

Structural insulation foams and sustainable building: ArmaFORM® PET and its contribution to LEED certification

Structural polyester foams with insulation properties help to improve thermal performance and control moisture in commercial, institutional and residential buildings. LEED Certification and the awarding of credits are based on the overall project design, properly designed building systems and construction assemblies, and the performance of the project as a whole. ArmaFORM® PET foam is a component of many of these assemblies considered in assessing compliance with the LEED Rating System within a given category and credit.

Green building (also known as green construction or sustainable building) refers to a structure and process that is environmentally responsible and resource-efficient throughout a life cycle of a building: from building site to design, construction, operation, maintenance, renovation, and in a final step demolition.

A wide variety of national and international green building directives have been introduced worldwide to provide third-party verification of green buildings. Among these the American LEED certification (Leadership in Energy and Environmental Design)

is recognized across the globe as the mark of quality for achievements in green building design, construction, operations and maintenance solutions. LEED considers the entire lifecycle of a building by focusing on the following crucial criteria: site location, water use, energy performance, materials and resources, indoor quality, and innovation & design.






To get LEED certification for any commercial buildings and neighborhoods a project must first satisfy all LEED prerequisites and additionally earn a minimum 40 points on a 110-point LEED rating system scale. The number of points determines its level of LEED certification:

- 40 = minimum for certification
- 50 = silver certificate
- 60 = gold certificate
- 80 = platinum certificate





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Below diagram depicts the different LEED categories:

	Sustainable sites credits encourage strategies that minimize the impact on ecosystems and water resources.
	Water efficiency credits promote smarter use water, inside and out.
	Energy & atmosphere credits promote better building energy performance.
	Materials & resources credits encourage using sustainable building materials and reducing waste.
	Indoor environmental quality credits promote better indoor air quality and access to daylight and views.

In addition to the 100 points constituted by the above main categories, an additional 6 bonus points can be obtained for credits in Innovation in Design and 4 bonus points are available for improvements in LEED-selected categories determined to impact Regional Priorities.

	Innovation in design or innovation in operations credits address sustainable building expertise as well as design measures not covered under the five LEED credit categories. Six bonus points are available in this category.
	Regional priority credits address regional environmental priorities for buildings in different geographic regions. Four bonus points are available in this category.

The following table shows the contribution of ArmaFORM® PET – as one component out of a multitude within a building project – to the LEED rating system.

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Leed Credit Category	Points	Intent	Contribution from ArmaFORM® PET
Energy & Atmosphere (17 possible points)			
Prerequisite 2 Minimum Energy Performance Required		Establish the minimum level of energy efficiency for the proposed building and systems.	ArmaFORM® PET foams provide thermal insulation properties that help to reduce energy demand in building and improve thermal comfort of building occupants.
Credit 1 Optimize Energy Performance	1–10 points; 2 points mandatory for new construction	Achieve increasing levels of energy performance above the baseline in the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.	Excellent insulation properties of ArmaFORM® PET will maximize energy performance of buildings. Products are manufactured in a variety of densities and thicknesses to meet the environmental design criteria to deliver a wide range of R-value specifications. When used with a whole building concept, can help achieve the 10 possible points.
Materials and Resources (13 points possible)			
Credit 2.1 Construction Waste Management: divert 50% from disposal	1 point	Divert construction, demolition and land-clearing debris from disposal in landfills and incinerators. Redirect recyclable recovered resources back to the manufacturing process. Redirect reusable materials to appropriate sites.	ArmaFORM® PET contributes a lower amount of waste materials by weight, and can help projects to reach the 50% to 75% target for diverting waste from the landfill. PET foams are completely recyclable and reusable and clean leftover parts/scrap materials can be reused.
Credit 2.2 Construction Waste Management: divert 75% from disposal	1 point in addition to credit 2.1		
Credit 4.1 Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	1 point	Increase demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.	ArmaFORM® PET GR contains 100% of recycled polymers, up to 90% of post-consumer materials and required amount of pre-consumer recycled materials (diverted from the waste stream during the manufacturing process).
Credit 4.2 Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	1 point in addition to credit 4.1		

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Leed Credit Category	Points	Intent	Contribution from ArmaFORM PET
Credit 5.1 Regional Materials: 10% extracted, processed & manufactured regionally	1 point	Increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.	Result of evaluation depends on the location of final installation place. Please contact our Technical Service to check the final distance and related number of credited LEED points.
Credit 5.2 Regional Materials: 20% extracted, processed & manufactured regionally	1 point in addition to credit 5.1		
Indoor Environmental Quality (15 possible points)			
Credit 3.1 Construction IAQ Management Plan: during construction	1 point	Reduce indoor air quality problems resulting from the construction/ renovation process in order to sustain the comfort and well-being of construction workers and building occupants.	ArmaFORM® PET foams contain low levels of VOCs (volatile organic compounds) and do not contribute to air pollution in the range defined in requirements.
Credit 3.2 Construction IAQ Management Plan: before occupancy	1 point		
Credit 7.1 Thermal Comfort: design	1 point	Provide a comfortable thermal environment that supports the productivity and well-being of building occupants.	The use of ArmaFORM® PET foam supports the desired quality and occupant satisfaction with building performance thanks to insulation properties and good ageing properties (thermal conductivity not affected by moisture or aging of foam).
Credit 7.2 Thermal Comfort: verification	1 point	Provide for the assessment of building thermal comfort over time.	
Innovation and Design Process (5 possible points)			
Credit 1.1 Innovation in Design	1-4 points	To provide design teams and projects the opportunity to be awarded points for exceptional performance above the requirements set by the LEED for New Construction Green Building Rating System	ArmaFORM® PET is a lightweight material, reducing transportation energy and structural load on the building and opening the freedom for new design concepts that can help projects win 1-4 points in design criterion. Thanks to its installation flexibility (thermoformability, easiness in shaping) together with

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Leed Credit Category	Points	Intent	Contribution from ArmaFORM PET
		and/or innovative performance in Green Building categories not specifically addressed by the LEED for New Construction Green Building Rating System.	superior performance characteristics (mechanical and insulation properties, thermal and chemical stability and compatibility with other sub-components) it allows easy installation and guarantees to perform to the stated specifications for the life of the structure.
Credits for School - Indoor Environmental Quality			
Credit 4.6 Low Emitting Materials: ceiling and wall systems	4 points for credits 4.1-4.6	To reduce the quantity of indoor air contaminants being harmful to occupants.	ArmaFORM® PET foams contain low levels of VOCs (volatile organic compounds) and do not contribute to air pollution in the range defined in requirements.
Credit 7.1 Thermal Comfort: design	1 point	Provide a comfortable thermal environment that supports the productivity and well-being of building occupants.	The use of ArmaFORM® PET foam support the desired quality and occupant satisfaction with building performance thanks to insulation properties and good ageing properties (thermal conductivity not affected by moisture or aging of foam).
Credit 7.1 Thermal Comfort: verification	1 point	Provide for the assessment of building thermal comfort over time.	
Credit 10 Mold Prevention	1 point	To reduce the potential presence of mold in schools through preventive design and construction measures.	ArmaFORM® PET has good mold and rot resistance, does not contribute to the mold growth.

References:

[1] <http://www.usgbc.org/leed/rating-systems/credit-categories>

[2] "LEED® for New Construction & Major Renovations" Version 2.2 for Public Use and Display, October 2005

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Status : July 2013

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