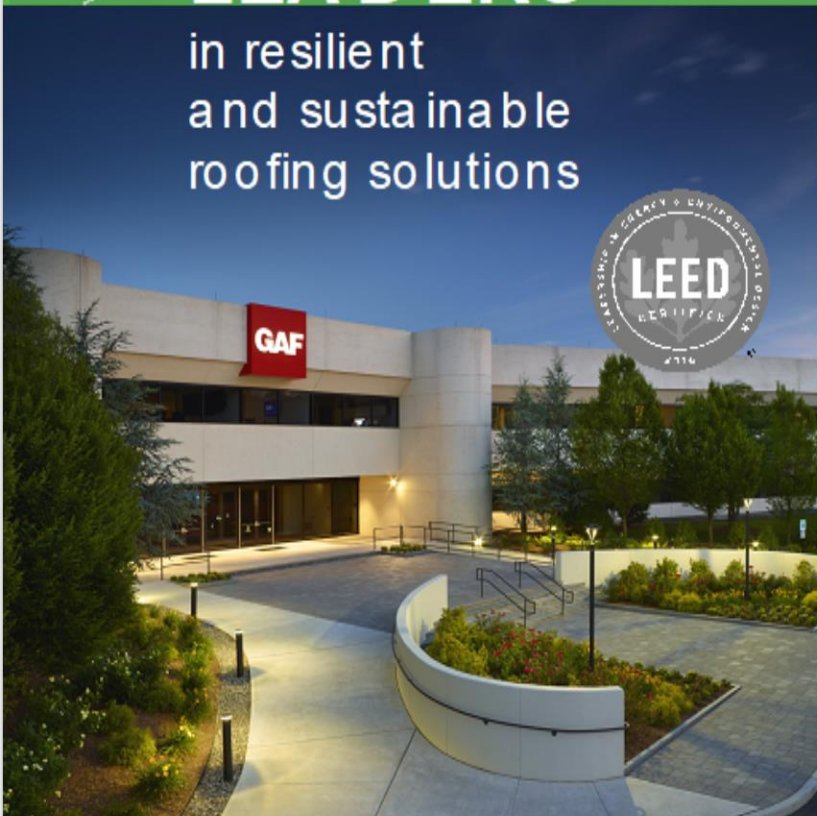


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in resilient
and sustainable
roofing solutions



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to helping
you meet your
environmental
design goals



GAF Green Building Playbook

Using GAF Products on LEED® v4, Living Building Challenge™, and Green Globes® Projects



We protect what matters most™

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¹ LEED® — an acronym for Leadership in Energy and Environmental Design™ — is a registered trademark of the U.S. Green Building Council and is used with permission.

² For project teams using the LEED® v2009 Rating System, contact GAF for the 2013 GAF Green Building Playbook at <http://gaf.com>.

The U.S. Green Building Council (USGBC®) releases quarterly Addenda, or changes to LEED®, that may affect credit requirements. Addenda should be checked by project teams for updates.

Note: USGBC® and the related logo are trademarks owned by the U.S. Green Building Council and is used with permission.



About GAF

Founded in 1886, GAF is the largest roofing manufacturer in North America.

As the industry leader, GAF proudly offers a comprehensive portfolio of award-winning, innovative roofing products for both steep-slope and commercial properties. Supported by an extensive national network of factory-certified contractors, GAF has built its reputation – and its success – on its steadfast commitment to Advanced Quality, Industry Expertise, and Solutions Made Simple.

GAF offers all major low-slope roofing technologies, including repair and maintenance products and roof restoration systems, as well as new roofing systems (BUR, modified bitumen, TPO, PVC, and liquid-applied roofing). GAF has developed single-ply, asphaltic and liquid-applied membranes with excellent durability and high reflectivity to meet the most rigorous industry standards while helping commercial property owners and designers reduce energy consumption.

For more information, visit <http://www.gaf.com>.



Image: GAF's LEED®-certified Global Headquarters in Parsippany, NJ

GAF's global headquarters in Parsippany, New Jersey, is the first building in the world to be awarded a LEED® Resilient Design Pilot credit from the U.S. Green Building Council (USGBC®). This achievement recognizes GAF for accommodations made in the building's design that allow it to function during an emergency event. The award helps further our commitment to global sustainability.



GAF Green Building Playbook

LEED® v4 for BD+C: New Construction and Major Renovation

About LEED®

The LEED® (Leadership in Energy and Environmental Design) Green Building Rating System is a voluntary, consensus-based, market-driven program that provides third-party verification of high-performance, energy-efficient sustainable buildings. The LEED® certification system is a program that certifies a building for satisfying specified green building criteria and requirements. GAF currently references the LEED® v4.0 BD+C: NC¹ rating system for this GAF Playbook. Starting last November 2016, all new projects were required to register under the v4.0 version of LEED®. A LEED® v4.1 (beta) version was released in January 2019 whereby individual LEED® v4.1 credits may be substituted for LEED® v4 credits. For more information, visit www.usgbc.org/leed.

Why LEED®?

The built environment has a profound impact on our natural environment, economy, health, and productivity. Green building practices can substantially reduce or eliminate negative environmental impacts and improve existing unsustainable design, construction, and operational practices. Working on a LEED® project? Please visit <http://gaf.ecoscorecard.com> for LEED® documentation resources related to GAF products.

Benefits of a "Green Building"

Environmental: A Green Building May...

- Protect and enhance ecosystems and biodiversity
- Improve air and water quality
- Conserve and limit natural resource use and reduce solid waste going to landfills

Economic: A Green Building May...

- Lower a building's operational costs
- Increase building values, assets, and profits
- Attract and retain superior employees
- Improve employee productivity and satisfaction and reduce sick days
- Promote eligible incentives for LEED® and other energy-efficiency improvements that are available at the federal, state, and local levels. For more information on relevant incentives, visit www.DSIREusa.org or www.energystar.gov.

Health & Community: A Green Building May...

- Enhance air, thermal, and acoustical quality
- Enhance occupant comfort and health
- Reduce the strain on the local infrastructures
- Improve overall quality of life







¹ LEED® v4 BD+C (Building Design and Construction) for NC (New Construction) addresses design and construction activities for both new buildings and major renovations. The LEED® credits referenced in this Playbook may also apply to various other LEED® rating systems.



LEED® v4 BD+C - NC Certification Levels:

Certified	40-49 points
Silver	50-59 points
Gold	60-79 points
Platinum	80 points and above

LEED® v4 BD+C - NC Addresses 8 Main Categories:

 Integrative Process (IP)	1 pt.
 Location and Transportation (LT)	16 pts.
 Sustainable Site (SS)	10 pts.
 Water Efficiency (WE)	11 pts.
 Energy & Atmosphere (EA)	33 pts.
 Materials & Resources (MR)	13 pts.
 Indoor Environmental Quality (IEQ)	16 pts.
 Innovation in Design (ID)	6 pts.
 Regional Priority (RP)	<u>4 pts.</u>

Total: 110 points



GAF Product Scorecard for LEED® v4 Projects

Rating System and Version	LEED® v4 FOR BUILDING DESIGN AND CONSTRUCTION: NEW CONSTRUCTION							
Credit Category	Energy and Atmosphere		Materials and Resources				Indoor Environmental Quality	
Credit Description	SSc5	EAp2/ EA2	EA5	MRc2	MRc3	MRc4	MRp2/ MRc5	EQc2
	Heat Island Reduction	Min/ Optimize Energy Performance	Renewable Energy Production	EPD – Environmental Product Declarations (EPDs)	EPD – Sourcing of Raw Materials (e.g., recycled content)	EPD – Material Ingredients (e.g., HFDS)	Construction & Demo Waste Planning/ Management	Low-Emitting Materials
	Opt 1 & 2			Option 1	Option 2	Option 1	Opt 1 & 2	Opt 1 & 2
GAF PRODUCT LINE²								
07 21 00 THERMAL INSULATION – ROOFING								
EnergyGuard™ Polyiso Insulation		✓		✓ EPD - Generic	✓	✓ HFD	✓ C	✓ Exempt (exterior)
EnergyGuard™ NH Polyiso Insulation		✓		✓ EPD - Product-specific Type III	✓	✓ HFD or Declare RLF	✓ C	✓ Exempt (exterior)
EnergyGuard™ NH Ultra Polyiso Insulation		✓			✓	✓ Declare RLF	✓ C	✓ Exempt (exterior)
EnergyGuard™ NH Barrier Polyiso Insulation		✓			✓	✓ HFD or Declare RLF	✓ C	✓ Exempt (exterior)
EnergyGuard™ NH HD Polyiso Insulation		✓			✓	✓ Declare RLF	✓ C	✓ Exempt (exterior)
EnergyGuard™ NH HD PLUS Polyiso Insulation		✓			✓	✓ Declare RLF	✓ C	✓ Exempt (exterior)
07 54 00 THERMOPLASTIC MEMBRANE ROOFING – SINGLE-PLY ROOFING								
EverGuard Extreme® TPO 50-80 mil Smooth	✓ (White & Energy Gray)	✓ Tile 24™ (White)		✓ EPD - Product-specific Type III	✓ C	✓ HFD or Declare RLF	✓ C	✓ Exempt (exterior)
EverGuard® TPO 45-80 mil Smooth	✓ (4 Standard colors; Gray excluded)	✓ Tile 24™ (3 colors)		✓ EPD - Product-specific Type III	✓ C	✓ HFD or Declare RLF	✓ C	✓ Exempt (exterior)
Resilient Red List Free Adhered TPO Roofing System	✓ (White & Tan; Gray excluded)	✓ Tile 24™ (White)			✓ C	✓ Declare RLF	✓ C	✓ Exempt (exterior)
TPO Single-Ply Roofing Membrane: Mechanically Fastened	✓ (4 Standard colors; Gray excluded)	✓ Tile 24™ (3 colors)		✓ EPD - Generic	✓ C		✓ C	✓ Exempt (exterior)
07 54 19 PVC MEMBRANE ROOFING								
EverGuard® PVC Smooth 50-80 mil	✓ (White)	✓ Tile 24™ (White)		✓ EPD - Product-specific Type III	✓		✓ C	✓ Exempt (exterior)
ADHESIVES, PRIMERS, CLEANERS, FASTENERS								
Drill-Tac™ Fasteners and Plates					✓	✓ HFD	✓	✓ Exempt (exterior)
EverGuard® TPO CleanWeld™ Conditioner						✓ HFD		✓ Exempt (exterior)
EverGuard® TPO Seam Cleaner						✓ HFD		✓ Exempt (exterior)
GAF 2-Part Roofing Adhesive						✓ HFD		✓ Exempt (exterior)
EverGuard® TPO Low-VOC Bonding Adhesive						✓ HFD		✓ Exempt (exterior)
07 72 73 VEGETATED ROOF SYSTEMS								
LiveRoof® System – GAF Vegetative Roofing	✓	✓			✓		✓	✓ Exempt (exterior)
07 31 13 ASPHALT SHINGLES								
Asphalt Shingle Roofing System: Fastened	✓ (Select colors) ³	✓ Tile 24™ (Select colors)		✓ EPD - Generic	✓		✓ C	✓ Exempt (exterior)
Glenwood® Shingles		✓ Tile 24™ (Golden Platina)		✓ EPD - Generic		✓ HFD	✓ C	✓ Exempt (exterior)
Timberline® Cool Series® Shingles	✓ (Standard colors) ³	✓ Tile 24™ (Cool Series)		✓ EPD - Generic	✓	✓ HFD	✓ C	✓ Exempt (exterior)
Timberline HD® Reflector Series™ Shingles	✓ (Select colors) ³	✓ Tile 24™ (HD Reflector Series)		✓ EPD - Generic	✓	✓ HFD	✓ C	✓ Exempt (exterior)



GAF Product Scorecard for LEED® v4 Projects (continued)

Rating System and Version	LEED® v4 FOR BUILDING DESIGN AND CONSTRUCTION: NEW CONSTRUCTION							
Credit Category	Energy and Atmosphere		Materials and Resources			Indoor Environmental Quality		
Credit Description	SSc5	EA p2/ EA c2	EA c5	MR c2	MR c3	MR c4	MR p2/ MR c5	EQ c2
Heat Island Reduction	Opt 1 & 2	Min/ Optimize Energy Performance	Renewable Energy Production	EPDO – Environmental Product Declarations (EPDs) Option 1	EPDO – Sourcing of Raw Materials (e.g., recycled content) Option 2	EPDO – Material Ingredients (e.g., HPDs) Option 1	Construction & Demo Waste Planning/ Management Opt 1 & 2	Low-Emitting Materials Opt 1 & 2
GAF PRODUCT LINE²								
07 51 13 BUILT-UP ASPHALT ROOFING – LOW-SLOPE ASPHALTIC								
GAFGLAS® EnergyCap™ Mineral-Surface Cap Sheet	✓ (White)	✓ (White)		✓ EPD: Generic		✓ HPD		✓ Exempt+ (exterior)
Built-Up Asphalt Roofing Membrane: Hot Asphalt	✓ (Select colors)	✓ (Select colors)		✓ EPD: Generic	✓ (Select products)			✓ Exempt+ (exterior)
07 13 52 MODIFIED BITUMINOUS SHEET WATERPROOFING								
RUBEROID® Torch Smooth Membrane				✓	✓	✓ HPD		✓ Exempt+ (exterior)
07 52 00 MODIFIED BITUMINOUS MEMBRANE ROOFING								
APP-Modified Bitumen Roofing Membrane: Torch Applied	✓ (White)	✓ (Select products)		✓ EPD: Generic	✓ (Select products)			✓ Exempt+ (exterior)
RUBEROID® Mop Granule	✓ (White)	✓			✓	✓ HPD		✓ Exempt+ (exterior)
SBS-Modified Bitumen Roofing Membrane: Cold Adhered	✓ (White)	✓ (White)		✓ EPD: Generic	✓ (Select products)			✓ Exempt+ (exterior)
SBS-Modified Bitumen Roofing Membrane: Hot Asphalt	✓ (White)	✓ (White)		✓ EPD: Generic	✓ (Select products)			✓ Exempt+ (exterior)
SBS-Modified Bitumen Roofing Membrane: Torch Applied	✓ (White)	✓ (White)		✓ EPD: Generic	✓ (Select products)			✓ Exempt+ (exterior)
07 56 00 LIQUID-APPLIED ROOFING – ROOF COATINGS								
HydroStop® PremiumCoat® FinishCoat	✓ (Select colors) ³	✓ (Red List (White & Cotton))				✓ HPD		✓ Exempt+ (exterior)
48 14 13 SOLAR ENERGY COLLECTORS								
Solar Roofing Program	✓	✓	✓					✓ Exempt+ (exterior)
32 12 16 ASPHALT PAVING								
StreetBond® SB150 Pavement Coating	✓ (All SB150 colors contribute ¹⁰)	✓				✓ HPD	✓	✓ Exempt+ (exterior)
LOW-VOC ADHESIVES								
EverGuard®, Matrix™, LRF OlyBond500®								✓ Exempt+ (exterior)

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- For a complete listing of GAF roofing and pavement coating products and submittal documents for LEED® projects, visit <http://gaf.ecoscorecard.com/> or transparencycatalog.com/company/gaf/. Also download the **GAF Green Building Playbook: Using GAF Products on LEED® v4 Projects at gaf.com/green**.
- Additional GAF roofing and/or pavement coating colors having a lower SRI or SR value respectively than the LEED® credit minimum may still contribute to SSc5 credit achievement using the weighted average calculation path. Refer to the GAF Green Building Playbook or LEED® Reference Guide under the SSc5: Heat Island Reduction credit for specifics. The SSc5 LEED® credit form can also be sourced to run sample SRI or SR scenarios using the weighted average calculation path.
- Exterior wet-applied Adhesives and Sealants and exterior materials are exempt from LEED® v4 EQ c2: Low-Emitting Materials credit requirements for the General Emissions Evaluation and VOC limits, and for Living Building Challenge™ (LBC) Imperative 08 for CDPH SM v1.1-2010 compliance, and for Green Globes Indoor Environment 3.12.1 VOCs. USGBC definition (and adopted by LBC): "The building interior is defined as everything within the waterproofing membrane. The building exterior is defined as everything outside and inclusive of the primary and secondary waterproofing system, such as waterproofing membranes and air- and water-resistant barrier materials." Note: The exception is for LEED® for Healthcare and LEED® for Schools projects, which do have VOC requirements for wet-applied exterior materials. For LBC projects, Imperative 10 – Red List also has exterior VOC requirements, addressed in Footnote 10.
- Asphalt shingle recycling programs vary by region. Visit gaf.com/green for our "Find an Asphalt Shingle Recycler" map or visit ShingleRecycling.org.
- This referenced product or system may employ hot asphalt in the installation process. Note that if pursuing the EQc2: Low-Emitting Materials credit, hot-mopped asphalt for LEED® for Healthcare and LEED® for Schools is prohibited.
- Renewable energy generated onsite contributes to achieving EA c2: Optimize Energy Performance. The Prerequisite, EA p2: Minimum Energy Performance, must be achieved without accounting for onsite renewable energy.
- StreetBond® SB150 Pavement Coating is fully recyclable with the asphalt.
- EnergyGuard® Polyiso and/or EverGuard® TPO and PVC membranes are recyclable only where appropriate recycling facilities are available. Polyiso may be reused. Note: Adhered membranes are not recyclable at this time.
- GAF's Resilient Red List Free Roofing System's 2-Part Adhesive has VOC content of 68 g/L, which meets LBC VOC limits of 250 g/L based upon SCAQMD Rule #1168 for Single-ply Roof Membrane Adhesives.
- StreetBond® SB150 Pavement Coating has 14 colors. 7 colors meet the LEED® v4 SSc5 credit minimum Solar Reflectance (SR) values. The other 7 colors contribute to credit compliance using the weighted average SR calculation method.
- Recycled content for EverGuard® TPO and EverGuard Extreme® TPO is minimal with 1% Pre-Consumer recycled content.
- StreetBond® SB150 Pavement Coating offers 14 colors, with all 14 SRI values exceeding the Green Globes Heat Island Reduction credit minimum SRI value.
- HPD Disclosure signifies that an HPD is available for Red List chemical assessment purposes by LBC project teams.
- Can be used to comply with 2016 Title 24, Part 6, Cool Roof Requirements of the California Code of Regulations.

Note: Living Building Challenge™ is a trademark of the International Living Future Institute.
 Note: Green Globes is a registered trademark of Green Building Initiative, Inc.
 Note: OlyBond500® is a registered trademark of OMG, Inc.
 Note: For LEED® Online documentation purposes, GAF products listed are considered "Enclosure" and not "Structural."
 Note: Substituting the LEED® v4.1 (beta) version of some Material and Resources credits may contribute more LEED® product value for LEED® v4 projects.

FOR SPECIFIC PRODUCT DETAILS AND TO LOCATE THE REQUIRED DOCUMENTATION FOR LEED® V4, LIVING BUILDING CHALLENGE™, AND GREEN GLOBES®, VISIT: GAF.COM/GREENARCHITECTS

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GAF Green Building Playbook for LEED® v4 Updated February 2020



GAF Product Scorecard for Green Building Programs— Living Building Challenge™ and Green Globes®

Rating System and Version	LIVING BUILDING CHALLENGE™ v3.1					GREEN GLOBES® – NC v2013				
Credit Category										
Credit Description	Health and Happiness Petal	Materials Petal				Site	Materials and Resources	Energy		Indoor Environment
	I08	I10	I12	I13	I14	3.2.2.4	3.5.1.2	3.3.4.1	3.3.9.1	3.7.2.1
	Healthy Interior Environment (CDPH SW v1.1-2010)	Red List (Red List Free, VOCs; Disclosure)	Responsible Industry (Declare)	Living Economy Sourcing (Distance & Declare)	Net Positive Waste	Heat Island Effect	Prescriptive Path for Building Core & Shell (e.g., EPDs) Path B	Thermal Resistance	On-Site Renewable Energy	Volatile Organic Compounds (VOCs)

GAF PRODUCT LINE²

07 21 00 THERMAL INSULATION – ROOFING

EnergyGuard™ Polyiso Insulation	✓ Exempt (exterior)			✓ Declare counts double	✓ ✓		✓ EPD- Generic	✓		✓ Exempt (exterior)
EnergyGuard™ NH Polyiso Insulation	✓ Exempt (exterior)	✓ Declare RfF	✓ Declare RfF	✓ Declare counts double	✓ ✓		✓ EPD- Product-specific Type III	✓		✓ Exempt (exterior)
EnergyGuard™ NH Ultra Polyiso Insulation	✓ Exempt (exterior)	✓ Declare RfF	✓ Declare RfF	✓ Declare counts double	✓ ✓			✓		✓ Exempt (exterior)
EnergyGuard™ NH Barrier Polyiso Insulation	✓ Exempt (exterior)	✓ Declare RfF	✓ Declare RfF	✓ Declare counts double	✓ ✓			✓		✓ Exempt (exterior)
EnergyGuard™ NH HD Polyiso Insulation	✓ Exempt (exterior)	✓ Declare RfF	✓ Declare RfF	✓ Declare counts double	✓ ✓			✓		✓ Exempt (exterior)
EnergyGuard™ NH HD PLUS Polyiso Insulation	✓ Exempt (exterior)	✓ Declare RfF	✓ Declare RfF	✓ Declare counts double	✓ ✓			✓		✓ Exempt (exterior)

07 54 00 THERMOPLASTIC MEMBRANE ROOFING – SINGLE-PLY ROOFING

EverGuard Extreme® TPO 50-80 mil Smooth	✓ Exempt (exterior)	✓ Declare RfF	✓ Declare RfF	✓ Declare counts double	✓ ✓	✓ (White & Energy Gray)	✓ EPD- Product-specific Type III			
EverGuard® TPO 45-80 mil Smooth	✓ Exempt (exterior)	✓ Declare RfF	✓ Declare RfF	✓ Declare counts double	✓ ✓	✓ (4 Standard colors, Gray excluded)	✓ EPD- Product-specific Type III			
Resilient Red List Free Adhered TPO Roofing System	✓ Exempt (exterior)	✓ Declare RfF (Red List Free, VOC compliant) ³	✓ Declare RfF	✓ Declare counts double	✓ ✓	✓ (White & Tan, Gray excluded)		✓		✓ Exempt (exterior)
TPO Single-Ply Roofing Membrane: Mechanically Fastened	✓ Exempt (exterior)			✓ ✓	✓ ✓	✓ (4 Standard colors, Gray excluded)	✓ EPD- Generic			

07 54 19 PVC MEMBRANE ROOFING

EverGuard® PVC Smooth 50-80 mil	✓ Exempt (exterior)			✓ ✓	✓ ✓	✓ (White)	✓ EPD- Product-specific Type III			
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ADHESIVES, PRIMERS, CLEANERS, FASTENERS

Drill-Tec™ Fasteners and Plates	✓ Exempt (exterior)	HPD Disclosure ⁴		✓ ✓	✓ ✓					
EverGuard® TPO CleanWeld™ Conditioner	✓ Exempt (exterior)	HPD Disclosure ⁴		✓ ✓	✓ ✓					✓ Exempt (exterior)
EverGuard® TPO Seam Cleaner	✓ Exempt (exterior)	HPD Disclosure ⁴		✓ ✓	✓ ✓					✓ Exempt (exterior)
GAF 2-Part Roofing Adhesive	✓ Exempt (exterior)	HPD Disclosure ⁴		✓ ✓	✓ ✓					✓ Exempt (exterior)
EverGuard® TPO Low-VOC Bonding Adhesive	✓ Exempt (exterior)	HPD Disclosure ⁴		✓ ✓	✓ ✓					✓ Exempt (exterior)

07 72 73 VEGETATED ROOF SYSTEMS

LiveRoof® System – GAF Vegetative Roofing	✓ Exempt (exterior)			✓ ✓	✓ ✓	✓				
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07 31 13 ASPHALT SHINGLES

Asphalt Shingle Roofing System: Fastened	✓ Exempt (exterior)			✓ ✓	✓ ✓	✓ (Select colors)	✓ EPD- Generic			
Glenwood® Shingles	✓ Exempt (exterior)	HPD Disclosure ⁴		✓ ✓	✓ ✓		✓ EPD- Generic			
Timberline® Cool Series® Shingles	✓ Exempt (exterior)	HPD Disclosure ⁴		✓ ✓	✓ ✓	✓ (2 colors)	✓ EPD- Generic			
Timberline HD® Reflector Series™ Shingles	✓ Exempt (exterior)	HPD Disclosure ⁴		✓ ✓	✓ ✓		✓ EPD- Generic			





GAF Product Scorecard for Green Building Programs— Living Building Challenge™ and Green Globes® (continued)

Rating System and Version	LIVING BUILDING CHALLENGE™ v3.1					GREEN GLOBES® – NC v2013				
Credit Category										
	Health and Happiness Panel	Materials Panel				Site	Materials and Resources	Energy		Indoor Environment
Credit Description	I08	I10	I12	I13	I14	3.2.2.4	3.5.1.2	3.3.4.1	3.3.9.1	3.7.2.1
	Healthy Interior Environment (CDPH SM v1.1-2010)	Red List (Red List Free: VOCs, Disclosure)	Responsible Industry (Declare)	Living Economy Sourcing (Distance & Declare)	Net Positive Waste	Heat Island Effect	Prescriptive Path for Building Core & Shell (e.g., EPDs) Path B	Thermal Resistance	On-Site Renewable Energy	Volatile Organic Compounds (VOCs)
GAF PRODUCT LINE²										
07 51 13 BUILT-UP ASPHALT ROOFING – LOW-SLOPE ASPHALTIC										
GAFGLAS® EnergyCap™ Mineral-Surfaced Cap Sheet										
Built-Up Asphalt Roofing Membrane: Hot Asphalt										
07 13 52 MODIFIED BITUMINOUS SHEET WATERPROOFING										
RUBERCID® Torch Smooth Membrane										
07 52 00 MODIFIED BITUMINOUS MEMBRANE ROOFING										
APP-Modified Bitumen Roofing Membrane: Torch Applied										
RUBERCID® Map Granule										
SBS-Modified Bitumen Roofing Membrane: Cold Adhered										
SBS-Modified Bitumen Roofing Membrane: Hot Asphalt										
SBS-Modified Bitumen Roofing Membrane: Torch Applied										
07 56 00 LIQUID-APPLIED ROOFING – ROOF COATINGS										
HydroStep® PremiumCoat® FinishCoat										
48 14 13 SOLAR ENERGY COLLECTORS										
Solar Roofing Program										
32 12 16 ASPHALT PAVING										
StreetBond® SB150 Pavement Coating										
LOW-VOC ADHESIVES										
EverGuard® Matrix™, LRF, OlyBond500®										

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- For a complete listing of GAF roofing and pavement coating products and submittal documents for LEED® projects, visit <http://gaf.ecoScorecard.com/> or transparencycatalog.com/company/gaf. Also download the **GAF Green Building Playbook: Using GAF Products on LEED® v4 Projects at gaf.com/green**.
- Additional GAF roofing and/or pavement coating colors having a lower SRI or SR value respectively than the LEED® credit minimum may still contribute to SSc5 credit achievement using the weighted average calculation path. Refer to the GAF Green Building Playbook or LEED® Reference Guide under the SSc5: Heat Island Reduction credit for specifics. The SSc5 LEED® credit form can also be sourced to run sample SRI or SR scenarios using the weighted average calculation path.
- Exterior wet-applied Adhesives and Sealants and exterior materials are exempt from LEED® v4 EQc2: Low-Emitting Materials credit requirements for the General Emissions Evaluation and VOC limits, and for Living Building Challenge® (LBC) Imperative 08 for CDPH SM v1.1-2010 compliance, and for Green Globes Indoor Environment 3.7.2.1 VOCs. USGBC definition (and adopted by LBC): "The building interior is defined as everything within the waterproofing membrane. The building exterior is defined as everything outside and inclusive of the primary and secondary weatherproofing system, such as waterproofing membranes and air- and water-resistive barrier materials." Note: The exception is for LEED® for Healthcare and LEED® for Schools projects, which do have VOC requirements for wet-applied exterior materials. For LBC projects, Imperative 10 – Red List also has exterior VOC requirements, addressed in Footnote 10.
- Asphalt shingle recycling programs vary by region. Visit gaf.com/green for our "Find an Asphalt Shingle Recycler" map or visit ShingleRecycling.org.
- This referenced product or system may employ hot asphalt in the installation process. Note that if pursuing the EQc2: Low-Emitting Materials credit, hot-mopped asphalt for LEED® for Healthcare and LEED® for Schools is prohibited.
- Renewable energy generated onsite contributes to achieving EAc2: Optimize Energy Performance. The Prerequisite, EAp2: Minimum Energy Performance, must be achieved without accounting for onsite renewable energy.
- StreetBond® SB150 Pavement Coating is fully recyclable with the asphalt.
- EnergyGuard® Polyiso and/or EverGuard® TPO and PVC membranes are recyclable only where appropriate recycling facilities are available. Polyiso may be reused. Note: Adhered membranes are not recyclable at this time.
- GAF's Resilient Red List Free Roofing System's 2-Part Adhesive has VOC content of 68 g/L, which meets LBC VOC limits of 250 g/L based upon SCAQMD Rule #1168 for Single-ply Roof Membrane Adhesives.
- StreetBond® SB150 Pavement Coating has 14 colors. 7 colors meet the LEED® v4 SSc5 credit minimum Solar Reflectance (SR) values. The other 7 colors contribute to credit compliance using the weighted average SR calculation method.
- Recycled content for EverGuard® TPO and EverGuard Extreme® TPO is minimal with 1% Pre-Consumer recycled content.
- StreetBond® SB150 Pavement Coating offers 14 colors, with all 14 SRI values exceeding the Green Globes Heat Island Reduction credit minimum SRI value.
- HPD Disclosure signifies that an HPD is available for Red List chemical assessment purposes by LBC project teams.
- Can be used to comply with 2016 Title 24, Part 6, Cool Roof Requirements of the California Code of Regulations.

Note: Living Building Challenge™ is a trademark of the International Living Future Institute.
 Note: Green Globes is a registered trademark of Green Building Initiative, Inc.
 Note: OlyBond500® is a registered trademark of OMG, Inc.
 Note: For LEED® Online documentation purposes, GAF products listed are considered "Enclosure" and not "Structural."
 Note: Substituting the LEED® v4.1 (beta) version of some Material and Resources credits may contribute more LEED® product value for LEED® v4 projects.

FOR SPECIFIC PRODUCT DETAILS AND TO LOCATE THE REQUIRED DOCUMENTATION FOR LEED® V4, LIVING BUILDING CHALLENGE™, AND GREEN GLOBES®, VISIT: GAF.COM/GREENARCHITECTS

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¹ For a complete listing of LEED® v4 contributing GAF roofing products and documentation for LEED® projects, visit <http://gaf.ecoScorecard.com>.

² USGBC® does not review, certify, or endorse third-party products or services.



The image features a green-tinted architectural floor plan of a building complex. The plan shows various rooms, corridors, and structural elements in white lines against a solid green background. The text "Integrative Process (IP)" is centered in a bold, white, sans-serif font.

Integrative Process (IP)

IP Credit (1 point)	Integrative Process
Intent	To support high-performance, cost-effective project outcomes through an early analysis of the interrelationships among systems.
IP Description Highlights	Beginning in pre-design and continuing throughout the design phases, identify and use opportunities to achieve synergies across disciplines and building systems. Use the Discovery and Analyses Guidelines described in the credit to inform the owner's project requirements (OPR), basis of design (BOD), design documents, and construction documents.
GAF Contribution to LEED® credit IPc1	<p>GAF roofing, insulation, and pavement coating products contribute to the integrative process in both the Energy-Related Systems and Water-Related Systems analysis, as well as the Implementation criteria.</p> <p>GAF and Energy-Related Systems</p> <ul style="list-style-type: none"> • StreetBond® SB 150 pavement coating adds reflectivity to help reduce heat islands that impact building cooling loads • EnergyGuard™ Non-Halogenated Polyiso insulation addresses thermal building envelope attributes • EverGuard® TPO roofing systems and LiveRoof® System address exterior materials analyses (reflective attributes and/or vegetative roofing) • EverGuard Extreme® TPO roofing with industry-tested high-temperature attributes partners well with solar PV roof systems • GAF Energy provides solar roofing systems <p>GAF and Water-Related Systems</p> <ul style="list-style-type: none"> • Supply sources of onsite rainwater related to roofing systems and catchment • GAF certificate <i>NSF P151: Health Effects from Rainwater Catchment System Components</i> • Landscaping and rainwater management related to vegetative roofing, the GAF LiveRoof® System



A woman with blonde hair and glasses, wearing a white button-down shirt, is looking down at architectural blueprints spread out on a table. Her right hand is resting on the blueprints. The entire image is overlaid with a semi-transparent green filter. The background shows a blurred office or construction site environment.

Sustainable Sites (SS)

SS Credit 2 (1-2 Points)	Site Development: Protect or Restore Habitat
Intent	To conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.
GAF Contribution¹ to LEED® Credit SSc2	Specify a GAF vegetative roof system to contribute towards LEED® credit requirements ² under "Option 1. Onsite Restoration."
IN³ Bonus Point	SSc2 is eligible for an exemplary performance point when doubling the 30% restoration requirements under Option 1.

SS Credit 3 (1 Point)	Open Space
Intent	To create exterior open space that encourages interaction with the environment, social interaction, passive recreation, and physical activities.
GAF Contribution¹ to LEED® Credit SSc3	Specify a GAF vegetative roof system to contribute towards LEED® credit requirements. ²




SS Credit 4 (2-3 points)	Rainwater Management
Intent	To reduce runoff volume and improve water quality by replicating the natural hydrology and water balance of the site, based on historical conditions and undeveloped ecosystems in the region.
GAF Contribution¹ to LEED® Credit SSc4	Specify a GAF vegetative roof system to contribute towards LEED® credit requirements. ²
IN³ Bonus Point	SSc4 is eligible for an exemplary performance point if 100% of rainwater that falls within the project boundary is managed and documented.

¹ USGBC® does not review, certify, or endorse third-party products or services.

² Refer to www.usgbc.org/leed for complete credit requirements.

³ IN stands for Innovation, one of eight LEED® credit categories.



SS Credit 5 (1–2 points)	Heat Island Reduction															
Intent	To minimize effects on microclimates and human and wildlife habitats by reducing heat islands (thermal gradient differences between developed and undeveloped areas).															
GAF Contribution¹ to LEED® Credit SSc5	Specify qualifying GAF roofing membranes and coatings, GAF Solar Roofing System, GAF vegetative roof system and/or GAF StreetBond® pavement coatings to reduce heat absorptions to contribute towards LEED® credit requirements under both Options 1 and 2. (See Tables 3 & 4)															
 <p><i>Image: EverGuard Extreme® TPO</i></p>  <p><i>Image: GAF Vegetative Roof System</i></p>  <p><i>Image: Coated asphalt parking lot using StreetBond® SB150 with Solar Reflectance (SR) Colorants</i></p>	<p>Credit Requirements² - Highlights:</p> <p>Choose one of the following two options:</p> <p>Option 1: Non-Roof and Roof (2 points)</p> <p>Meet the criterion in Equation 1 (see page 16, or alternatively, an SRI and SR weighted average approach may be used to calculate compliance using Equation 2 (see page 16). SRI stands for Solar Reflectance Index and SR is Solar Reflectance.</p> <p>For example, roofing materials having a higher SRI value than those listed in Table 1 may help offset non-roof hardscape areas not meeting the SR values, depending on the relative proportions of roof to non-roof areas and mitigation strategies in the project.</p> <p>Use any combination of the following strategies for Option 1:</p> <p>High-Reflectance Roof</p> <ul style="list-style-type: none"> Use roofing materials that have an SRI equal to or greater than the values in Table 1. <p>Table 1. Minimum solar reflectance index value, by roof slope.</p> <table border="1" data-bbox="706 1344 1399 1522"> <thead> <tr> <th>Roof Type</th> <th>Slope</th> <th>Initial SRI</th> <th>Or</th> <th>3-yr Aged SRI</th> </tr> </thead> <tbody> <tr> <td>Low-sloped roof</td> <td>≤ 2:12 (15%)</td> <td>82</td> <td></td> <td>64</td> </tr> <tr> <td>Steep-sloped roof</td> <td>> 2:12 (15%)</td> <td>39</td> <td></td> <td>32</td> </tr> </tbody> </table> <p>Vegetated Roof</p> <ul style="list-style-type: none"> Install a vegetated roof. 	Roof Type	Slope	Initial SRI	Or	3-yr Aged SRI	Low-sloped roof	≤ 2:12 (15%)	82		64	Steep-sloped roof	> 2:12 (15%)	39		32
Roof Type	Slope	Initial SRI	Or	3-yr Aged SRI												
Low-sloped roof	≤ 2:12 (15%)	82		64												
Steep-sloped roof	> 2:12 (15%)	39		32												

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² Refer to www.usgbc.org/leed for complete credit requirements.

SS Credit 5 (1–2 points)

TIP:

Option 1 in LEED® v4 BD+C now requires combining non-roof (hardscape) areas with roof areas into one performance calculation, if hardscape is present.

TIP:

SR (Solar Reflectance) values are now used to calculate non-roof (hardscape) areas, rather than SRI (Solar Reflectance Index) as in LEED® v2009.



Image: Asphalt streetscape coated with StreetBondSR®

TIP:

Try using the SS5 LEED® credit form to run various roof and hardscape mitigation scenarios for quick calculations.

Go to: <http://usgbc.org/leed>
See Credit Library / Heat Island Reduction / Forms

TIP:

Only 75% of roofing and 50% of non-roofing area must meet the **minimum** SRI and SR values. Because it is a combined performance calculation, this means any areas that exceed the minimum SRI or SR values can actually help 'carry' the areas that are below the minimum SR or SRI values.

IN¹ Bonus Point

Heat Island Reduction (Continued)

Credit Requirements² - Highlights: (continued)

Non-roof Measures

- Use paving materials with a three-year aged SR value of at least 0.28, or if aged values are unavailable, use an initial solar reflectance (SR) value of at least 0.33 at installation
- Provide shade with architectural devices or structures that have a three-year aged SR value of at least 0.28, or if aged is unavailable, use an Initial SR of at least 0.33 at installation
- Provide shade with vegetated structures
- Use an open-grid pavement system (at least 50% unbound)
- Provide shade with structures covered by energy generation systems, such as solar thermal collectors, photovoltaics, and wind turbines
- Use the existing plant material or install plants that provide shade over paving areas (including playgrounds) on the site within 10 years of planting. Install vegetated planters. Plants must be in place at the time of occupancy permit and cannot include artificial turf

Table 2. Typical SR (Solar Reflectance) Values

Standard Non-Roof Materials	Initial SR Index	3-Yr Aged SR Index
Grey cement concrete	0.26	0.18
White cement concrete	0.70	0.35
Asphalt concrete	0.05	0.10

Source: USGBC® LEED® Interpretation #10411

OR

Option 2: Parking Under Cover (1 point)

- Place a minimum of 75% of parking spaces under cover. Any roof used to shade or cover parking must (1) have a three-year aged SRI of at least 32, or if aged is unavailable, have an Initial SRI of at least 39 at installation (2) be a vegetated roof, or (3) be covered by energy generation systems, such as solar thermal collectors, photovoltaics, and wind turbines.

SS5 is eligible for an exemplary performance point if both Options 1 and 2 are achieved AND 100% of parking spaces have been located undercover.

¹ IN stands for Innovation, one of eight LEED® credit categories.

SSc5: Option 1 - Non-Roof and Roof (2 points)

Meet the criterion in Equation 1, or alternatively, an SRI and SR weighted average approach may be used to calculate compliance using Equation 2.

Equation 1. Standard non-roof or roof calculation

EQUATION 1. Standard nonroof or roof calculation

$$\frac{\text{Area of Nonroof Measures}}{0.5} + \frac{\text{Area of High-Reflectance Roof}}{0.75} + \frac{\text{Area of Vegetated Roof}}{0.75} \geq \text{Total Site Paving Area} + \text{Total Roof Area}$$

Source: USGBC®

Equation 2. Weighted non-roof or roof calculation

EQUATION 2. Weighted nonroof or roof calculation

$$\left(\frac{\text{Area of high reflectance nonroof A} \times \frac{\text{SR of high reflectance nonroof A}}{\text{Required SR}} \right)^1 + \frac{\text{Area of other Nonroof Measures}}{0.5} + \left(\frac{\text{Area of high reflectance roof A} \times \frac{\text{SRI of high reflectance roof A}}{\text{Required SRI}} \right)^2 + \frac{\text{Area of Vegetated Roof}}{0.75} \geq \text{Total Site Paving Area} + \text{Total Roof Area}$$

1. Summed for all high-reflectance nonroof areas.
2. Summed for all high-reflectance roof areas.

Source: USGBC®

GAF Roofing Products¹ SRI Values

SSc5: Heat Island Reduction

Table 3. GAF Solar Reflectance Index (SRI) Values

Product Name	Product Area	Initial Reflectivity	Initial Emissivity	Initial SRI	3-Yr. Aged SRI
Product Area: Asphaltic Cap Sheets					
GAFGLAS [®] EnergyCap [™] Mineral-Surfaced Cap Sheet (White)	Cap Sheet	0.72	0.91	89	72
RUBEROID [®] EnergyCap [™] 30 Granule FR (White)	Cap Sheet	0.71	0.90	87	70
RUBEROID [®] EnergyCap [™] HW Plus Granule FR (White)	Cap Sheet	0.75	0.82	91	69
RUBEROID [®] EnergyCap [™] Mop Plus Granule FR (White)	Cap Sheet	0.74	0.84	90	70
RUBEROID [®] EnergyCap [™] Torch Granule FR (White)	Cap Sheet	0.72	0.91	89	pending
RUBEROID [®] EnergyCap [™] Torch Plus Granule FR (White)	Cap Sheet	0.74	0.90	92	77
Product Area: Single-Ply Membranes					
EverGuard Extreme [®] TPO (Energy Gray)	Single-Ply Membrane	0.73	0.90	90	80
EverGuard Extreme [®] TPO (White)	Single-Ply Membrane	0.83	0.84	103	89
EverGuard Extreme [®] TPO FB Ultra (White)	Single-Ply Membrane	0.83	0.84	103	89
EverGuard [®] Freedom [™] TPO (Gray)	Single-Ply Membrane	0.40	0.89	45	46
EverGuard [®] Freedom [™] TPO (Tan)	Single-Ply Membrane	0.65	0.90	79²	69
EverGuard [®] Freedom [™] TPO (White)	Single-Ply Membrane	0.76	0.90	94	81
EverGuard [®] PVC (White)	Single-Ply Membrane	0.87	0.88	110	pending
EverGuard [®] PVC Fleece-back (White)	Single-Ply Membrane	0.87	0.88	110	pending
EverGuard [®] PVC KEE (White)	Single-Ply Membrane	0.87	0.88	110	pending
EverGuard [®] PVC KEE Fleece-back (White)	Single-Ply Membrane	0.87	0.88	110	pending

¹ USGBC[®] does not review, certify, or endorse third-party products or services.

² Roofing and/or pavement coating materials having a lower SRI or SR value than the minimum values stated in SSc5 requirements may still contribute to achieving this credit in many cases using Equation 1 or by using the weighted calculation path using Equation 2 in the LEED[®] Reference Guide or by inputting various project scenarios in the SSc5 sample credit form or in LEED[®] Online.



GAF Roofing Products¹ SRI Values (continued)

SSc5: Heat Island Reduction

Table 3. GAF Solar Reflectance Index (SRI) Values (continued)

Product Name	Product Area	Initial Reflectivity	Initial Emissivity	Initial SRI	3-Yr. Aged SRI
Product Area: Single-Ply Membranes (continued)					
EverGuard® PVC Smooth (White)	Single-Ply Membrane	0.87	0.87	110	93
EverGuard® PVC XK (White)	Single-Ply Membrane	0.87	0.87	110	93
EverGuard® PVC XK Fleeceback (White)	Single-Ply Membrane	0.87	0.87	110	93
EverGuard® TPO (Energy Gray)	Single-Ply Membrane	0.72	0.87	88	82
EverGuard® TPO (Energy Tan)	Single-Ply Membrane	0.72	0.89	88	80
EverGuard® TPO (Gray)	Single-Ply Membrane	0.40	0.89	45	46
EverGuard® TPO (Tan)	Single-Ply Membrane	0.65	0.90	79²	69
EverGuard® TPO (White)	Single-Ply Membrane	0.76	0.90	94	81
EverGuard® TPO FB Ultra (Gray)	Single-Ply Membrane	0.40	0.89	45	46
EverGuard® TPO FB Ultra (Tan)	Single-Ply Membrane	0.65	0.90	79²	69
EverGuard® TPO FB Ultra(White)	Single-Ply Membrane	0.76	0.90	94	81
Product Area: Coatings					
HydroStop® PremiumCoat® Finish Coat (Cotton)	Coating	0.71	0.90	87	82
HydroStop® PremiumCoat® Finish Coat (White)	Coating	0.79	0.90	99	86
United Coatings™ EnergyCote™ Roof Coating (White)	Coating	0.91	0.87	115	97
TOPCOAT® MB Plus (White)	Coating	0.83	0.88	104	90
TOPCOAT® Membrane (White)	Coating	0.85	0.90	107	84
TOPCOAT® Surface Seal SB (White)	Coating	0.84	0.90	106	70
United Coatings™ Acron 60 Roof Coating (White)	Coating	0.84	0.88	105	80

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GAF Roofing Products¹ SRI Values (continued)

SSc5: Heat Island Reduction

Table 3. GAF Solar Reflectance Index (SRI) Values (continued)

Product Name	Product Area	Initial Reflectivity	Initial Emissivity	Initial SRI	3-Yr. Aged SRI
Product Area: Coatings (continued)					
United Coatings™ Diathon® HT Roof Coating (White)	Coating	0.82	0.89	103	89
United Coatings™ Diathon® Roof Coating (Light Tan)	Coating	0.71	0.93	88	71
United Coatings™ Diathon® Roof Coating (Tan)	Coating	0.67	0.90	82	50
United Coatings™ Diathon® Roof Coating (White)	Coating	0.83	0.92	105	87
United Coatings™ Elastuff™ 103 Roof Coating (White)	Coating	0.81	0.89	101	83
United Coatings™ Kymax™ Coating (White)	Coating	0.87	0.87	110	95
United Coatings™ Roof Mate™ Top Coat (Light Tan)	Coating	0.71	0.93	88	71
United Coatings™ Roof Mate™ Top Coat (Tan)	Coating	0.67	0.90	82	50
United Coatings™ Roof Mate™ Top Coat (White)	Coating	0.83	0.92	105	87
United Coatings™ Roof Mate™ HT Coating (White)	Coating	0.82	0.89	103	89
United Coatings™ Roof Mate™ MB Plus Coating (White)	Coating	0.83	0.88	104	90
United Coatings™ Roof Mate™ TCM Coating (White)	Coating	0.85	0.90	107	84
United Coatings™ Roofshield® Coating (Tan)	Coating	0.66	0.90	80²	55²
United Coatings™ Roofshield® Coating (White)	Coating	0.84	0.90	106	81
United Coatings™ Surface Seal SB Roof Coating (White)	Coating	0.84	0.90	106	70

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² Roofing and/or pavement coating materials having a lower SRI or SR value than the minimum values stated in SSc5 requirements may still contribute to achieving this credit in many cases using Equation 1 or by using the weighted calculation path using Equation 2 in the LEED® Reference Guide or by inputting various project scenarios in the SSc5 sample credit form or in LEED® Online.

GAF Roofing Product¹ SRI Values (continued)
SSc5: Heat Island Reduction

Table 3. GAF Solar Reflectance Index (SRI) Values (continued)

Product Name	Product Area	Initial Reflectivity	Initial Emissivity	Initial SRI	3-Yr. Aged SRI
Product Area: Coatings (continued)					
United Coatings™ Unisil HS Roof Coating (White)	Coating	0.87	0.89	110	86
United Coatings™ Unisil Roof Coating (White)	Coating	0.85	0.85	106	80
Product Area: Shingles					
Glenwood® (Golden Prairie)	Shingle	0.17	0.92	16	18
Grand Sequoia® Reflector Series™ – Charcoal (Fontana, CA plant)	Shingle	0.18	0.92	17	pending
Grand Sequoia® Reflector Series™ – Forest Brown (Fontana, CA plant)	Shingle	0.19	0.92	19	pending
Grand Sequoia® Reflector Series™ – Ocean Gray (Fontana, CA plant)	Shingle	0.19	0.92	19	pending
Grand Sequoia® Reflector Series™ – Sagewood (Fontana, CA plant)	Shingle	0.20	0.92	20	pending
Grand Sequoia® Reflector Series™ – Sandalwood (Fontana, CA plant)	Shingle	0.20	0.92	20	pending
Royal Sovereign® (White)	Shingle	0.27	0.91	28	25²
Timberline HD® - White (Tampa, Fla plant)	Shingle	0.26	0.85	24	25²
Timberline HD® Reflector Series™ - Birchwood (Shafter, CA plant)	Shingle	0.20	0.92	20	24²
Timberline HD® Reflector Series™ - Charcoal (Shafter, CA plant)	Shingle	0.16	0.92	15	pending

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² Roofing and/or pavement coating materials having a lower SRI or SR value than the minimum values stated in SSc5 requirements may still contribute to achieving this credit in many cases using Equation 1 or by using the weighted calculation path using Equation 2 in the LEED® Reference Guide or by inputting various project scenarios in the SSc5 sample credit form or in LEED® Online.



GAF Roofing Products¹ SRI Values (continued)
SSc5: Heat Island Reduction

Table 3. GAF Solar Reflectance Index (SRI) Values (continued)

Product Area: Shingles (continued)					
Timberline HD® Reflector Series™ - Copper Canyon (Shafter, CA plant)	Shingle	0.17	0.92	16	16
Timberline HD® Reflector Series™ - Golden Amber (Shafter, CA plant)	Shingle	0.20	0.92	20	21
Timberline HD® Reflector Series™ - Hickory (Shafter, CA plant)	Shingle	0.18	0.91	17	pending
Timberline HD® Reflector Series™ - Sagewood (Shafter, CA plant)	Shingle	0.19	0.91	18	pending
Timberline HD® Reflector Series™ - Sandalwood (Shafter, CA plant)	Shingle	0.21	0.90	21	pending
Timberline HD® Reflector Series™ - Stone Gray (Shafter, CA plant)	Shingle	0.17	0.91	16	pending
Timberline Ultra HD® Reflector Series™ – Sagewood (Shafter, CA plant)	Shingle	0.19	0.91	18	pending
Timberline Ultra HD® Reflector Series™ – Hickory (Shafter, CA plant)	Shingle	0.18	0.91	17	pending
Timberline Ultra HD® Reflector Series™ – Hickory (Shafter, CA plant)	Shingle	0.18	0.91	17	pending
Timberline Ultra HD® Reflector Series™ – Aged Chestnut (Shafter, CA plant)	Shingle	0.18	0.90	16	pending
Timberline Ultra HD® Reflector Series™ – Birchwood (Shafter, CA plant)	Shingle	0.20	0.92	20	24²

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² Roofing and/or pavement coating materials having a lower SRI or SR value than the minimum values stated in SSc5 requirements may still contribute to achieving this credit in many cases using Equation 1 or by using the weighted calculation path using Equation 2 in the LEED® Reference Guide or by inputting various project scenarios in the SSc5 sample credit form or in LEED® Online.

GAF Roofing Product¹ SRI Values (continued)

SSc5: Heat Island Reduction

Table 3. GAF Solar Reflectance Index (SRI) Values (continued)

Product Name	Product Area	Initial Reflectivity	Initial Emissivity	Initial SRI	3-Yr. Aged SRI
Product Area: Shingles (continued)					
Timberline Ultra HD® Reflector Series™ – Charcoal (Shafter, CA plant)	Shingle	0.16	0.92	15	pending
Timberline Ultra HD® Reflector Series™ – Coastal Slate (Shafter, CA plant)	Shingle	0.18	0.91	17	pending
Timberline Ultra HD® Reflector Series™ – Sandalwood (Shafter, CA plant)	Shingle	0.21	0.91	21	pending
Timberline® American Harvest® - Amber Wheat	Shingle	0.18	0.92	17	18
Timberline® Cool Series® - Cool Antique Slate	Shingle	0.28	0.92	30²	27²
Timberline® Cool Series® - Cool Barkwood	Shingle	0.27	0.90	28	28²
Timberline® Cool Series® - Cool Weathered Wood	Shingle	0.28	0.92	30²	28²
Timberline® Natural Shadow® - Arctic White	Shingle	0.26	0.85	24	25²

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² Roofing and/or pavement coating materials having a lower SRI or SR value than the minimum values stated in SSc5 requirements may still contribute to achieving this credit in many cases using Equation 1 or by using the weighted calculation path using Equation 2 in the LEED® Reference Guide or by inputting various project scenarios in the SSc5 sample credit form or in LEED® Online.

GAF Non-Roof Products¹ SR Values (Hardscape)
SSc5: Heat Island Reduction

Table 4. GAF Solar Reflectance (SR) Values

Product Name	Product Area	Initial SR	3-Yr. Aged SR
Product Area: Pavement Coatings			
StreetBond® SB150 SR Pavement Coating (SR White)	Pavement Coatings	0.72	n/a
StreetBond® SB150 SR Pavement Coating (SR Sun Baked Clay)	Pavement Coatings	0.44	n/a
StreetBond® SB150 SR Pavement Coating (SR Irish Cream)	Pavement Coatings	0.48	n/a
StreetBond® SB150 SR Pavement Coating (SR Limestone)	Pavement Coatings	0.33	n/a
StreetBond® SB150 SR Pavement Coating (SR Paprika)	Pavement Coatings	0.38	n/a
StreetBond® SB150 SR Pavement Coating (SR Mustard)	Pavement Coatings	0.35	n/a
StreetBond® SB150 SR Pavement Coating (SR Khaki)	Pavement Coatings	0.33	n/a
StreetBond® SB150 SR Pavement Coating (SR Sandstone)	Pavement Coatings	0.35	n/a
StreetBond® SB150 SR Pavement Coating (SR Evergreen)	Pavement Coatings	0.33	n/a
StreetBond® SB150 SR Pavement Coating (SR Fawn)	Pavement Coatings	0.29²	n/a
StreetBond® SB150 SR Pavement Coating (SR Terra Cotta)	Pavement Coatings	0.32²	n/a
StreetBond® SB150 SR Pavement Coating (SR Slate)	Pavement Coatings	0.28²	n/a
StreetBond® SB150 SR Pavement Coating (SR Brownstone)	Pavement Coatings	0.30²	n/a
StreetBond® SB150 SR Pavement Coating (SR Safety Blue)	Pavement Coatings	0.30²	n/a
StreetBond® SB150 SR Pavement Coating (SR Sandy Beige)	Pavement Coatings	0.26²	n/a

¹ USGBC® does not review, certify, or endorse third-party products or services.

² Roofing and/or pavement coating materials having a lower SRI or SR value than the minimum values stated in SSc5 requirements may still contribute to achieving this credit in many cases using Equation 1 or by using the weighted calculation path using Equation 2 in the LEED® Reference Guide or by inputting various project scenarios in the SSc5 sample credit form or in LEED® Online.



GAF LEED® Case Study #1

Project Profile

Example project of how GAF roofing products contribute directly to achieving multiple LEED® v4 credit requirements.



LEED® Credit SSc5: *Heat Island Reduction*

EverGuard Extreme® TPO White roofing (Initial SRI of 94) exceeds the minimum LEED® credit threshold of Initial SRI 82.

LEED® Credit MRc2: *BPDO¹ – Environmental Product Declaration (EPD)*

EverGuard Extreme® TPO roofing has a third-party verified Product-specific Type III EPD, which means it contributes as 1 'whole' product to the 20 required for credit achievement.

EnergyGuard™ Polyiso Roof Insulation has an industry-wide (generic) EPD, contributing as 'one-half' product value toward credit achievement.

LEED® Credit MRc3: *BPDO – Leadership Extraction Practices*

EverGuard Extreme® TPO roofing and EnergyGuard™ Polyiso Roof Insulation contribute with their recycled content.

LEED® Credit MRc4: *BPDO – Material Ingredients*

EverGuard Extreme® TPO roofing and EnergyGuard™ Polyiso both contribute with the required Health Product Declaration (HPD) transparency disclosures. EverGuard Extreme® also carries a Declare® Red List Free Label.

LEED® Credit EQc2: *Low-Emitting Materials*

GAF's low-VOC adhesives and sealants in this project are all exterior-applied, which exempts them from credit requirements.

LEED® Credit IPc1: *Integrative Process*

EverGuard Extreme® TPO roofing and EnergyGuard™ Polyiso Insulation both contribute to the Energy-Related Systems compliance portion of this credit through the Discovery and Implementation process for the building envelope and roofing systems. EverGuard Extreme® TPO contributes towards Renewable Energy opportunities given its advanced heat and UV protection properties.

Contributing to the Water-Related Systems requirement, EverGuard Extreme® TPO is also certified through an **NSF P151 Health Effects from Rainwater Catchment System Components**.

¹ BPDO stands for Building Product Disclosure and Optimization.

GAF LEED® Case Study #2

Project Profile: Historical Beach House Parking Lot - Annenberg Community Beach Club
Location: Santa Monica, CA

Project Challenge:

Reduce the Heat Island Effect of the existing dark, non-reflective asphalt parking surface.

GAF Solution:

The project applied GAF's *StreetBond® SB150 Pavement Coating* that contains a SR (solar reflective) Colorant that keeps asphalt cooler, which in turn keeps outdoor ambient temperatures lower. This reduction then contributes to lowering cooling demands and costs of the building while also reducing CO² emissions and pollution.

GAF's *StreetBond® SB150* contributes to the following LEED® v4 credits:

LEED® Credit SSc5:

Heat Island Reduction

StreetBond® SB150 Pavement Coating increased the Solar Reflectance (SR) of the black asphalt parking pavement from Initial SR 0.05 to Initial SR 0.33 using the Khaki Colorant. StreetBond® SB150 solar reflectance colorant selections range from SR 0.30 to 0.60.

Image: Coated asphalt parking lot with StreetBond® SB150 Pavement Coating applied

LEED® Credits EAp2 & EAc2: Optimize Energy Performance

GAF StreetBond® SB150 Pavement Coating contributed to reducing the cooling loads of the building by decreasing the outside summer ambient temperatures.

StreetBond® increased the Solar Reflectance of the asphalt parking pavement by reflecting more of the summer sun's heat.

LEED® Credit EQc2: Low-Emitting Materials

GAF StreetBond® SB150 Pavement Coating is water based, and low VOC (<25 g/L), and meets stringent SCAQMD air pollution regulations.

LEED Credit IPc1: Integrative Process

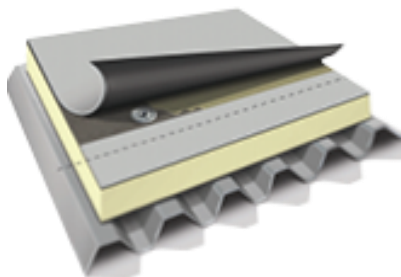
GAF StreetBond® SB150 Pavement Coating contributes to the Energy-Related Systems path of this credit, specifically in the Discovery and Implementation process for Site Conditions. The Integrative Process identifies design opportunities to achieve synergies across disciplines and building systems. In this case, the default decisions for hardscape surfaces are explored, resulting in the StreetBond® reflective coating solution over the traditional non-reflective asphalt parking pavement, but without the cost of concrete.

The background of the slide is a detailed architectural floor plan of a building, rendered in white lines on a solid green background. The plan shows various rooms, corridors, and structural elements, including a large central area with a grid pattern and several smaller rooms with furniture icons. The text "Energy & Atmosphere (EA)" is centered over the plan in a bold, white, sans-serif font.

Energy & Atmosphere (EA)

EA Credit 1 (2-6 points)	Enhanced Commissioning
Intent	To further support the design, construction, and eventual operation of a project that meets the owner's project requirements for energy, water, indoor environmental quality, and durability.
GAF Contribution¹ to LEED® Credit EAc1	<p>Option 2. Building Envelope Commissioning (BECx) is new in LEED® v4.</p> <p>GAF can contribute to achieving this credit option by supporting the design and construction team with roofing system drawings and specifications for the roofing portions of the thermal envelope.</p>

EAp2 / EA Credit 2 (1-18 points)	Minimum / Optimize Energy Performance
Intent	To achieve increasing levels of energy performance beyond the baseline in the prerequisite standard to reduce harmful environmental and economic impacts associated with excessive energy use.
GAF Contribution¹ to LEED® Credit EAp2/EAc2	<p>Option 1: Use GAF EnergyGuard™ Polyiso Roof Insulation to improve thermal building performance compared to the baseline per ANSI/ASHRAE/IESNA Standard 90.1-2010. (See Table 5)</p> <p>Other methods to improve energy performance using GAF products include the use of a reflective roofing membrane system, vegetative roof system, or solar roofing system².</p>



*Image: GAF EnergyGuard™ Halogen-Free Polyiso
Roof Insulation*

¹ USGBC® does not review, certify, or endorse third-party products or services.

² Refer to <http://www.usgbc.org/leed> for complete credit requirements.

EAc2: Optimize Energy Performance
Points Awarded for Increase in Energy Performance over Base Standard

Table 5



Energy Efficiency Improvement¹		LEED® Points
New Construction	Major Renovation	
6%	4%	1
8%	6%	2
10%	8%	3
12%	10%	4
14%	12%	5
16%	14%	6
18%	16%	7
20%	18%	8
22%	20%	9
24%	22%	10
26%	24%	11
29%	27%	12
32%	30%	13
35%	33%	14
38%	36%	15
42%	40%	16
46%	44%	17
50%	48%	18
54%	54%	IN ² Bonus Point

Source: USGBC®

¹ The Building Performance Rating Method includes ALL of the energy costs within and associated with the building project.

² IN stands for Innovation, one of eight LEED® credit categories.



EA Credit 5 (1-3 points)	Renewable Energy Production										
Intent	To reduce the environmental and economic harms associated with fossil fuel energy by increasing self-supply of renewable energy.										
<p>GAF Contribution¹ to LEED® Credit EAc5</p>  <p><i>Image: GAF Solar Roofing System</i></p>  <p><i>Image: GAF Master Flow® Green Machine™ Solar-Powered EcoSmart Roof Vent</i></p>	<p>Use a GAF Solar Roofing System or GAF Master Flow® Green Machine™ Solar-Powered EcoSmart Roof Vent product to contribute toward credit thresholds in Table 6.</p> <p>Credit Requirements² - Highlights:</p> <p>Specify renewable energy systems to offset building energy costs. Calculate the percentage of renewable energy with the following equation:</p> $\% \text{ renewable energy} = \frac{\text{Equivalent cost of usable energy produced by the renewable energy system [divided by]}}{\text{Total building annual energy cost}}$ <p>Onsite Renewable Energy Thresholds Table 6</p> <table border="1" data-bbox="696 1045 1373 1297"> <thead> <tr> <th>Percentage Renewable Energy²</th> <th>LEED® Points</th> </tr> </thead> <tbody> <tr> <td>1%</td> <td>1</td> </tr> <tr> <td>5%</td> <td>2</td> </tr> <tr> <td>10%</td> <td>3</td> </tr> <tr> <td>15%</td> <td>IN³ Bonus Point</td> </tr> </tbody> </table>	Percentage Renewable Energy ²	LEED® Points	1%	1	5%	2	10%	3	15%	IN ³ Bonus Point
Percentage Renewable Energy ²	LEED® Points										
1%	1										
5%	2										
10%	3										
15%	IN ³ Bonus Point										




¹ USGBC® does not review, certify, or endorse third-party products or services.

² Refer to www.usgbc.org/leed for complete credit requirements.



³ IN stands for Innovation, one of eight LEED® credit categories.

Materials & Resources (MR)

MR Credit 1 (2-5 points)	Building Life-Cycle Impact Reduction
<p>Intent</p>	<p>To encourage adaptive reuse and optimize the environmental performance of products and materials.</p>
<p>GAF Contribution¹ to LEED® Credit MRc1</p> <div data-bbox="302 678 638 934" style="border: 1px solid black; padding: 5px; margin: 10px 0;">  <p>The image shows the cover of a GAF report. At the top is the GAF logo in a red square. Below it, the text reads 'Life Cycle Assessment Report for Thermoplastic Polyolefin (TPO) Roofing Products'. At the bottom, there are five small icons representing different stages of a building's life cycle: a wheelbarrow, a tractor, a factory, a person, and a truck.</p> </div> <p>Image: GAF Life-Cycle Assessment (LCA) Report for TPO</p>	<p>GAF EverGuard® TPO products have contributed LCA (Life-Cycle Assessment) data to the Athena Impact Estimator, which is a tool used to calculate achievement of Option 4: Whole-Building Life-Cycle Assessment for this credit.</p> <hr/> <p>Credit Requirements² - Highlights:</p> <p>Demonstrate reduced environmental effects during initial project decision-making by reusing existing building resources or demonstrating a reduction in materials use through life-cycle assessment. Achieve one of the following options.</p> <p>Option 1. Historic Building Reuse</p> <p>Option 2. Renovation of Abandoned or Blighted Buildings</p> <p>Option 3. Building and Material Reuse</p> <p>Option 4. Whole-Building Life-Cycle Assessment</p> <p>For new construction (buildings or portions of buildings), conduct a life-cycle assessment (LCA) of the project's structure and enclosure that demonstrates a minimum of 10% reduction compared with a baseline building in at least three of the six impact categories, one of which must be global warming potential. No impact category assessed as part of the life-cycle assessment may increase by more than 5% compared with the baseline building.</p>

¹ USGBC® does not review, certify, or endorse third-party products or services.

² Refer to www.usgbc.org/leed for complete credit requirements.

MR Credit 2 (1-2 points)	Building Product Disclosure and Optimization – Environmental Product Declarations
<p>Intent</p>	<p>To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts.</p> <p>To reward project teams for selecting products from manufacturers who have verified improved environmental life-cycle impacts.</p>
<p>GAF Contribution¹ to LEED® Credit MRc2</p>	<p>Select numerous GAF products with a published third-party Type III EPD. (See Table 9 for full list of products)</p>
 <p>Image: GAF Product-specific Type III EPD for EverGuard® TPO</p> <p>TIP: Option 1 EPDs can be achieved sourcing:</p> <ul style="list-style-type: none"> • 20 products counting as 'Whole product,' or • 40 products counting as 'Half product,' or • 80 products counting as 'Quarter product,' or • any combination  <p>ENVIRONMENTAL PRODUCT DECLARATION Polyiso Roof Insulation Boards</p> <p>Image: GAF Industry-Wide (generic) EPD for EnergyGuard® Polyiso</p>	<p>Credit Requirements² - Highlights: Achieve one or more of the options below, for a maximum of 2 points.</p> <p>Option 1: Environmental Product Declaration (EPD) (1 point) Use at least 20 different permanently installed products sourced from at least five different manufacturers that meet one of the disclosure criteria below.</p> <p>Product-Specific Declaration Products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle-to-gate scope are valued as one quarter (1/4) of a product for the purposes of credit achievement calculation.</p> <p>Environmental Product Declarations (EPDs) EPDs that conform to ISO 14025 and EN 15804 or ISO 21930 and have at least a cradle-to-gate scope.</p> <ul style="list-style-type: none"> • Industry-wide (generic) EPD – Products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant by the program operator are valued as one half (1/2) of a product for purposes of credit achievement calculation. • Product-specific Type III EPD – Products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as the participant by the program operator are valued as one whole product for purposes of credit achievement calculation. <p>USGBC-approved program (future)</p> <p>AND/OR</p>

¹ USGBC® does not review, certify, or endorse third-party products or services.

² Refer to www.usgbc.org/leed for complete credit requirements.

MR Credit 2 (1-2 points)	Building Product Disclosure and Optimization – Environmental Product Declarations (Continued)
<p>TIP: Use the LEED® MR credit BPDO Calculator to track and document material purchases (or projections) and their eligible mix-and-match criteria for MR credit achievement.</p> <p>Go to http://usgbc.org and search 'BPDO calculator.'</p>  <p>EnergyGuard™ NH</p> <p>Environmental Product Declaration for EnergyGuard™ NH Polyiso</p> <p>TIP: Looking for the actual product EPDs to view or document for this credit? Go to: http://gaf.ecoscorecard.com/ or https://www.transparencycatalog.com/company/gaf or http://www.gaf.com/green</p>	<p>Option 2. Multiattribute Optimization (1 point)</p> <p>Use products that comply with one of the criteria below for 50%, by cost, of the total value of permanently installed products in the project. Products will be valued as below.</p> <ul style="list-style-type: none"> - Third-party certified products that demonstrate impact reduction below industry average in at least three of the following categories are valued at 100% of their cost for credit achievement calculations. <ul style="list-style-type: none"> ○ global warming potential (greenhouse gases), in CO₂e; ○ depletion of the stratospheric ozone layer, in kg CFC-11; ○ acidification of land and water sources, in moles H⁺ or kg SO₂; ○ eutrophication, in kg nitrogen or kg phosphate; ○ formation of tropospheric ozone, in kg NO_x, kg O₃, or kg ethane; and ○ depletion of nonrenewable energy resources, in MJ. - Future USGBC-approved program for multiattribute frameworks. <p>Location valuation factor (a regional multiplier): For credit achievement calculation, products sourced (extracted, manufactured, AND purchased) within 100 miles (160 km) of the project site are valued at 200% of their base contributing cost. Go to http://gaf.ecoscorecard.com to determine project distances.</p> <p>Structure and enclosure materials may not constitute more than 30% of the value of compliant building products. However: Projects with significant amounts of structural and enclosure materials <u>may</u> exceed the 30% limit by calculating an alternative structure and enclosure limit.</p>

Table 8. USGBC® EPD Process Comparison – MRc2 (LEED® v4)

EPD Types	Product-specific Declaration	Industry-Wide EPD	Product-specific EPD
Data are critically reviewed	X	X	X
Data are specific to product	X		X
Data are reported according to a PCR		possibly	X

Source: USGBC®

GAF Products with EPD¹ Transparency Reporting

MRC2: BPDO - Environmental Product Declarations (EPDs)²

Table 9. GAF Published EPDs

	LCA		EPDs	
MRC2 - Opt. 1 Requirements: "Use at least 20 different permanently installed products sourced from at least five different manufacturers that meet one of the [MRC2 EPD] disclosure criteria."	Product-specific Declaration	Industry-wide (generic) EPD	Product-specific Type III EPD	
Contributing GAF Products	¼ LEED® product value	½ LEED® product value	1 Whole LEED® product value	
07 21 00 Thermal Insulation – Roofing				
EnergyGuard® NH Polyiso Roof Insulation			✓	
EnergyGuard® Polyiso Roof Insulation		✓		
07 54 00 Thermoplastic Membrane Roofing - Single-Ply				
EverGuard® TPO Roofing			✓	
EverGuard Extreme® TPO Roofing			✓	
EverGuard® PVC Membrane Smooth			✓	
TPO Single-Ply Roofing Membrane: Fastened		✓		
07 51 13 Built-Up Asphalt Roofing – Low-Slope Asphaltic				
Built-Up Asphalt Roofing Membrane: Hot Asphalt		✓		
GAFGLAS® EnergyCap™ Mineral-Surfaced Cap Sheet		✓		
07 52 00 APP-Modified Bituminous Membrane Roofing: Torch Applied				
APP-Modified Bitumen Roofing Membrane: Torch Applied		✓		
07 52 00 SBS-Modified Bituminous Membrane Roofing: Torch Applied				
SBS-Modified Bitumen Roofing Membrane: Torch Applied		✓		
07 52 00 SBS-Modified Bituminous Membrane Roofing: Hot Asphalt				
SBS-Modified Bitumen Roofing Membrane: Hot Asphalt		✓		

¹ Visit WWW.GAF.COM/GREEN for EPD transparency documents.

² Project teams may optionally consider substituting the LEED® v4.1 (beta) version of the MRC2 credit that may reward even higher product values for EPDs than the current MRC2 LEED® v4 version.

GAF Products with EPD¹ Transparency Reporting (continued)
MRC2: BPDO - Environmental Product Declarations (EPDs)² (continued)

Table 9. GAF Published EPDs (continued)

	LCA	EPDs	
MRC2 - Opt. 1 Requirements: <i>"Use at least 20 different permanently installed products sourced from at least five different manufacturers that meet one of the [MRC2 EPD] disclosure criteria."</i>	Product-specific Declaration	Industry-wide (generic) EPD	Product-specific Type III EPD
Contributing GAF Products	¼ LEED® product value	½ LEED® product value	1 Whole LEED® product value
07 52 00 SBS-Modified Bituminous Membrane Roofing: Cold-Applied			
SBS-Modified Bitumen Roofing Membrane: Cold Adhered		✓	
07 31 13 Asphalt Shingles – Steep Slope Roofing			
Asphalt Shingle Roofing Systems: Fastened		✓	
Timberline® Cool Series® Shingles		✓	
Timberline HD® Reflector Series™ Shingles		✓	
Glenwood® Shingles		✓	

¹ Visit WWW.GAF.COM/GREEN for EPD transparency documents.

² Project teams may optionally consider substituting the LEED® v4.1 (beta) version of the MRC2 credit that may reward even higher product credit values for EPDs than the current MRC2 LEED® v4 version shown above.

MR Credit 3 (1-2 points)	Building Product Disclosure and Optimization – Sourcing of Raw Materials
<p>Intent</p>	<p>To encourage the use of products and materials for which life cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts.</p> <p>To reward project teams for selecting products verified to have been extracted or sourced in a responsible manner.</p>
<p>GAF Contribution¹ to LEED[®] Credit MRc3</p>	<p>Select GAF products that can contribute to Option 2; Leadership Extraction Practices. (See Table 10)</p>
<p>TIP:</p> <p>Use the LEED[®] MR credit BPDO Calculator to track and document material purchases (or projections) and their eligible mix-and-match criteria for MR credit achievement.</p> <p>Go to http://usgbc.org and search 'BPDO calculator.' Be sure to source the latest version.</p> <p>Recycled content is the sum of postconsumer recycled content plus one-half the preconsumer recycled content, based on cost.</p> <p>Products meeting recycled content criteria are valued at 100% of their cost for the purposes of credit achievement calculation.</p>	<p>Credit Requirements² - Highlights:</p> <p>Option 1: Raw Material Source and Extraction Reporting (1 point)</p> <p>Option 2: Leadership Extraction Practices (1 point)</p> <p>Use products that meet at least one of the responsible criteria below for at least 25%, by cost, of the total value of permanently installed building products in the project.</p> <ul style="list-style-type: none"> • Recycled content • Extended producer responsibility • Bio-based materials • Wood products • Materials reuse • USGBC-approved program (future) <p>Location valuation factor (a regional multiplier):</p> <p>For credit achievement calculation, products sourced (extracted, manufactured, AND purchased) within 100 miles (160 km) of the project site are valued at 200% of their base contributing cost. Go to http://gaf.ecoScorecard.com to determine project distances.</p> <p>Structure and enclosure materials may not constitute more than 30% of the value of compliant building products. However:</p> <p>Projects with significant amounts of structural and enclosure materials <u>may</u> exceed the 30% limit by calculating an alternative structure and enclosure limit.</p>
<p>IN³ Bonus Credit</p>	<p>Option 1: Source at least 40 products from five manufacturers. Option 2: Purchase 50%, by cost, of the total value of permanently installed building products that meet the responsible extraction criteria.</p>

¹ USGBC[®] does not review, certify, or endorse third-party products or services.

² Refer to www.usgbc.org/leed for complete credit requirements.

³ IN stands for Innovation, one of eight LEED[®] credit categories.

GAF Products¹ Recycled Content

MRC3: BPDO – Sourcing of Raw Materials

Table 10. GAF Recycled Content

Commercial Roofing Products²	Recycled Content³ Postconsumer	Recycled Content³ Preconsumer
Product Area: Single-Ply Membrane		
EverGuard® TPO (White) 45 mil, 60 mil, 80 mil	0%	1.0%
EverGuard® TPO (Tan) 45 mil, 60 mil, 80 mil	0%	1.0%
EverGuard® Energy Tan TPO 45 mil, 60 mil, 80 mil	0%	1.0%
EverGuard® Energy Gray TPO 45 mil, 60 mil, 80 mil	0%	1.0%
EverGuard® Freedom™ TPO (White) 45 mil, 60 mil, 80 mil	0%	1.0%
EverGuard® Freedom™ TPO (Tan) 45 mil, 60 mil, 80 mil	0%	1.0%
EverGuard® TPO Fleece-Back (White) 45 mil, 60 mil, 80 mil	0%	1.0%
EverGuard® TPO Fleece-Back (Tan) 45 mil, 60 mil, 80 mil	0%	1.0%
EverGuard® PVC (White) 50 mil, 60 mil, 80 mil	7.0%	7.0%
EverGuard® PVC Fleece-Back (White) 60 mil, 80 mil	7.0%	7.0%
EverGuard® Steep-Slope TPO (White) Residential	0%	1.0%
EverGuard Extreme® TPO (White) 50 mil, 60 mil, 70 mil, 80 mil	0%	1.0%
Product Area: Roof Insulation⁴		
EnergyGuard™ Polyiso Insulation AA Panel EnergyGuard™ NH Polyiso Insulation AA Panel	34%	11%
EnergyGuard™ Polyiso Insulation A Panel EnergyGuard™ NH Polyiso Insulation A Panel	29%	10%
EnergyGuard™ Polyiso Insulation B Panel EnergyGuard™ NH Polyiso Insulation B Panel	23%	7%
EnergyGuard™ Polyiso Insulation C Panel EnergyGuard™ NH Polyiso Insulation C Panel	18%	6%
EnergyGuard™ Polyiso Insulation 1" Panel EnergyGuard™ NH Polyiso Insulation 1" Panel	32.0%	11%
EnergyGuard™ Polyiso Insulation 1.5" Panel EnergyGuard™ NH Polyiso Insulation 1.5" Panel	25.0%	8%
EnergyGuard™ Polyiso Insulation 2" Panel EnergyGuard™ NH Polyiso Insulation 2" Panel	20%	7%
EnergyGuard™ Polyiso Insulation 2.5" Panel EnergyGuard™ NH Polyiso Insulation 2.5" Panel	16%	6%

¹ USGBC® does not review, certify or endorse third-party products or services.

² If a product you are evaluating is not shown in Table 10, it may not contain any recycled content. Consult GAF for additional information on any product.

³ Recycled content is based on weight. Sourcing varies by region and is determined when the product is ordered.

⁴ EnergyGuard™ Insulation is sourced from manufacturing facilities nationwide and recycled content is based on GAF national averages. Sourcing location will not be determined until time of shipment and is subject to change. Depending on material sourcing, check packaging to determine if EnergyGuard™ Insulation is labeled RA, RN, or no designation. Confirm with GAF Customer Services.

GAF Products¹ Recycled Content (continued)
MRc3: BPDO – Sourcing of Raw Materials (continued)

Table 10. GAF Recycled Content (continued)

Commercial Roofing Products²	Recycled Content³ Postconsumer	Recycled Content³ Preconsumer
EnergyGuard™ Polyiso Insulation 3" Panel EnergyGuard™ NH Polyiso Insulation 3" Panel	14%	4%
EnergyGuard™ Polyiso Insulation 3.1" Panel EnergyGuard™ NH Polyiso Insulation 3.1" Panel	14%	4%
EnergyGuard™ Polyiso Insulation 3.3" Panel EnergyGuard™ NH Polyiso Insulation 3.3" Panel	13%	4%
EnergyGuard™ Polyiso Insulation 3.5" Panel EnergyGuard™ NH Polyiso Insulation 3.5" Panel	12%	4%
EnergyGuard™ Polyiso Insulation 4" Panel EnergyGuard™ NH Polyiso Insulation 4" Panel	11%	4%
EnergyGuard™ Polyiso Insulation X Panel EnergyGuard™ NH Polyiso Insulation X Panel	32%	11%
EnergyGuard™ Polyiso Insulation Y Panel EnergyGuard™ NH Polyiso Insulation Y Panel	20%	7%
EnergyGuard™ Polyiso Insulation Z Panel EnergyGuard™ NH Polyiso Insulation Z Panel	14%	4%
EnergyGuard™ Polyiso Insulation Q Panel EnergyGuard™ NH Polyiso Insulation Q Panel	25.0%	8%
EnergyGuard™ RA Polyiso Insulation 1" Panel	24.5%	18.5%
EnergyGuard™ RA Polyiso Insulation 1.5" Panel	18.8%	14.2%
EnergyGuard™ RA Polyiso Insulation 2" Panel	15.4%	11.6%
EnergyGuard™ RA Polyiso Insulation 2.5" Panel	13.1%	9.9%
EnergyGuard™ RA Polyiso Insulation 3" Panel	11.4%	8.6%
EnergyGuard™ RA Polyiso Insulation 3.1" Panel	10.8%	8.2%
EnergyGuard™ RA Polyiso Insulation 3.3" Panel	10.3%	7.7%
EnergyGuard™ RA Polyiso Insulation 3.5" Panel	10.3%	7.7%
EnergyGuard™ RA Polyiso Insulation 4" Panel	9.1%	6.9%
EnergyGuard™ RA Polyiso Insulation X Panel	24.5%	18.5%
EnergyGuard™ RA Polyiso Insulation Y Panel	15.4%	11.6%
EnergyGuard™ RA Polyiso Insulation Z Panel	11.4%	8.6%
EnergyGuard™ RA Polyiso Insulation Q Panel	18.8%	14.2%
EnergyGuard™ RA Polyiso Insulation AA Panel	0%	n/a
EnergyGuard™ RA Polyiso Insulation A Panel	21.9%	15.9%
EnergyGuard™ RA Polyiso Insulation B Panel	16.8%	12.7%
EnergyGuard™ RA Polyiso Insulation C Panel	14.0%	10.5%
EnergyGuard™ RN Polyiso Insulation 1"	26.4%	13.7%

¹ USGBC® does not review, certify, or endorse third-party products or services.

² If a product you are evaluating is not shown in Table 10, it may not contain any recycled content. Consult GAF for additional information on any product.

³ Recycled content is based on weight. Sourcing varies by region and is determined when the product is ordered.



GAF Products¹ Recycled Content (continued)
MRC3: BPDO – Sourcing of Raw Materials (continued)

Table 10. GAF Recycled Content (continued)

Commercial Roofing Products²	Recycled Content³ Postconsumer	Recycled Content³ Preconsumer
EnergyGuard™ RN Polyiso Insulation 1.5"	19.1%	11.8%
EnergyGuard™ RN Polyiso Insulation 2"	15.8%	10.9%
EnergyGuard™ RN Polyiso Insulation 2.5"	12.9%	10.1%
EnergyGuard™ RN Polyiso Insulation 3"	11.3%	9.7%
EnergyGuard™ RN Polyiso Insulation 3.1"	11.0%	9.7%
EnergyGuard™ RN Polyiso Insulation 3.3"	10.5%	9.5%
EnergyGuard™ RN Polyiso Insulation 3.5"	9.6%	9.3%
EnergyGuard™ RN Polyiso Insulation 4"	8.7%	9.1%
EnergyGuard™ RN Polyiso Insulation X Panel	26.4%	13.7%
EnergyGuard™ RN Polyiso Insulation Y Panel	15.8%	10.9%
EnergyGuard™ RN Polyiso Insulation Z Panel	11.3%	9.7%
EnergyGuard™ RN Polyiso Insulation Q Panel	19.1%	11.8%
EnergyGuard™ RN Polyiso Insulation AA Panel	26.4%	13.7%
EnergyGuard™ RN Polyiso Insulation A Panel	22.8%	12.8%
EnergyGuard™ RN Polyiso Insulation B Panel	17.5%	11.4%
EnergyGuard™ RN Polyiso Insulation C Panel	14.4%	10.5%
EnergyGuard™ Perlite Cant Strip	33.0%	2.0%
EnergyGuard™ Perlite Edge Strip	28.0%	2.0%
EnergyGuard™ NH Ultra Polyiso Insulation	pending	pending
EnergyGuard™ NH Barrier Polyiso Insulation	pending	pending
Product Area: Cover Board		
EnergyGuard™ HD Plus Polyiso Cover Board ½"	38.5%	10.2%
EnergyGuard™ NH HD Plus Polyiso Cover Board ½"		
EnergyGuard™ HD Polyiso Cover Board ½"	43.8%	10.4%
EnergyGuard™ NH HD Polyiso Cover Board ½"		
EnergyGuard™ HD Fiberboard	28.0%	3.0%
DensDeck® Roof Board	0%	0%
DensDeck® Prime Roof Board	0%	0%
Securock® Gypsum-Fiber Roof Board	0%	95.0%
EnergyGuard™ Perlite	28.0%	2.0%

¹ USGBC® does not review, certify, or endorse third-party products or services.

² If a product you are evaluating is not shown in Table 10, it may not contain any recycled content. Consult GAF for additional information on any product.

³ Recycled content is based on weight. Sourcing varies by region and is determined when the product is ordered.

Note: DensDeck® is a registered trademark of Georgia Pacific. Securock® is a registered trademark of USG.



GAF Products¹ Recycled Content (continued)
MRc3: BPDO – Sourcing of Raw Materials (continued)

Table 10. GAF Recycled Content (continued)

Commercial Roofing Products²	Recycled Content³ Postconsumer	Recycled Content³ Preconsumer
Product Area: SBS Modified Bitumen Membrane		
RUBEROID® 20 Smooth	0%	0%
RUBEROID® 30 Granule	0%	0%
RUBEROID® 30 Granule FR	0%	0%
RUBEROID® Mop Granule FR	0%	4.4%
RUBEROID® Mop Plus Smooth	0%	5.0%
RUBEROID® Mop Granule	0%	4.8%
RUBEROID® Mop Plus Granule FR	0%	0%
RUBEROID® Mop Smooth 1.5	0%	5.0%
RUBEROID® EnergyCap™ Mop Plus Granule FR (White)	0%	0%
RUBEROID® EnergyCap™ 30 Granule FR (White)	0%	0%
RUBEROID® UltraClad® SBS	0%	0%
RUBEROID® HW Smooth	0%	4.6%
RUBEROID® HW Granule	0%	4.7%
RUBEROID® HW 25 Smooth	0%	0%
RUBEROID® HW Plus Granule	0%	5.6%
RUBEROID® HW Plus Granule FR	0%	5.5%
RUBEROID® HW Granule FR	0%	4.4%
RUBEROID® EnergyCap™ HW Plus Granule FR (White)	0%	0%
Product Area: APP Modified Bitumen Membrane		
RUBEROID® Torch Plus Granule FR	0%	7.5%
RUBEROID® Torch Smooth	0%	4.3%
RUBEROID® Torch Granule	0%	7.3%
RUBEROID® EnergyCap™ Torch Plus Granule FR (White)	0%	0%
RUBEROID® EnergyCap™ Torch Granule FR (White)	0%	0%
WorkHorse™ RoofMatch™ APP Granular – Hickory ⁴	0%	7.3%
WorkHorse™ RoofMatch™ APP Granular – Shakewood ⁴	0%	7.3%
WorkHorse™ RoofMatch™ APP Granular – Slate ⁴	0%	7.3%
WorkHorse™ RoofMatch™ APP Granular – Tan ⁴	0%	7.3%
WorkHorse™ RoofMatch™ APP Granular – Weathered Wood ⁴	0%	7.3%
WorkHorse™ RoofMatch™ SBS Granular ⁴	0%	4.8%

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² If a product you are evaluating is not shown in Table 10, it may not contain any recycled content. Consult GAF for additional information on any product.

³ Recycled content is based on weight. Sourcing varies by region and is determined when the product is ordered.

⁴ This product is discontinued



GAF Products¹ Recycled Content (continued)
MRc3: BPDO – Sourcing of Raw Materials (continued)

Table 10. GAF Recycled Content (continued)

Product Area: Built-Up Roofing Membrane		
GAFGLAS® FlexPly™ 6 Ply Sheet	0%	0%
GAFGLAS® Ply 4 Ply Sheet	0%	4.8%
GAFGLAS® #75 Base Sheet	0%	0%
GAFGLAS® #80 Ultima™ Base Sheet	0%	0%
GAFGLAS® Mineral-Surfaced Cap Sheet	0%	0%
GAFGLAS® Stratavent® Nailable Venting Base Sheet	0%	39.7%
GAFGLAS® Stratavent® Perforated Venting Base Sheet	0%	39.7%
GAFGLAS® EnergyCap™ Mineral-Surfaced Cap Sheet (White)	0%	0%
Product Area: SBS Modified Bitumen		
LIBERTY™ SBS Mechanically Attached Base Sheet	0%	0%
LIBERTY™ SBS Self-Adhering Cap Sheet	0%	4.9%
LIBERTY™ Self-Adhering Base/Ply Sheet	0%	0%
Product Area: Underlayment		
StormSafe™ Anchor Sheet	0%	0%
WeatherWatch® XT ⁴	0%	0%
UnderRoof™ HT ⁴	0%	0%
Shingle-Mate® Roof Deck Protection	60.0%	0%
Product Area: Vegetative Roofing		
GardenScapes™ Drainage Mat	0%	50.0%
Product Area: Fasteners & Plates		
Drill-Tec™ Fasteners & Plates	25.0%	0%
Residential Roofing Products²	Recycled Content³ Postconsumer	Recycled Content³ Preconsumer
Product Area: Shingle		
Timberline® Cool Series® Shingles	0%	8.7%
Camelot® Shingles ⁴	0%	32.0%
Camelot® II Shingles	0%	21.2%
Grand Canyon® Shingles	0%	30.0%
Sentinel® Shingles (White ⁴)	0%	17.3%
County Mansion® II Shingles ⁴	0%	11.4%
Royal Sovereign® Shingles (White)	0%	12.9%
Grand Sequoia® ArmorShield® SBS-Modified IR Shingles	0%	17.4%
Timberline HD® Shingles (White)	0%	9.3%
Marquis Weathermax® Shingles	0%	18.1%

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² If a product you are evaluating is not shown in Table 10, it may not contain any recycled content. Consult GAF for additional information on any product.

³ Recycled content is based on weight. Sourcing varies by region and is determined when the product is ordered.

⁴ This product is discontinued



GAF Products¹ Recycled Content (continued)
MRc3: BPDO – Sourcing of Raw Materials (continued)

Table 10. GAF Recycled Content (continued)

Residential Roofing Products²	Recycled Content³ Postconsumer	Recycled Content³ Preconsumer
Monaco [®] Shingle ⁴	0%	10.1%
Slateline [®] Shingles	0%	19.8%
Timberline [®] American Harvest [®] Shingles	0%	6.9%
Timberline [®] ArmorShield [®] II Shingles	0%	20.0%
Timberline [®] Natural Shadow [®] Shingles	0%	5.9%
Timberline Ultra HD [®] Shingles	0%	33.5%
Woodland [®] Shingles	0%	14.7%
Glenwood [®] Shingles	pending	pending
Product Area: Starter Shingle		
StarterMatch [™] Starter Strip Shingles	0%	11.1%
WeatherBlocker [™] Starter Strip Shingles	0%	36.0%
Pro-Start [®] Starter Strip Shingles	0%	43.4%
Product Area: Cap Shingle		
Seal-A-Ridge [®] (Cool Series Shingles)	0%	30.7%
Seal-A-Ridge [®] ArmorShield [®] SBS-Modified IR Ridge Cap Shingles	0%	35.5%
Ridglass [®] Ridge Cap Shingles (Cool White)	0%	37.1%
Ridglass [®] Ridge Cap Shingles (Cool Barkwood)	0%	37.1%
Ridglass [®] Ridge Cap Shingles (Antique Slate)	0%	37.1%
Ridglass [®] Ridge Cap Shingles	0%	37.1%
TimberTex [®] Ridge Cap Shingles	0%	37.1%
Z [®] Ridge Ridge Cap Shingles	0%	37.1%
Product Area: Solar Ventilation/Ventilation		
Master Flow [®] Green Machine [™] Solar-Powered Intake Booster Vent	25.0%	0%
EcoSmart Roof Vent	25.0%	0%
Master Flow [®] Green Machine [™] Solar-Powered EcoSmart Gable Vent	25.0%	0%
Master Flow [®] Green Machine [™] Solar-Powered EcoSmart Ridge Vent	25.0%	0%
Cobra [®] Exhaust Vent	80.0%	20.0%
Product Area: Underlayment		
Shingle-Mate [®] Roof Deck Protection	60.0%	0%
Product Area: Insulation Panels		
ThermaCal [®] 1 Ventilated Roof Insulation Panels 2.5"	16.5%	9.1%

¹ USGBC[®] does not review, certify, or endorse third-party products or services.

² If a product you are evaluating is not shown in Table 10, it may not contain any recycled content. Consult GAF for additional information on any product.

³ Recycled content is based on weight. Sourcing varies by region and is determined when the product is ordered.



GAF Products¹ Recycled Content (continued)
MRC3: BPDO – Sourcing of Raw Materials (continued)

Table 10. GAF Recycled Content (continued)

Residential Roofing Products²	Recycled Content³ Postconsumer	Recycled Content³ Preconsumer
ThermaCal®1 Ventilated Roof Insulation Panels 3.0"	14.7%	9.1%
ThermaCal®1 Ventilated Roof Insulation Panels 3.5"	12.9%	9.0%
ThermaCal®1 Ventilated Roof Insulation Panels 4.0"	11.5%	8.9%
ThermaCal®1 Ventilated Roof Insulation Panels 4.5"	10.4%	8.9%
ThermaCal®1 Ventilated Roof Insulation Panels 5.0"	9.5%	8.8%
ThermaCal®1 Ventilated Roof Insulation Panels 5.5"	8.8%	8.8%
ThermaCal®1 Ventilated Roof Insulation Panels 6.0"	8.1%	8.7%
ThermaCal®1 Ventilated Roof Insulation Panels 6.5"	7.4%	8.7%
ThermaCal®1 Ventilated Roof Insulation Panels 7.0"	7.0%	8.7%
ThermaCal®2 Ventilated Roof Insulation Panels 3.5"	12.9%	9.0%
ThermaCal®2 Ventilated Roof Insulation Panels 4.0"	11.5%	8.9%
ThermaCal®2 Ventilated Roof Insulation Panels 4.5"	10.4%	8.9%
ThermaCal®2 Ventilated Roof Insulation Panels 5.0"	9.5%	8.8%
ThermaCal®2 Ventilated Roof Insulation Panels 5.5"	8.8%	8.8%
ThermaCal®2 Ventilated Roof Insulation Panels 6.0"	8.1%	8.7%
ThermaCal®2 Ventilated Roof Insulation Panels 6.5"	7.4%	8.7%
ThermaCal®2 Ventilated Roof Insulation Panels 7.0"	7.0%	8.7%
ThermaCal® Non-Ventilated Roof Insulation Panels 1.5"	32.6%	9.9%
ThermaCal® Non-Ventilated Roof Insulation Panels 2.0"	20.3%	9.3%
ThermaCal® Non-Ventilated Roof Insulation Panels 2.5"	16.5%	9.1%
ThermaCal® Non-Ventilated Roof Insulation Panels 3.0"	14.7%	9.1%
ThermaCal® Non-Ventilated Roof Insulation Panels 3.5"	12.9%	9.0%
ThermaCal® Non-Ventilated Roof Insulation Panels 4.0"	11.5%	8.9%
ThermaCal® Non-Ventilated Roof Insulation Panels 4.5"	10.4%	8.9%
ThermaCal® Non-Ventilated Roof Insulation Panels 5.0"	9.5%	8.8%
ThermaCal® Non-Ventilated Roof Insulation Panels 5.5"	8.8%	8.8%
ThermaCal® Non-Ventilated Roof Insulation Panels 6.0"	8.1%	8.7%
ThermaCal® Non-Ventilated Roof Insulation Panels 6.5"	7.4%	8.7%
ThermaCal® Non-Ventilated Roof Insulation Panels 7.0"	7.0%	8.7%

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² If a product you are evaluating is not shown in Table 10, it may not contain any recycled content. Consult GAF for additional information on any product.

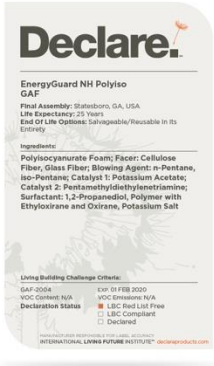
³ Recycled content is based on weight. Sourcing varies by region and is determined when the product is ordered.



MR Credit 4 (1-2 points)	Building Product Disclosure and Optimization – Material Ingredients
<p>Intent</p>	<p>To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts.</p> <p>To reward project teams for selecting products for which the chemical ingredients in the product are inventoried using an accepted methodology and for selecting products verified to minimize the use and generation of harmful substances.</p> <p>To reward raw material manufacturers who produce products verified to have improved life-cycle impacts.</p>
<p>GAF Contribution¹ to LEED® Credit MRC4</p>	<p>Specify GAF’s numerous products that have published HPD and Declare RLF Label chemical ingredient disclosures that contribute to achieving Option 1 of this credit. (See Table 11 for a full list of products)</p>
<p>TIP: Mix-and-match! Products can comply under different programs; it is not necessary to find 20 products that all comply using the same path for Opt. 1.</p> <div data-bbox="391 989 574 1129" data-label="Image"> </div> <div data-bbox="391 1178 553 1329" data-label="Image"> </div> <p>Images: GAF disclosure types for numerous products. See Table 11.</p>	<p>Credit Requirements² - Highlights:</p> <p>Option 1: Material Ingredient Reporting (1 point)</p> <p>Use at least 20 different permanently installed products from at least five different manufacturers that use any of the following programs to demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm).</p> <ul style="list-style-type: none"> • <i>Manufacturer Inventory.</i> The manufacturer has published complete content inventory for the product following specific guidelines. • <i>Health Product Declaration (HPD).</i> The end use product has a published, complete Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration Open Standard. • <i>Cradle to Cradle.</i> The end use product has been certified at the Cradle to Cradle v2 Basic level or Cradle to Cradle v3 Bronze level. • <i>Declare.</i> The Declare product label must indicate that all ingredients have been evaluated and disclosed down to 1000 ppm. • <i>ANSI/BIRMA e3 Furniture Sustainability Standard.</i> • <i>Cradle to Cradle Material Health Certificate.</i> The product has been certified at the Bronze level or higher and at least 90% of materials are assessed by weight. • <i>UL Product Lens™ Certification.</i> • <i>Facts – NSF/ANSI 336: Sustainability Assessment for Commercial Furnishings Fabric at any certification level.</i> • <i>USGBC-Approved Program (future).</i> <p>AND/OR</p>

¹ USGBC® does not review, certify, or endorse third-party products or services.

² Refer to www.usgbc.org/leed for complete credit requirements.

MR Credit 4 (1-2 points)	Building Product Disclosure and Optimization – Material Ingredients (continued)
<p>TIP: Use the LEED® MR credit BPDO Calculator to track and document material purchases (or projections) for MR credit achievement.</p> <p>Go to http://usgbc.org and search 'BPDO calculator'</p>  <p>Image: GAF Declare Red List Free Label for EnergyGuard® NH Polyiso</p> <p>TIP: Looking for the actual product HPDs or Declare Labels to view or document for this credit? Go to: http://gaf.ecoscorecard.com/ or http://www.gaf.com/green or https://www.transparencycatalog.com/company/gaf</p>	<p>Option 2: Material Ingredient Optimization (1 point) Use products that document their material ingredient optimization using the paths below for at least 25%, by cost, of the total value of permanently installed products in the project.</p> <ul style="list-style-type: none"> • GreenScreen v1.2 Benchmark • Cradle to Cradle Certified • International Alternative Compliance Path – REACH Optimization (outside U.S. only) • USGBC-approved program (future) <p>AND/OR</p> <p>Option 3: Product Manufacturer Supply Chain Optimization (1 point) Use building products for at least 25%, by cost, of the total value of permanently installed products in the project that meet specific guidelines.</p> <p>Products meeting Option 3 criteria are valued at 100% of their cost for the purposes of credit achievement calculation.</p> <p>Location valuation factor (a regional multiplier): For credit achievement calculation of Options 2 and 3, products sourced (extracted, manufactured, AND purchased) within 100 miles (160 km) of the project site are valued at 200% of their base contributing cost. Go to http://gaf.ecoscorecard.com to determine project distances.</p> <p>Structure and enclosure materials may not constitute more than 30% of the value of compliant building products. However: Projects with significant amounts of structural and enclosure materials <u>may</u> exceed the 30% limit by calculating an alternative structure and enclosure limit.</p>
<p>IN¹ Bonus Point</p>	<p>Option 1: Purchase at least 40 permanently installed building products that meet the credit criteria.</p> <p>Option 2: Purchase at least 50%, by cost, of permanently installed building products that meet the credit criteria.</p>

¹ IN stands for Innovation, one of eight LEED® credit categories.

² USGBC® does not review, certify, or endorse third-party products or services.

³ HPD stands for Health Product Declaration.

GAF Products¹ with Transparency Ingredient Reporting MRc4: BPDO – Material Ingredients

Table 11. GAF Reporting Disclosures

Product Name	LEED® Reporting Program	
	HPD ²	Declare RLF ³
Single-Ply Membrane		
EverGuard Extreme® TPO	✓	✓
EverGuard® TPO	✓	✓
Resilient Red List Free Adhered TPO Roofing System		✓
SBS-Modified Bitumen Membrane		
RUBEROID® Mop Granule Membrane	✓	
APP-Modified Bitumen Membrane		
RUBEROID® Torch Smooth Membrane	✓	
Built-Up Membrane		
GAFGLAS® EnergyCap™ Mineral-Surfaced Cap Sheet	✓	
Insulation		
EnergyGuard™ Polyiso Insulation	✓	
EnergyGuard™ NH (Non-Halogenated) Polyiso Insulation	✓	✓
EnergyGuard™ NH (Non-Halogenated) Ultra Polyiso Insulation		✓
EnergyGuard™ NH (Non-Halogenated) HD Polyiso Insulation		✓
EnergyGuard™ NH (Non-Halogenated) HD PLUS Polyiso Insulation		✓
EnergyGuard™ NH (Non-Halogenated) Polyiso Insulated Sheathing ⁴		✓
EnergyGuard™ NH (Non-Halogenated) Barrier Polyiso Insulation	✓	✓
Roofing Coatings		
HydroStop® PremiumCoat® Finish Coat	✓	
Shingles		
Timberline® Cool Series® Shingles	✓	
Timberline HD® Reflector Series™ Shingles	✓	
Glenwood® Shingles	✓	

¹ USGBC® does not review, certify, or endorse third-party products or services.

² HPD stands for Health Product Declaration.

³ Declare[®] is a transparency label from the Living Building Challenge program. RLF stands for Red List Free, or free from 'worst-in class' chemical ingredients.

⁴ This product is discontinued

GAF Products¹ with Transparency Ingredient Reporting

MRc4: BPDO – Material Ingredients (continued)

Table 11. GAF Reporting Disclosures (continued)


Product Name	LEED [®] Reporting Program	
	HPD ²	Declare RLF ³
Adhesives		
GAF 2-Part Roofing Adhesive	✓	
EverGuard [®] TPO Low-VOC Bonding Adhesive	✓	
Primers, Cleaners, Flashing, & Sealants		
EverGuard [®] TPO Seam Cleaner	✓	
EverGuard [®] CleanWeld [™] Conditioner	✓	
Fasteners & Plates		
Drill-Tec [™] Fasteners and Plates	✓	
Pavement Coatings		
StreetBond [®] SB150 Pavement Coating	✓	

¹ USGBC[®] does not review, certify, or endorse third-party products or services.

² HPD stands for Health Product Declaration.

³ Declare is a transparency label from the Living Building Challenge program. RLF stands for Red List Free, or free from 'worst-in class' chemical ingredients.



MR Credit 5 (1-2 points)	Construction and Demolition Waste Management												
Intent	To reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials.												
GAF Contribution¹ to LEED® credit MRc5 TIP: For tips on recycling roofing materials, go to the GAF website www.gaf.com/green .	Recycle or salvage nonhazardous construction and demolition materials. Examples of potential roofing materials include: TPO and PVC membranes, polyiso insulation, and asphalt shingles, where appropriate facilities are available.												
TIP: Check out the GAF Commercial Roof Recycling Program flyer “Zero Waste Jobsite Policies” in this credit section, on the following pages.  <p>Image: Construction Hauler</p>	Credit Requirements² - Highlights: This credit implements the Construction and Demolition Waste Management (CWM) Plan developed in the corresponding LEED® MR Prerequisite 2 that establishes diversion goals and strategies, and identifies construction haulers and recyclers to handle the designated materials. This credit measures actual performance against goals. Project teams may select 1 of 2 options (See Table 7): Option 1: Diversion (1-2 points); <i>or</i> Option 2: Reduction of Total Waste (2 points) Table 7. MRc5: CWM Options <table border="1" data-bbox="686 1188 1386 1520"> <thead> <tr> <th>Construction Waste Management (CWM)</th> <th>LEED® Points</th> </tr> </thead> <tbody> <tr> <td>Option 1: Diversion</td> <td></td> </tr> <tr> <td>Path 1: Divert min. 50% including min. 3 material streams; <i>OR</i></td> <td>1</td> </tr> <tr> <td>Path 2: Divert min. 75% including min. 4 material streams</td> <td>2</td> </tr> <tr> <td>Option 2: Reduction of Total Waste Material</td> <td></td> </tr> <tr> <td>Do not generate more than 2.5 lb. of construction waste per square foot of the building’s floor area.</td> <td>2</td> </tr> </tbody> </table>	Construction Waste Management (CWM)	LEED® Points	Option 1: Diversion		Path 1: Divert min. 50% including min. 3 material streams; <i>OR</i>	1	Path 2: Divert min. 75% including min. 4 material streams	2	Option 2: Reduction of Total Waste Material		Do not generate more than 2.5 lb. of construction waste per square foot of the building’s floor area.	2
Construction Waste Management (CWM)	LEED® Points												
Option 1: Diversion													
Path 1: Divert min. 50% including min. 3 material streams; <i>OR</i>	1												
Path 2: Divert min. 75% including min. 4 material streams	2												
Option 2: Reduction of Total Waste Material													
Do not generate more than 2.5 lb. of construction waste per square foot of the building’s floor area.	2												
IN² Bonus Point	Achieve both Option 1 (either Path 1 or Path 2) and Option 2												

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² Refer to www.usgbc.org/leed for complete credit requirements.

The background of the slide is a detailed architectural floor plan of a building, rendered in a light green color against a darker green background. The plan shows various rooms, corridors, and structural elements, including what appears to be a large central hall and several smaller rooms with furniture like desks and chairs. The overall layout is complex and multi-sectioned.

Indoor Environmental Quality (EQ)

EQ Credit 2 (1-3 points)	Low-Emitting Materials
Intent	To reduce concentrations of chemical contaminants that can damage air quality, human health, productivity, and the environment.
GAF Contribution¹ to LEED® Credit EQc2	Specify GAF low-emitting adhesives, sealants, and roof and pavement coatings to contribute toward achieving the low-emitting materials goal. See Table 12 on page 54 for low-emitting GAF adhesives, sealants, and roof and pavement coatings.
<p>TIP: Exterior-applied products are exempt from this Low-Emitting Materials credit, except for LEED® for Healthcare and LEED® for Schools projects.</p> <p>(visit http://gaf.ecoScorecard.com for current GAF VOC contents)</p> <p>TIP: Use the roof drawing in Illustration 1 (next page) to identify the dividing plane of the building interior from the exterior for your project.</p> <p>TIP: For interior-applied products, (and Healthcare & Schools projects) use the LEED® v4 Low-Emitting Materials Calculator to track products and their low-emitting and emissions criteria.</p> <p>Go to http://usgbc.org and search "Low-Emitting Materials Calculator."</p>	<p>Credit Requirements² - Highlights:</p> <p>This credit includes requirements for product manufacturing as well as project teams. It covers the VOC content of materials, volatile organic compound (VOC) emissions into indoor air, and the testing methods by which indoor VOC emissions are determined.</p> <p>The building interior and exterior are organized in seven categories, each with different requirements and thresholds of compliance. Therefore, identifying this dividing plane is a key step.</p> <p>Refer to Illustration 1 (next page) to identify exterior from interior.</p> <p>DEFINING INTERIOR AND EXTERIOR</p> <p>The building interior is defined as everything within the waterproofing membrane.</p> <p>The building exterior is defined as everything outside and inclusive of the primary and secondary weatherproofing system, such as waterproofing membranes and air- and water-resistive barrier materials.</p> <p>Option 1: Product Category Calculations (1-3 points) Achieve the threshold level of compliance with emissions and content standards for the number of product categories listed in Table A.</p> <p>Option 2: Budget Calculation Method (1-3 points) The Budget Calculation Method may be used if some products in a category do not meet the criteria. (Equations not shown)</p>
IN³ Bonus Credit	Option 1. Earn all points and reach 100% of products. Option 2. Reach 100% of products.

¹ USGBC® does not review, certify, or endorse third-party products or services.

² Refer to www.usgbc.org/leed for complete credit requirements.

³ IN stands for Innovation, one of eight LEED® credit categories.

Definition of Building Interior and Exterior

LEED® v4: EQ Credit 2 – Low-Emitting Materials

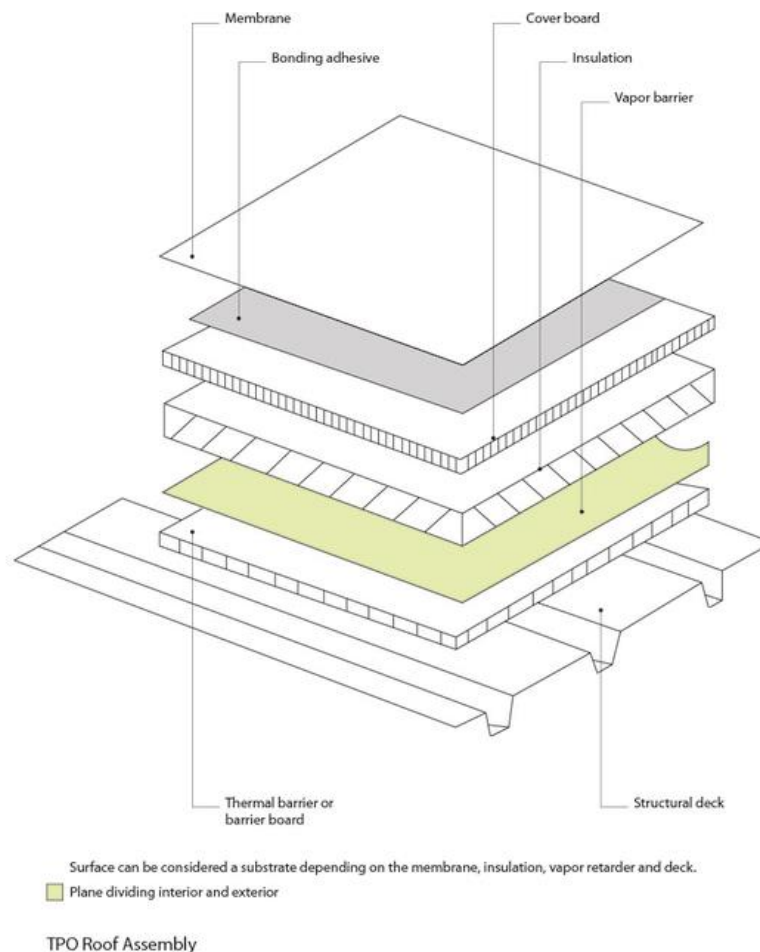


Illustration 1. TPO Roof Assembly

Source: USGBC® LEED® v4 BD+C Reference Guide

Drawing illustrates the specific plane distinguishing the building interior from the exterior for LEED® purposes.

EQc2 credit requirements vary for interior and exterior applications, making this an important first step.

For example, exterior-applied products are exempt from low-emitting materials credit requirements, except for Healthcare and Schools.

Low-Emitting Materials – Definition for building interior and exterior:

- *Building Interior is everything within the waterproofing membrane.*
- *Building Exterior is everything outside and inclusive of the primary and secondary weatherproofing system, such as waterproofing membranes and air-and-water-resistive barrier materials.*

Source: USGBC®

EQc2: Low-Emitting Materials

Option 1. Product Category Calculations

Table A. Thresholds of compliance with emissions and content standards for 7 categories of materials

Category	Threshold	Emissions and Content Requirements
Interior paints and coatings applied onsite	At least 90%, by volume, for emissions; 100% for VOC content	<ul style="list-style-type: none"> General Emissions Evaluation for paints and coatings applied to walls, floors, and ceilings VOC content requirements for wet-applied products
Interior adhesives and sealants applied onsite (including flooring adhesive)	At least 90%, by volume, for emissions; 100% for VOC content	<ul style="list-style-type: none"> General Emissions Evaluation VOC content requirements for wet-applied products
Flooring	100%	General Emissions Evaluation
Composite wood	100% not covered by other categories	Composite Wood Evaluation
Ceilings, walls, and thermal and acoustic insulation	100%	<ul style="list-style-type: none"> General Emissions Evaluation Healthcare, Schools only: <ul style="list-style-type: none"> Additional insulation requirements
Furniture (include in calculations if part of scope of work)	At least 90%, by cost	Furniture Evaluation
Healthcare and Schools Projects only: Exterior-applied products	At least 90%, by volume	Exterior-Applied Products

Source: USGBC® LEED® v4: BD+C - NC

Note: Exterior products are exempt from the General Emissions Evaluation requirement of this credit (CDPH Standard Method v1.1-2010, also known as chamber testing). Exterior products are also exempt from credit requirements for VOC content limits, excepting LEED® for Healthcare and LEED® for Schools projects.



VOC Limits for GAF Products EQc2: Low-Emitting Materials

Table 12 (For a complete list of products, please visit <http://gaf.ecoscorecard.com>)

Product Name	VOC Limit of Product (g/L less water)	VOC Limit Allowed ¹ if EXTERIOR applied (g/L less water)
Adhesives		
OlyBond500® Insulation Adhesives (Spot Shot & Bag-in-Box)	0	exempt
OlyBond500® Green	0	exempt
GAF 2-Part Roofing Adhesive	68	exempt
LRF Adhesive O	0	exempt
LRF Adhesive M	0	exempt
EverGuard® Low VOC TPO Bonding Adhesive	250	exempt
EverGuard® Low VOC PVC Bonding Adhesive	245	exempt
EverGuard® WB181 Bonding Adhesive	8	exempt
Matrix™ 102 SBS Membrane Adhesive	289	exempt
Matrix™ 103 Cold Process Adhesive	289	exempt
Matrix™ 201 Premium SBS Flashing Cement	289	exempt
Matrix™ 202 SBS Flashing Cement	289	exempt
Matrix™ 203 Plastic Roof Cement	289	exempt
Matrix™ 204 Wet/Dry Roof Cement	289	exempt
MajorSeal™ Liquid Flashing	25	exempt
Primers, Cleaners, Flashing & Sealants		
Acrylex 400 Multisurface Roof Primer	100	exempt
Adhere-It® II Primer	n/a	n/a
CleanAct Rinsable Primer	n/a	n/a
Epoxy Primer (formerly Uniseal Primer)	100	exempt
Lock-Down Primer	420	exempt
StableRust Primer	100	exempt
SureBond Primer	200	exempt
TPO Red Primer	50	exempt
UniBase Primer	50	exempt
Unisil Primer (Part A & B)	100	exempt
UniTile LV Sealer (Part A & B)	420	exempt
XR-2000 Primer	166	exempt
United Cleaning Concentrate (UCC)	n/a	n/a
HydroStop® PremiumCoat® Butter Grade Flashing	25	exempt
United Coatings™ Roof Mate™ Butter Grade Flashing	50	exempt
United Coatings™ Roof Mate™ Liquid Fabric	27	exempt
United Coatings™ Roof Mate™ Spray Grade Flashing	38	exempt
United Coatings™ Roof Mate™ WOB Flashing	56	exempt
FlexSeal™ Caulk Grade Sealant	295	exempt

¹ Exterior-applied products are exempt from EQc2: Low-Emitting Materials, except for LEED® v4 for Healthcare and LEED® v4 for Schools. Note: OlyBond500® is a registered trademark of OMG, Inc.



VOC Limits for GAF Products (continued)

EQc2: Low-Emitting Materials (continued)

Table 12 (continued) (For a complete list of products, please visit <http://gaf.ecoscorecard.com>)

Product Name	VOC Limit of Product (g/L less water)	VOC Limit Allowed ¹ if EXTERIOR applied (g/L less water)
Primers, Cleaners, Flashing & Sealants (cont'd)		
FlexSeal™ Sealant	295	exempt
EverGuard® Pourable Sealer (Part A & B)	2	exempt
EverGuard® One-Part Pourable Sealant	25	exempt
EverGuard® Low VOC Primer	243	exempt
M-Thane™ One-Part Pourable Sealant	50	exempt
Matrix™ 307 Primer	320	exempt
Roof Coatings		
FireOut™ Fire Barrier Coating	50	exempt
United Coatings™ Acron 60 Roof Coating	10	exempt
United Coatings™ Acron DS Roof Coating	50	exempt
United Coatings™ Diathon® Base Coat	50	exempt
United Coatings™ Diathon® DS Roof Coating	50	exempt
United Coatings™ Diathon® HT Roof Coating	50	exempt
United Coatings™ Diathon® QS Roof Coating	50	exempt
United Coatings™ Diathon® Roof Coating	50	exempt
United Coatings™ Elastuff® 101 Base Roof Coating	250	exempt
United Coatings™ Elastuff® 103 Roof Coating (A & B)	250	exempt
United Coatings™ EnergyCote™ Roof Coating	28	exempt
United Coatings™ FireShield® MB Roof Coating	29	exempt
United Coatings™ Kymax™ Coating	250	exempt
United Coatings™ Roof Mate™ Base Coat	50	exempt
United Coatings™ Roof Mate™ HT Coating	50	exempt
HydroStop® BarrierGuard® Waterproofing	50	exempt
HydroStop® PremiumCoat® Finish Coat	50	exempt
HydroStop® PremiumCoat® Foundation Coat	50	exempt
United Coatings™ Unisil Roof Coating	250	exempt
United Coatings™ Unisil HS Roof Coating	50	exempt
United Coatings™ Roof Mate™ TCM Coating	50	exempt
United Coatings™ Roof Mate™ QS Coating	50	exempt
United Coatings™ Roof Mate™ WOB Coating	55	exempt
United Coatings™ Roof Mate™ MB Plus Coating	29	exempt
United Coatings™ Roofshield® Coating	50	exempt
United Coatings™ Surface Seal SB Roof Coating	429	exempt

¹ Exterior-applied products are exempt from EQc2: Low-Emitting Materials, except for LEED® v4 for Healthcare and LEED® v4 for Schools.

VOC Limits for GAF Products (continued)

EQc2: Low-Emitting Materials (continued)

Table 12 (continued) (For a complete list of products, please visit

<http://gaf.ecoscorecard.com>)

Product Name	VOC Limit of Product (g/L less water)	VOC Limit Allowed ¹ if EXTERIOR applied (g/L less water)
Architectural & Wall Coatings		
United Coatings™ Acrysheen Sealer	100	exempt
United Coatings™ Aquathon® Wall Coating	50	exempt
United Coatings™ CanyonTone™ Clear Wall Coating	120	exempt
United Coatings™ Canyon Tone Stain®	100	exempt
United Coatings™ Elastuff® 120 Coating - Part A	508	exempt
United Coatings™ Elastuff® 120 Coating - Part B	508	exempt
United Coatings™ Elastuff® 120 Coating - Roller Grade	25	exempt
United Coatings™ Elastuff® 120 Coating - Spray Grade	25	exempt
United Coatings™ Rhino Top Smooth Coating	250	exempt
United Coatings™ Rhino Top Textured Coating	100	exempt
Pavement Coatings		
StreetBond® SB150 Pavement Coating	50	exempt
StreetBond® SB120 Pavement Coating	50	exempt
DuraShield Pavement Coating	50	exempt
StreetBond® Concrete Primer WB	100	exempt
StreetBond® Adhesion Promoter Concentrate	10	exempt
StreetBond® CemBase Asphalt Fortifier	25	exempt
StreetBond® Sealer Concentrate	100	exempt

¹ Exterior-applied products are exempt from EQc2: Low-Emitting Materials, except for LEED® v4 for Healthcare and LEED® v4 for Schools.

A woman with blonde hair and glasses, wearing a white button-down shirt, is looking down at architectural blueprints spread out on a table. Her right hand is resting on the plans. The entire image is overlaid with a semi-transparent green filter. The background shows a blurred office environment with windows and shelves.

Regional Priority (RP)

RP Credits (1–4 points)	Regional Priority A LEED® Incentive Credit Category
Intent	<p>Regional Priority (RP) credits are existing LEED® credits that have been designated as having additional regional importance for the project’s region.</p> <p>They provide an incentive for the achievement of credits that address geographically specific environmental, social equity, and public health priorities.</p>
Credit Description TIP: To identify the six Regional Priority credits for your project, enter the project location and LEED® rating system and version at the link below. RegionalPriorityCredits	<p>A specific location, referenced by project address, has six RP credits that have been identified by USGBC® regional councils and chapters. <u>A project may earn up to four bonus points as a result of achieving these credits elsewhere in the rating system that are designated for a project’s location, with one bonus point earned per eligible credit.</u></p> <p>For example, if a project team pursues and achieves the two points for SSc5: Heat Island Reduction and it is a designated Regional Priority credit for your project’s location, you automatically earn an extra bonus point. RP credits may specify a particular threshold level.</p> <p>Projects registered on LEED® Online automatically see the associated Regional Priority credits.</p> <p>Projects registered prior to May 8, 2016, used a zip code look-up for RP selections.</p>

Comparison of LEED® v2009 to LEED® v4 for Roofing

Is LEED® v4 harder or easier for roofing? Here's a possible interpretation of how the new SSc5 combined credit will affect projects:

LEED® v2009 SSc7.1 Heat Island Effect: Nonroof SSc7.2 Heat Island Effect: Roof vs. LEED® v4 SSc5 Heat Island Reduction: Nonroof and Roof		
Credit Features	v4 Easier	v4 Harder
Combining 2 credits into one credit and one performance calculation. Weighted averages approach applies for combined nonroof/roof areas.	High SRI roof can 'carry' non-reflective hardscape, depending on roof-to-hardscape proportions and SRI/SR values. High SRI roof can reduce size of hardscape area requiring mitigation.	Large hardscape areas with small roofs will require more aggressive hardscape mitigation strategies in the combined nonroof/roof credit
Solar Reflectance Index (SRI) of roofs	---	SRI increased: from 78 to 82 for low-sloped from 29 to 39 for steep-sloped
Solar Reflectance (SR) is the new metric in v4 vs the SRI metric in v2009 for hardscape and shading devices	---	The minimum SR value increased
Vegetated roof area	---	Qualifying area increased from 50% to 75%; weighted averages still apply
Initial SRI value vs. 3-Year Aged SRI option	A project seeks 3-Year Aged SRI values, but if unavailable, can use the Initial SRI value	---
Exemplary performance	---	<i>Both</i> Opt. 1 & 2, <i>and</i> 100% of Parking Under Cover (Opt. 2) must be achieved
Tree canopy shade – growth years	Increased from 5 to 10 years; no more summer solstice calculations	---
Parking under cover	---	Increased from 50% to 75% of spaces

Note: This chart reflects LEED® v4 SSc5 for BD+C for New Construction and Major Renovations. Other rating systems may differ.

Need LEED® documentation for your GAF product?
Check out the GAF ecoScorecard website! <http://gaf.ecoscorecard.com/>



Architects, Designers, Specifiers: You've been heard. As you face thousands of product choices, understanding a particular product's contribution to a rating system is a daunting task. **ecoScorecard** solves this pervasive challenge, making environmental product calculations and documentation easier for you.

ecoScorecard is a web-based tool accessed on a manufacturer's website that allows you to search that specific manufacturer's product catalog based on specific green characteristics. Beyond just the search function, ecoScorecard performs the required calculations and compiles the data into a printable PDF cut sheet. This PDF can then be used to help you meet the product documentation required by LEED® or any other certifying body.

ecoScorecard is a no-cost service provided to you as an added customer service benefit by the manufacturer. The tool will help eliminate your dependence on the sales reps and outside LEED® consultants for accurate product information and documentation. And because it's a web-based tool, you have access to the answers you need **24 hours a day, 7 days a week**, within minutes.

Source: www.ecoscorecard.com

Now More Than Ever, It's Easy To Be "Green"... When Making Your Roofing Choices.

As the industry leader, GAF is proud to offer a broad array of environmentally preferable solutions. We have options for both residential and commercial properties, including products containing recycled materials, reflective or "cool" roofing, re-cover roofing to reduce landfill waste, vegetative roofing, and solar roofing products. We have also worked to incorporate sustainable practices into our manufacturing process, including the recycling of shingle waste at plants and a Zero-Waste-to-Landfill effort. GAF was a leader in the HPD pilot program for LEED® v4 and has been working to establish more HPDs, LCAs, and EPDs as well as Declare Red List Free Labels for our product line over time. Be sure to ask about our Certified Green Roofer™ program that recognizes professional roofing contractors for recycling!

Want to learn more?

GAF Technical Services can provide detail and answer questions on project specific conditions.

Technical Services Hotline: 1-800-766-3411

For more information about the GAF commitment to green manufacturing processes and our full line of energy-saving products, visit "Sustainable Buildings and Resilient Design" at www.gaf.com/green.

Helpful Links:

www.gaf.com

<http://www.usgbc.org>

<http://gaf.ecoscorecard.com>

www.coolroofs.org

www.energystar.gov

www.roofpoint.org

www.DSIREusa.org

GAF

U.S. Green Building Council (USGBC®)

GAF ecoScorecard

Cool Roof Rating Council (CRRC)

Federal Tax Credits

RoofPoint

State Incentives for Renewables & Efficiency

LEED® v4: Roofing-Related Provisions — a guide published by NRCA

The National Roofing Contractors Association (NRCA) has published a 130-page guide titled *LEED® v4: Roofing-Related Provisions* written to assist roofing contractors who want to understand roofing-specific issues related to USGBC's LEED® v4 Green Building Rating System.

The NRCA guide takes a deep-dive into each roofing-related LEED® credit with relevance specific to roofing contractors. But don't be scared off by the size of the guide — it's written for a comprehensive understanding of both green building and LEED®, yet it's also structured for skipping directly to the succinct practical advice that roofing contractors need for a prospective LEED® project.

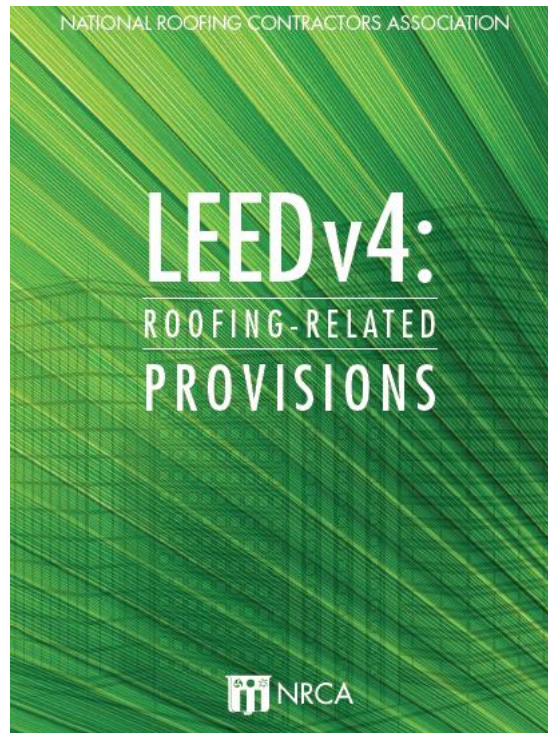
Roofing contractors will appreciate having this interpretation of green building and the LEED® process, as it's uniquely tailored to their specific roles and responsibilities in a clear, chronological format. It covers the LEED® v4 rating systems in both the Building Design and Construction (BD+C) and Building Operations and Maintenance (O+M) families.



Want to learn more? (continued)

For roofing contractors who participated in earlier versions of LEED®, NRCA includes an analysis of the roofing-related provisions that have changed in LEED® v4, saving the reader's time. There have been quarterly updates to LEED® v4 since the guide was published in 2014, so be sure to check all Addenda for any changes to specific LEED® credits at <http://www.usgbc.org>.

NRCA Members can purchase the guide at <http://www.nrca.net>.



Glossary of Terms¹

Appurtenance

Any built-in, nonstructural portion of a roof system, such as skylights, ventilators, mechanical equipment, partitions, and solar energy panels.

Building Exterior

A structure's primary and secondary weatherproofing system, including waterproofing membranes and air- and water-resistant barrier materials, and all building elements outside that system.

Building Interior

Everything inside a structure's weatherproofing membrane.

Emissivity

The ratio of the radiation emitted by a surface to the radiation emitted by a black body at the same temperature.

ENERGY STAR® Rating

The rating a building earns using the ENERGY STAR® Portfolio Manager to compare building energy performance to similar buildings in similar climates. A score of 50 represents average building performance.

Environmental Product Declaration

A statement that the item meets the environmental requirements of ISO 14021–1999, ISO 14025–2006 and EN 15804, or ISO 21930–2007.

Extensive Vegetative Roof

A roof that is covered with plants and typically not designed for general access. Usually an extensive system is a rugged green roof that requires little maintenance once established. The planting medium in extensive vegetated roofs ranges from 1 to 6 inches in depth. (Adapted from U.S. EPA.)

Hardscape

The inanimate elements of the building landscaping. It includes pavement, roadways, stonewalls, wood and synthetic decking, concrete paths and sidewalks, and concrete, brick, and tile patios.

Heat Island Effect

The thermal absorption by hardscape, such as dark, non-reflective pavement and buildings, and its subsequent radiation to surrounding areas. Other contributing factors may include vehicle exhaust, air conditioners, and street equipment. Tall buildings and narrow streets reduce airflow and exacerbate the effect.

Infrared (Thermal) Emittance

A value between 0 and 1 (or 0% and 100%) that indicates the ability of a material to shed infrared radiation (heat). A cool roof should have a high thermal emittance. The wavelength range for radiant energy is roughly 5 to 40 micrometers. Most building materials (including glass) are opaque in this part of the spectrum and have an emittance of roughly 0.9, or 90%. Clean, bare metals, such as untarnished galvanized steel, have a low emittance and are the most important exceptions to the 0.9 rule. In contrast, aluminum roof coatings have intermediate emittance levels. (Adapted from Lawrence Berkeley National Laboratory.)

Intensive Vegetated Roof

A roof that, compared with an extensive vegetated roof, has greater soil volume, supports a wider variety of plants (including shrubs and trees), and allows a wider variety of uses (including human access). The depth of the growing medium is an important factor in determining habitat value. The native or adapted plants selected for the roof should support the site's endemic wildlife populations. (Adapted from Green Roofs for Healthy Cities.)

¹ Refer to the USGBC® LEED® v4 Online BD+C Reference Guide for current credit-specific LEED® terms and definitions or view the full LEED® v4 Glossary of Terms at <http://www.usgbc.org/resources/leed-v4-glossary-terms-translations>.

Note: ENERGY STAR® and the ENERGY STAR® mark are registered trademarks owned by the U.S. Environmental Protection Agency.

Glossary of Terms¹ (Continued)

Life-Cycle Inventory

A database that defines the environmental effects (inputs and outputs) for each step in a material's or assembly's life cycle. The database is specific to countries and regions within countries.

Location Valuation Factor (formerly termed Regional Materials in LEED® v2009)

For credit achievement calculation for LEED® v4 credits MRc2, MRc3, and MRc4 (Options 2 & 3 only), products that are sourced (extracted, manufactured, and purchased) within 100 miles of the project site are valued at 200% of their base contributing cost. What was formerly a LEED® credit and point in v2009 is instead a multiplier for the LEED® v4 material credits.

Low-Sloped Roof

≤2:12 pitch

Post-consumer Recycled Content

Defined as waste material generated by household or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose.

Pre-consumer Recycled Content (Post-Industrial)

Defined as material diverted from the waste stream during the manufacturing process, determined as the percentage of material, by weight. Examples include planer shavings, sawdust, bagasse, walnut shells, culls, trimmed materials, over issue publications, and obsolete inventories. The designation excludes rework, regrind, or scrap materials capable of being reclaimed within the same process that generated them (ISO 14021). Formerly known as post-industrial content.

Primer

A material applied to a substrate to improve adhesion of subsequently applied coatings.

Product (permanently installed building product)

An item that arrives on the project site either as a finished element ready for installation or as a component to another item assembled onsite. The product unit is defined by the functional requirement for use in the project; this includes the physical components and services needed to serve the intended function of the permanently installed building product. In addition, similar products within a specification can each contribute as separate products.

Rainwater Management Onsite (formerly Storm Water Control in LEED® v2009)

To capture and retain a specified volume of rainfall to mimic natural hydrologic function. Examples of rainwater management include strategies that involve evapotranspiration, infiltration, and capture and reuse.

Recycling

The collection, reprocessing, marketing, and use of materials that were diverted or recovered from the solid waste stream.

Regionally Extracted or Manufactured Materials (see Location Valuation Factor)

Reuse

A strategy to return materials to active use in the same or related capacity.

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Glossary of Terms¹ (Continued)

Raw Material

The basic substance from which products are made, such as concrete, glass, gypsum, masonry, metals, recycled materials (e.g., plastics and metals), oil (petroleum, polylactic acid), stone, agrifiber, bamboo, and wood.

Roof Area

The area of the uppermost surface of the building that covers enclosed Gross Floor Area, as measured when projected onto a flat, horizontal surface (i.e., as seen in Roof Plan view).

Sealant

A material with adhesive properties that is formulated primarily to fill, seal, or waterproof any gaps or joints between two surfaces. Sealants include sealant primers and caulks.

Solar Reflectance (SR)

The fraction of solar energy that is reflected by a surface on a scale of 0 to 1. Black paint has a solar reflectance of 0; white paint (titanium dioxide) has a solar reflectance of 1. The standard technique for its determination uses spectrophotometric measurements, with an integrating sphere to determine the reflectance at each wavelength. The average reflectance is then determined by an averaging process, using a standard solar spectrum, as documented by ASTM Standards E903 and E892.

Solar Reflectance Index (SRI)

A measure of the constructed surface's ability to stay cool in the sun by reflecting solar radiation and emitting thermal radiation. It is defined such that a standard black surface (initial solar reflectance 0.05, initial thermal emittance 0.90) has an initial SRI of 0, and a standard white surface (initial solar reflectance 0.80, initial thermal emittance 0.90) has an initial SRI of 100. To calculate the SRI for a given material, obtain its solar reflectance and thermal emittance via the Cool Roof Rating Council Standard (CRRC-1). SRI is calculated according to ASTM E1980. Calculation of the aged SRI is based on the aged tested values of solar reflectance and thermal emittance.

Steep-Sloped Roof

>2:12 pitch

Thermal Emittance (See Infrared Emittance)

Three-year Aged SR or SRI Value

A Solar Reflectance or Solar Reflectance Index rating that is measured after three years of weather exposure.

Title 24

California's energy-efficiency standards for residential and nonresidential buildings.

Waste Diversion

A management activity that disposes of waste through methods other than incineration or landfilling. Examples include reuse and recycling.

VOCs (Volatile Organic Compounds)

Carbon compounds that participate in atmospheric photochemical reactions (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonates, and ammonium carbonate). The compounds vaporize (become a gas) at normal room temperatures.

¹ Refer to the USGBC LEED® v4 Online BD+C Reference Guide for current credit-specific LEED® terms and definitions or view the full LEED® v4 Glossary of Terms at <http://www.usgbc.org/resources/leed-v4-glossary-terms-translations>.

LEED® v4 Project Checklist



LEED v4 for BD+C: New Construction and Major Renovation Project Checklist

Project Name:
Date:

Y ? N

0	0	0	Credit 1	Integrative Process	1
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0	0	0	Location and Transportation		Poss. Pts:	16
0	0	0	Credit 1	LEED for Neighborhood Development Location	16	
0	0	0	Credit 2	Sensitive Land Protection	1	
0	0	0	Credit 3	High Priority Site	2	
0	0	0	Credit 4	Surrounding Density and Diverse Uses	5	
0	0	0	Credit 5	Access to Quality Transit	5	
0	0	0	Credit 6	Bicycle Facilities	1	
0	0	0	Credit 7	Reduced Parking Footprint	1	
0	0	0	Credit 8	Green Vehicles	1	

0	0	0	Sustainable Sites		Poss. Pts:	10
Y			Prereq 1	Construction Activity Pollution Prevention	Required	
0	0	0	Credit 1	Site Assessment	1	
0	0	0	Credit 2	Site Development - Protect or Restore Habitat	2	
0	0	0	Credit 3	Open Space	1	
0	0	0	Credit 4	Rainwater Management	3	
0	0	0	Credit 5	Heat Island Reduction	2	
0	0	0	Credit 6	Light Pollution Reduction	1	

0	0	0	Water Efficiency		Poss. Pts:	11
Y			Prereq 1	Outdoor Water Use Reduction	Required	
Y			Prereq 2	Indoor Water Use Reduction	Required	
Y			Prereq 3	Building-Level Water Metering	Required	
0	0	0	Credit 1	Outdoor Water Use Reduction	2	
0	0	0	Credit 2	Indoor Water Use Reduction	6	
0	0	0	Credit 3	Cooling Tower Water Use	2	
0	0	0	Credit 4	Water Metering	1	

0	0	0	Energy and Atmosphere		Poss. Pts:	33
Y			Prereq 1	Fundamental Commissioning and Verification	Required	
Y			Prereq 2	Minimum Energy Performance	Required	
Y			Prereq 3	Building-Level Energy Metering	Required	
Y			Prereq 4	Fundamental Refrigerant Management	Required	
0	0	0	Credit 1	Enhanced Commissioning	6	
0	0	0	Credit 2	Optimize Energy Performance	18	
0	0	0	Credit 3	Advanced Energy Metering	1	
0	0	0	Credit 4	Demand Response	2	
0	0	0	Credit 5	Renewable Energy Production	3	
0	0	0	Credit 6	Enhanced Refrigerant Management	1	
0	0	0	Credit 7	Green Power and Carbon Offsets	2	

0	0	0	Materials and Resources		Poss. Pts:	13
Y			Prereq 1	Storage and Collection of Recyclables	Required	
Y			Prereq 2	Construction and Demolition Waste Management Planning	Required	
0	0	0	Credit 1	Building Life-Cycle Impact Reduction	5	
0	0	0	Credit 2	Building Product Disclosure and Optimization - Environmental Product Declarations	2	
0	0	0	Credit 3	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2	
0	0	0	Credit 4	Building Product Disclosure and Optimization - Material Ingredients	2	
0	0	0	Credit 5	Construction and Demolition Waste Management	2	

0	0	0	Indoor Environmental Quality		Poss. Pts:	16
Y			Prereq 1	Minimum Indoor Air Quality Performance	Required	
Y			Prereq 2	Environmental Tobacco Smoke Control	Required	
0	0	0	Credit 1	Enhanced Indoor Air Quality Strategies	2	
0	0	0	Credit 2	Low-Emitting Materials	3	
0	0	0	Credit 3	Construction Indoor Air Quality Management Plan	1	
0	0	0	Credit 4	Indoor Air Quality Assessment	2	
0	0	0	Credit 5	Thermal Comfort	1	
0	0	0	Credit 6	Interior Lighting	2	
0	0	0	Credit 7	Daylight	3	
0	0	0	Credit 8	Quality Views	1	
0	0	0	Credit 9	Acoustic Performance	1	

0	0	0	Innovation		Poss. Pts:	6
0	0	0	Credit 1	Innovation	5	
0	0	0	Credit 2	LEED Accredited Professional	1	

0	0	0	Regional Priority		Poss. Pts:	4
0	0	0	Credit 1	Regional Priority: Specific Credit	1	
0	0	0	Credit 2	Regional Priority: Specific Credit	1	
0	0	0	Credit 3	Regional Priority: Specific Credit	1	
0	0	0	Credit 4	Regional Priority: Specific Credit	1	

0	0	0	TOTALS		Possible Points:	110
Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110						





We
protect
what
matters
most™