board	High-density board made of expanded perlite and cellulosic fibers. Top surface is sealed with TopLoc® coating to ensure good attachment in bituminous applications.	+	+			+	+	+										
RetroPlus™ Roof Board	High-density board made of expanded perlite and cellulosic fibers. Top surface is sealed with TopLoc® coating to ensure good attachment in bituminous applications.	+	+			+	+	+										
DuraBoard®	High-density, low-thermal rigid insulation board. For new and recover applications or over closed cell foam insulations using SBS or APP membrane roofing systems with torch application.	+	+			+	+	+	+	+	+							
ENRGY 3® (ENRGY 3® Foil Face Roof Insulation, ENRGY 3® Roof Insulation, ENRGY 3® Plus Roof Insulation or ENRGY 3® 25 PSI)	Rigid insulation board that provides high thermal insulation value over metal, nailable and non-nailable roof decks in built-up, modified bitumen and single-ply membrane roofing systems. Polyisocyanurate foam factory-bonded to fiber glass reinforced facers.	+	+			+	+	+	+	+	+							
FesCant Plus Cant Strip	High-density, laminated board that provides an excellent way to transition from the deck to the wall of the roof.	+	+					+	+	+	+							
Fesco® Board	Expanded perlite rigid insulation board. Ideal as a low-thermal roof insulation board and general-purpose cover board over closed cell-foam insulation boards in some roofing systems.	+	+			+	+	+	+	+	+							
Fesco® Board HD	High-density expanded perlite rigid insulation board. Ideal to use over wide flute or metal deck applications.	+	+			+	+	+	+	+	+							
Invinsa® Roof Board	Resilient, lightweight polyisocyanurate roof board that maximizes membrane performance and protects insulation below.	+	+			+	+											
Tapered ENRGY 3® Roof Insulation	Rigid polyisocyanurate insulation board designed to be directly applied to and promote positive drainage for steel and other roof decks.	+	+			+	+	+	+	+	+							
Tapered Fesco® Board	Expanded perlite panel that's pre-cut to several slopes.	+	+			+	+	+	+	+	+							
Tapered Fesco® Edge Strip	Ideal for transitioning from membrane to nailer or transitioning from Tapered Fesco, Tapered ENRGY 3 or Tapered Fesco.	+	+					+	+	+	+							

BUILDING INSULATION

Batts and Rolls																		
ComfortTherm® Plastic-wrapped Fiber Glass Insulation Batts and Rolls	Wrapped in plastic for twice the moisture control of kraft facings.							+	+	+	+	+	+	+				
FSK-25 Faced Fiber Glass Insulation Batts	Foil-scrim kraft-faced insulation provides superior moisture control and light reflectivity.							+	+	+	+	+	+	+				
Kraft-Faced Fiber Glass Insulation Batts and Rolls	Kraft facing serves as a vapor retarder to control moisture in concealed wall applications.							+	+	+	+	+	+	+				
MR® Faced Mold- and Mildew-resistant Fiber Glass Insulation Batts	Facing treated with a U.S. EPA-registered agent to protect the insulation from mold and mildew.							+	+	+	+	+	+	+				
Panel Deck FSK-25 & PSK Faced Fiber Glass Insulation Batts	Foil-scrim kraft-faced or polypropylene-scrim kraft-faced insulation with extended side tabs for use beneath roofing panel decks.							+	+	+	+	+	+	+				
Unfaced Fiber Glass Insulation Batts and Rolls	Bonded fiber glass building insulation for use where no vapor retarder is needed or where a separate vapor barrier is applied.							+	+	+	+	+	+	+				
Blow-in and Spray-in Insulation																		
Climate Pro® Loose Fill Fiber Glass Insulation	Blow-in fiber glass for attics and other hard-to-reach areas. Can be used in walls and ceilings as part of the Blow-in-Blanket System®.							+	+	+	+	+	+	+				
JM Spider® Spray-in Custom Fiber Glass Insulation	Spray-in fiber glass achieves up to R-15 in 2x4 framing and up to R-25 in 6-inch steel framing. Treated with a U.S. EPA-registered agent to protect the insulation against mold.							+	+	+	+	+	+	+				
Rigid and Semi-rigid Boards																		
Insul-SHIELD® Unfaced Boards	Fiber glass insulation boards designed for curtain wall applications.							+	+	+	+	+	+	+				
Insul-SHIELD® FSK-25 & PSK Panel Boards	Faced boards for applications where a vapor barrier is needed. FSK facing is fire resistant and helps maximize lighting efficiency.							+	+	+	+	+	+	+				

+ JM products contribute to this prerequisite or credit. + Contact JM to find out how JM products can contribute to credits at your project site. ● JM is in the process of auditing material extraction locations.
*Energy Star compliant grey and sandstone color options available.



LEED v3 Criteria
Prerequisites or Credits Where
JM Products Contribute

JM products can also help earn credits under other LEED programs.
For more information, visit JM.com/buildgreen.

SS		EA		MR		ID	IEQ					
CREDIT 5.1	CREDIT 5.2	CREDIT 7.1	CREDIT 7.2	PREREQUISITE 2	CREDIT 1	CREDIT 4	CREDIT 5: 10%	CREDIT 5: 20%	CREDIT 6	CREDIT 1	CREDIT 3.2	CREDIT 4.1

MECHANICAL INSULATION

Pipe, Tank & Equipment Insulation												
Micro-Flex® Large Diameter Pipe & Tank Insulation	High-temperature, semi-rigid fiber glass blanket bonded to a flexible facing. Ideal for pipes, tanks, ducts, vessels and other round or irregular shapes.											
Micro-Lok® HP Pipe Insulation	The next generation of Micro-Lok pipe insulation.											
Micro-Lok® Pipe Insulation	Reinforced vapor retarder facing. Ideal for piping systems with operating temperatures up to 850°F.											
800 Series Spin-Glas® Duct & Equipment Insulation	Can be used in plain or faced form to insulate commercial and industrial heating, air conditioning, power and process equipment.											
1000 Series Spin-Glas® High Temperature Equipment Insulation	Semi-rigid board insulation ideal for insulating furnaces, boilers, heated vessels, ducts, tanks and other heated equipment operating at temperatures up to 850°F.											
Zeston® PVC Fitting Covers & Jacketing	Heavy-duty fitting covers and jacketing with Formaldehyde-free™ fiber glass inserts for chilled water, hot water, steam and other piping systems.											
Ceel-Co® PVC Fitting Covers & Jacketing	Heavy-duty fitting covers and jacketing with Formaldehyde-free™ fiber glass inserts for chilled water, hot water, steam and other piping systems.											
Insulations for Rectangular Steel Ducts												
Linacoustic® RC Duct Liner	Flexible duct liner featuring JM's exclusive Reinforced Coating System to protect the airstream surface.											
Linacoustic® HP Duct Liner	Flexible duct liner featuring JM's exclusive Reinforced Coating System to protect the airstream surface.											
Linacoustic® R-300 Rigid Duct Liner	Airstream surface and long edges are coated with a tough, smooth, acrylic polymer. Designed for HVAC plenums and air distribution ductwork with air velocities up to 6,000 fpm and temperatures up to 250°F.											
LinaTex® Duct Liner	Flexible liner with airstream surface protected by a black, high-density glass mat. For lining sheet metal ducts with air velocity up to 6,000 fpm and operating temperatures up to 250°F.											
Microlite® Duct Wrap	Lightweight, highly resilient blanket-type thermal and acoustical insulation available plain or with factory-applied foil-skrim-kraft facing and white Class 1 vinyl.											
Microlite® XG™ Duct Wrap	Made without formaldehyde, this is a lightweight, highly resilient blanket-type thermal and acoustical insulation for the exterior of HVAC systems or other spaces or surfaces.											
800 Series Spin-Glas® Duct & Equipment Insulation	Can be used in plain or faced form to insulate commercial and industrial heating, air conditioning, power and process equipment.											
Insulations for Round & Spiral Steel Ducts												
Microlite® Duct Wrap	Lightweight, highly resilient blanket-type thermal and acoustical insulation available plain or with factory-applied foil-skrim-kraft facing and white Class 1 vinyl.											
Microlite® XG™ Duct Wrap	Made without formaldehyde, this is a lightweight, highly resilient blanket-type thermal and acoustical insulation for the exterior of HVAC systems or other spaces or surfaces.											
Spiracoustic Plus™ Duct Liner	This system is a comprehensive group of duct lining products engineered to provide very high acoustical and thermal performance in round air ducts of virtually any size.											
Self-insulated Duct Products												
EnviroAire™ Duct Board	The only fiber glass duct board for residential and commercial air handling systems that is made without formaldehyde.											
Mat-Faced Micro-Aire® Duct Board	Airstream side features a fiber glass mat for use at velocities up to 5,000 fpm. The opposite side features a fire-resistant foil-skrim-kraft facing. Ideal for fabrication into rectangular ductwork.											
SuperDuct® RC Duct Board	Male/female joints are factory-made on the transverse edges of each board and a tough foil-skrim-kraft facing is laminated to the exterior surface of the board.											
Duct Adhesives & Sealants												
SuperSeal® Edge Treatment	Sprayable liquid for high-volume shop applications. May also be applied with a brush.											
SuperSeal® HV	High-viscosity version of the Permacote® coating for spot or edge repair.											

Currently, mechanical systems, components and associated pipe, duct and HVAC equipment thermal and acoustical insulations are excluded from MR credit calculations under LEED-NC.

WALL COVERINGS

Scandatex® Wall Covering	Durable woven glass textile in an extensive range of textures and patterns. Easy to clean, repaint and repair.											
Tassoglas® Wall Covering	Glass textile with fine or heavy textures and Jacquard-woven, classic-woven and relief-printed patterns. Available pre-primed, pre-glued and strippable and for wet rooms and shower rooms.											
Textra™ Wall Covering	Woven glass textile in a variety of textures that can be repainted up to 10 times. Breathable when painted with a low-sheen latex paint.											

LEED v3 Criteria

SUSTAINABLE SITES (SS)				ENERGY AND ATMOSPHERE (EA)		MATERIALS AND RESOURCES (MR)			INNOVATION & DESIGN (ID)	INDOOR ENVIRONMENTAL QUALITY (IEQ)	
CREDIT 5.1	CREDIT 5.2	CREDIT 7.1	CREDIT 7.2	PREREQUISITE 2	CREDIT 1	CREDIT 4	CREDIT 5	CREDIT 6	CREDIT 1	CREDIT 3.2	CREDIT 4.1
Site Development – Protect or Restore Habitat	Site Development – Maximize Open Space	Heat Island Effect – Non-Roof	Heat Island Effect – Roof	Minimum Energy Performance	Optimize Energy Performance	Recycled Content: 10% or 20% (Post-consumer + ½ pre-consumer)	Regional Materials: 10% or 20% Extracted, Harvested or Recovered and Manufactured Regionally	Rapidly Renewable Materials	Innovation in Design	Construction IAQ Management Plan OPTION 2: Air Quality Testing	Low-emitting Materials

 Printed on recycled paper.



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