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## Opportunities for BaySystems™ Spray Foam & Specialty Coatings to Contribute to USGBC's LEED® Performance

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### LEED OPPORTUNITIES

BaySystems products offer numerous opportunities to contribute to the performance of several different LEED project types.

There are three different types of opportunities where BaySystems products can **assist project teams in achieving LEED certification**:

- **Direct** – this means that *use of a BaySystems product type* can garner LEED points.
- **Contributing** – this means that the use of a BaySystems product type can *contribute towards, or assist* a project in earning LEED points.
- **Supporting** – this means that the use of a BaySystems product type *supports a strategy* that will earn a project LEED points.

In all of the above scenarios, it is also important to keep in mind that there are typically other circumstances that also influence whether or not the LEED points are earned.

The relevant LEED rating systems are listed below, along with the abbreviations used in this document:

- a. LEED for Homes (Homes)
- b. LEED for New (Commercial) Construction & Major Remodels (NC)
- c. LEED for Existing Building: Operations & Maintenance (EB)
- d. LEED for Core and Shell (CS)

The table that follows lists all the LEED credits for which the use of BaySystems products may be advantageous, and identifies the type(s) of opportunity in each case.

### BaySystems Spray Foam and Specialty Coatings Contribution to LEED Credits

Attribute	Relevant LEED credits	Type of LEED opportunity
Optimizing energy performance	NC EAp2, EAc1; EB EAp2, EAc1; CS EAp2, EAc1; Homes EA1	Supporting
Insulating	Homes EA2	Contributing
Air sealing	Homes EA3	Supporting
Air sealing @ garage for IAQ	Homes EQ10	Supporting
Durability management	Homes ID2	Supporting
Advanced framing	Homes MR1	Supporting
Recycled content	NC MRc4, CS MRc4, EB MRc3	Contributing
Low-emitting materials (sealant)	NC EQc4.1, CS EQc4.1, EB MRc3	Contributing
Low-emitting materials (insulation)	Homes MR2.2	Direct
Thermal comfort: design	NC EQc7.1, CS EQc7.1	Supporting
Energy Star with Indoor Air Package (comprehensive air quality management)	Homes EQ1	Supporting
Building reuse	NC MRc1, CS MRc1	Supporting
Rapidly renewable material	NC MRc6	Contributing
Rainwater catchment	CS WEc1, CS WEc2, Homes WE1.1, Homes SS4.3	Supporting
Vegetated roof	NC SSc7.2, CS SSc7.2, EB SSc7.2, Homes SS4.3	Supporting
Cool roof (urban heat island effect)	NC SSc7.2, EB SSc7.2, CS SSc7.2	Direct
LEGEND:		
DIRECT: Use of product can earn LEED points		
CONTRIBUTING: Use of product can contribute toward earning LEED points		
SUPPORTING: Use of product supports a strategy that earns LEED points		
Includes Homes credit(s)		

Each of these credits and the potential product contribution is summarized below. The full text of the credits is available at [www.usgbc.org/leed](http://www.usgbc.org/leed). Prerequisites in the LEED Rating Systems earn no points, although projects are required to comply with them in order to earn a rating. Prerequisites in the NC, EB, and CS rating systems are indicated by a “p” in the credit abbreviation; in LEED for Homes, they are not; therefore “(prerequisite)” is shown by the Homes prerequisites referenced below.

## Optimizing Energy Performance: **Supporting**

**NC, EB, CS: EAp2, Minimum Energy Performance** (0 points)

**NC, EB, CS: EA1, Optimize Energy Performance** (up to 10 points)

**Homes EA1, Optimize Energy Performance** (prerequisite + credit, up to 34 points<sup>1</sup>)

The prerequisites are met and the credits are earned by achieving improvements in energy efficiency beyond what is required by code. The higher the level of energy efficiency achieved, the more points are earned. Performance is determined based on energy simulation and, in Homes, by performance testing (including blower door testing and EPA Thermal Bypass Inspection). Simulation – or modeling – as the spray polyurethane foam industry is painfully aware, is a highly imperfect mechanism for the evaluation of true energy performance. Nevertheless, spray polyurethane foam can contribute to a projects achievement of high levels of energy efficiency, even using these imperfect assessment methods, because the R-value per inch is higher than other insulation materials. (Note that if the same R-value is specified as would be if spray polyurethane foam were not used, then the benefit of spray polyurethane foam is not likely to be realized; rather, the use of the same thickness – resulting in a higher total R-value – will be most likely to support earning this credit.

## Insulation: **Contributing**

**Homes EA2, Insulation** (prerequisite + credit, up to 2 points)

The prerequisite (EA2.1) requires that insulation be installed to meet or exceed the R-value requirements in Chapter 4 of the 2004 International Energy Conservation Code (IECC), that it be installed to meet the Grade II specification set by the National Home Energy Rating Standards (HERS), and that the installation be verified by an energy rater or “green rater” conducting a pre-drywall thermal bypass inspection. The credit (EA2.2) awards 2 points if, in addition to meeting the prerequisite, the IECC R-values are exceeded by at least 5% and the insulation is installed to meet the HERS Grade I specifications. (Note that in LEED for Homes, EA1 is a “bundled” credit, meaning that if it is earned, the “a la carte” credits EA2 through EA6 may not be earned. Therefore, EA1 and EA2 are mutually exclusive; this is because EA1 comprises the performance standards in EA2 as well as EA3-6.) spray polyurethane foam, because of its higher R-value per inch, can contribute to projects earning this credit.

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<sup>1</sup> The prerequisite portion of EA1 in LEED for Homes requires performance at least 15% better than code; points are earned for exceeding that level of performance. In California, because the California Title 24 energy standards are structured somewhat differently than in other parts of the US, only 19 points are available.

### **Air Sealing: Supporting**

#### **Homes EA3, Infiltration** (prerequisite + credit, up to 3 points)

The prerequisite (EA3.1) specifies a maximum air leakage rate (which varies by IECC climate zone) and requires that the rate be tested and verified by an energy rater. The credit (EA3.2) awards either 2 points for “greatly reduced envelope leakage” or 3 points for “minimal envelope leakage” – i.e., air leakage significantly reduced below the levels required by the prerequisite. (As described above for EA2, EA1 and EA3 are mutually exclusive.) Because of its effectiveness as an air sealer and its ability to fill hard-to-reach voids, Bayseal™ spray polyurethane foam insulation ably supports achievement of this credit.

### **Air Sealing at Garage: Supporting**

#### **Homes EQ10.2, Minimize Pollutants from Garage** (2 points)

This credit is earned if all shared surfaces between the garage and conditioned spaces are tightly sealed. Because of its effectiveness as an air sealer and its ability to fill hard-to-reach voids, Bayseal spray polyurethane foam insulation ably supports achievement of this credit.

### **Durability Management: Supporting**

#### **Homes ID2, Durability Management Process** (prerequisite + credit, up to 3 points)

The prerequisites require project teams to undertake a durability risk analysis, develop specific responses to moderate and high durability risks, and incorporate those measures in project documents. Project teams that also have the implementation of these durability measures verified in the field earn 3 points. Bayseal spray polyurethane foam, because of its efficacy as an air sealer and closed-cell foam insulation installed at 1” as a vapor retarder, has the potential to be a key component of the durability management strategy for a building. Other than specific wet room measures (e.g., avoidance of carpet in baths), points are not awarded for use of any specific materials or even any specific durability management strategies; rather, it is the approach to durability management that is rewarded.

### **Advanced Framing: Supporting**

#### **Homes MR1.4, Framing Efficiencies** (up to 3 points)

Several points are available for “advanced framing” or “optimum value engineering” practices, including 1 point for spacing studs at greater than 16 inches on center and ½ point each for spacing ceiling joists, floor joists, and/or roof rafters at greater than 16 inches on center.

Bayseal spray polyurethane foam, because its use in framing cavities increases the racking

strength, can support the adoption of these material-efficient framing measures. Note that the involvement of a qualified and motivated structural engineer to capitalize on this opportunity.

### Recycled Content: **Contributing**

**NC, CS: MRc4, Recycled Content** (1-2 points)

**EB: MRc3, Sustainable Purchasing: Facility Alterations & Additions** (1 point)

In NC and CS, 1 point is earned if materials with recycled content are used such that the sum of post-consumer recycled content plus one-half of the pre-consumer (post-industrial) recycled content constitutes at least 10% (based on cost) of the total value of the materials in the project; 2 points are earned if total recycled content is at least 20%. In EB, 1 point is awarded to projects that achieve “sustainable purchases” of 50% of total purchases (by cost) over a specified period of time. A variety of product types qualify as “sustainable purchases” including those that contain at least 10% post-consumer or 20% post-industrial material. Bayseal spray polyurethane foam may contribute 1 point toward projects earning these credits.

### Low-Emitting Materials: **Contributing<sup>2</sup>**

**NC, CS: EQc4.1, Low-Emitting Adhesives & Sealants** (1 point)

**EB: MRc3, Sustainable Purchasing – Facility Alterations & Additions** (1 point)

In NC and CS, 1 point is earned if all adhesives and sealants used on the interior of the building comply with specified VOC limits, which vary by application. In EB, 1 point is earned if “sustainable purchases” total 50% or more of total purchases (by cost) over a specified period of time. A variety of product types qualify as “sustainable purchases” including adhesives and sealants that have a VOC content less than the current VOC content limits of South Coast Air Quality Management District Rule #1168; and sealants used as fillers that meet or exceed the requirements of the Bay Area Air Quality Management District Regulation 8, Rule 51. Bayseal spray polyurethane foam and Baytec™ polyurea coatings may contribute toward projects earning these credits.

### Thermal Comfort: **Supporting**

**NC, CS: EQc7.1, Thermal Comfort – Design** (1 point)

Buildings designed to meet the requirements of ASHRAE<sup>3</sup> Standard 55-2004, Thermal Comfort Conditions for Human Occupancy, earn 1 point. If used as part of a comprehensive, high-quality

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<sup>3</sup> ASHRAE is the American Society of Heating, Refrigeration, and Air-conditioning Engineers.

approach to air-sealing and insulating, Bayseal spray polyurethane foam can support the achievement of this credit.

### **Indoor Air Package: Supporting**

**Homes: EQ1, ENERGY STAR with Indoor Air Package<sup>4</sup>** (13 points)

Projects that complete all the requirements of the US EPA's ENERGY STAR with Indoor Air Package (IAP)<sup>5</sup> earn 13 points. (Note that EQ1 is a "bundled" credit, meaning that if it is earned, the following may not be earned, because EQ1 comprises the performance standards in these credits: EQ2.2, EQ3, EQ4.3, EQ6.2, EQ6.3, EQ8.1, EQ8.3, EQ9.2, EQ10.2, EQ10.3, and EQ10.4.) The IAP emphasizes ventilation and moisture management and includes a several measures for which spray polyurethane foam which may be relevant, including:

- 1.15 (seal all plumbing, electrical, and other penetrations ... with polyurethane caulk)
- 1.19 (crawl spaces shall be unvented and conditioned)
- 1.20 (exterior surface of below-grade walls shall be finished ... with damp-proofing ... or equivalent waterproofing)
- 5.3 (common walls and ceiling between an attached garage and living space shall be completely sealed before insulation is installed).

### **Building Reuse: Supporting**

**NC, CS: MRc1, Building Reuse** (1-2 points)

Projects earn 1 point if at least 75% (based on surface area) of the existing building structure (including structural floor and roof decking) and envelope (exterior skin and framing, excluding window assemblies and non-structural roofing material) is maintained; 2 points are earned if at least 95% is maintained. Strategic use of Bayseal insulation and roofing systems may support achievement of this credit. For example, a Bayseal roofing system might be used for re-roofing, thereby making it possible to retain the existing roof sheathing.

### **Rapidly Renewable: Contributing**

**NC: MRc6, Rapidly Renewable Materials** (1 point)

Projects earn 1 point if rapidly renewable materials and products (made from plants that are typically harvested within a ten-year or shorter cycle) comprise at least 2.5% of the total value of

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<sup>4</sup> [http://www.energystar.gov/ia/partners/bldrs\\_lenders\\_raters/downloads/IAP\\_Specification\\_041907.pdf](http://www.energystar.gov/ia/partners/bldrs_lenders_raters/downloads/IAP_Specification_041907.pdf).

<sup>5</sup> The IAP is a companion program to the EPA's ENERGY STAR Homes program, and requires participation in that program. LEED for Homes, likewise, requires participation in the ENERGY STAR Homes program; it is a cornerstone of LEED for Homes.

all building materials and products used in the project, based on cost. If Bayseal were used as part of the project, a fraction of the polyol chemistry is derived from rapidly renewable sugar beets. This could contribute toward the total required to earn the point.

### Rainwater Catchment: **Supporting**

**CS: WEc1, Water-Efficient Landscaping** (1-2 points)

**CS: WEc2, Innovative Wastewater Technologies** (1 point)

**Homes: WE1.1, Water Reuse** (2-4 points)

**Homes: SS4.3, Management of Roof Runoff** (1 point)

In CS, WEc1, projects earn 1 point for reducing potable water consumption for irrigation by 50% from a calculated midsummer baseline; use of captured rainwater is one of the allowable means of achieving this reduction. An additional point is earned if there is *no* reliance on potable water for irrigation. In CS, WEc1, projects earn 1 point for reducing potable water use for building sewage conveyance by 50% through the use of non-potable water, including captured rainwater. In Homes WE1.1, projects may earn 2-4 points for a rainwater harvesting system; the number of points earned depends on the system's storage capacity and whether the water will be used indoors, for landscape irrigation, or both. In Home SS4.3, 1 point is awarded for the installation of a rainwater cistern designed to manage runoff. Bayseal spray foam roofing topped with Baytec polyurea, an elastomeric waterproofing membrane, is suitable for use in a rainwater catchment design scheme; it can therefore support the achievement of these credits.

### Vegetated Roof: **Supporting**

**Homes: SS4.3, Management of Roof Runoff** (½ to 1 point)

**NC, CS, EB: SSc7.2, Heat Island Effect – Roof** (1 point)

In Homes, projects earn ½ point for a vegetated roof that covers 50% of the roof area or 1 point for a vegetated roof that covers 100% of the roof area. In NC, CS, and EB, projects earn 1 point for installing a vegetated roof that covers at least 50% of the roof area or is installed in combination with high-albedo roofing such that the roof complies with the following equation:  
Area of SIR Roof / 0.75) + (Area of Vegetated Roof / 0.5) >= Total Roof Area.

Baytec polyureas can be used as a waterproofing membrane. Baytec polyureas are durable and suitable for use in a living roof design scheme; they can therefore support the achievement of these credits.

## Cool Roof: **Direct**

**NC, CS, EB: SSc7.2, Heat Island Effect – Roof** (1 point)

Projects earn 1 point for the use of roofing materials having a solar reflectance index (SRI) of at least 78 for low-sloped roofs (72:12) or at least 29 for steep-sloped roofs (>2:12), and covering at least 75% of the roof surface (or in combination with a vegetated roof as described above). Use of an spray polyurethane foam roofing system such as Bayblock™ Acrylic Coatings for at least 75% of the roof surface complies with this credit and will therefore earn the project 1 point.

## The Bottom Line

The true value of BaySystems spray polyurethane foam and coatings are in the multiplicity of functions. Bayseal, Bayblock and Baytec are uniquely attractive because ***they are multi-attribute products.***

### Disclaimer

The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether our products, technical assistance and information are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale which are available upon request. All information and technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with any claim of any patent relative to any material or its use. No license is implied or in fact granted under the claims of any patent.



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