



STYROFOAM Extruded Polystyrene And Dow Polyisocyanurate Insulations, Integrated Insulated Concrete Systems And LEED

The U.S. Green Building Council (USGBC), a nonprofit coalition promoting high-performance green building design, has developed a system to rate the environmental designs of buildings. The Leadership in Energy and Environmental Design (LEED™) Green Building Rating System is a voluntary, consensus-based standard that recognizes the life-cycle costing of construction.

The LEED Green Building Rating System allows design professionals to accumulate credits based on meeting certain criteria pertaining to the use of environmentally friendly, sustainable and energy-efficient products and systems. Buildings may become LEED certified by achieving certain point levels in each of the LEED categories (there are four certification levels). Using the LEED design process offers numerous benefits, including financial incentives in some states and localities.

Incorporating STYROFOAM* extruded polystyrene and Dow polyisocyanurate insulations into your building designs can help obtain LEED credits in several categories.

To download the *Green Building Rating System for New Construction and Major Renovations (LEED-NC) Version 2.1*, visit www.usgbc.org.

STYROFOAM Extruded Polystyrene Insulations

STYROFOAM extruded polystyrene is the original extruded polystyrene foam, developed by Dow in 1941 and adopted as an insulation material later that decade. During the proprietary manufacturing process, millions of plastic cells are extruded together to produce a closed-cell, void-free, durable and highly moisture-resistant rigid foam with long-term thermal performance.

Dow Polyisocyanurate Insulations

Made with an exclusive free-rise technology, Dow polyisocyanurate insulations feature a uniform, closed-cell foam core for better insulation and higher R-values. Facers add strength, moisture resistance and rigidity.

Integrated Insulated Concrete Systems

Sandwiching rigid foam insulation between layers of concrete puts the insulation in the optimum position to help maximize the thermal mass of concrete. Integrated insulated concrete systems from Dow combine STYROFOAM extruded polystyrene or Dow polyisocyanurate insulation with patented fiber composite connectors, software and technical service. Licensing opportunities are available.

Sustainable Sites (SS)

SS CREDIT 7.2 (ONE POINT POSSIBLE) HEAT ISLAND EFFECT: ROOF

The USGBC encourages the construction industry to reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

STYROFOAM extruded polystyrene insulation can be used in garden roof assemblies and with reflective roofing membranes or surfaces to reduce the urban heat island effect.

Energy & Atmosphere (EA)

EA CREDIT 1 (ONE-10 POINTS POSSIBLE) OPTIMIZE ENERGY PERFORMANCE

The USGBC encourages the construction industry to achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use.

Achieving energy performance above the prerequisite standard can help reduce environmental impacts associated with excessive energy use.

STYROFOAM extruded polystyrene and Dow polyisocyanurate insulations can help achieve high energy efficiencies by providing stable, long-term insulation value as well as blocking thermal shorts that may occur in roof, wall and below-grade assemblies.

In addition, the STYROFOAM Composite Connector System and THERMOMASS® Building Insulation System can maximize the thermal mass effect to deliver high R-value (mass performance R-value), depending on climate location, the occupancy type and orientation, as well as the building design.

EA PREREQUISITE 2 (REQUIRED) MINIMUM ENERGY PERFORMANCE

The use of STYROFOAM extruded polystyrene and Dow polyisocyanurate insulations, either solely or as integrally cast in the STYROFOAM Composite Connector System and THERMOMASS Building Insulation System, will help the building design meet/exceed ASHRAE Standard 90.1-1999 or the local energy code, whichever is more stringent.

Materials & Resources (MR)

MR CREDITS 1.1 AND 1.2 (TWO POINTS POSSIBLE) BUILDING REUSE

The USGBC encourages the construction industry to extend the life cycle of existing building stock, conserve resources, reduce waste and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.

Precast panels in existing buildings constructed with the STYROFOAM Composite Connector System or THERMOMASS Building Insulation System can be easily reconfigured and reused. For example, the panels can be added to an existing building or even moved to another job site.

This extends the life of buildings, conserves resources and reduces waste, minimizing many of the environmental impacts of new buildings due to manufacturing and transport.

MR CREDITS 2.1 AND 2.2 (TWO POINTS POSSIBLE) CONSTRUCTION WASTE MANAGEMENT

The USGBC encourages the construction industry to divert construction debris from landfill disposal, redirect recyclable recovered resources back to the manufacturing process and redirect reusable materials to appropriate sites.

STYROFOAM extruded polystyrene insulation is 100 percent recyclable. Scrap material can be taken to a polystyrene recycling center and recycled into other useful products, thereby diverting it from landfills.

MR CREDITS 4.1 AND 4.2 (TWO POINTS POSSIBLE) RECYCLED CONTENT

The USGBC encourages the construction industry to increase demand for building products that incorporate recycled content materials, therefore reducing the impacts resulting from extraction and processing of new virgin materials.

STYROFOAM extruded polystyrene foam contains up to 40 percent post-industrial recycled content. Dow polyisocyanurate insulation contains 11 to 18 percent post-consumer recycled content.

In addition, the concrete wythes in the STYROFOAM Composite Connector System and THERMOMASS Building Insulation System may contain recycled content, such as supplementary cementitious material (i.e., flyash and aggregate, depending on the precaster and local conditions).

By incorporating recycled content into its insulation products, Dow is helping to reduce the impacts associated with extracting and processing new virgin materials.

TABLE 1

| STYROFOAM Extruded Polystyrene and Dow Polyisocyanurate Insulation Manufacturing Locations | |
|--|----------------------|
| Allyn's Point, Connecticut | extruded polystyrene |
| Charleston, Illinois | polyisocyanurate |
| Dalton, Georgia | extruded polystyrene |
| Hanging Rock, Ohio | extruded polystyrene |
| Joliet, Illinois | extruded polystyrene |
| La Porte, Texas | extruded polystyrene |
| Pennsauken, New Jersey | polyisocyanurate |
| Riverside, Missouri | extruded polystyrene |
| Texarkana, Arkansas | polyisocyanurate |
| Torrance, California | extruded polystyrene |
| Tracy, California | polyisocyanurate |
| Fort Saskatchewan, Alberta, Canada | extruded polystyrene |
| Varenes, Québec, Canada | extruded polystyrene |
| Weston, Ontario, Canada | extruded polystyrene |

**MR CREDITS 5.1 AND 5.2
(TWO POINTS POSSIBLE)
LOCAL/REGIONAL
MATERIALS**

The USGBC encourages the construction industry to increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the regional economy and reducing the environmental impacts resulting from transportation.

The regional manufacturing and distribution system for rigid foam insulation products from Dow helps support local and regional economies and reduce environmental impacts of transportation.

Rigid foam insulation from Dow is produced in 14 locations throughout North America (Table 1). In most cases, the product will be sourced from a location within 500 miles of the job site.

Similarly, depending on location and availability, local and regional precasters may be used to produce walls with the STYROFOAM Composite Connector System or THERMOMASS Building Insulation System.

**Indoor
Environmental
Quality (EQ)**

**EQ CREDIT 3.1
(ONE POINT POSSIBLE)
CONSTRUCTION IAQ
MANAGEMENT PLAN:
DURING CONSTRUCTION**

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

Problems encountered during the construction or renovation process can contribute to indoor air quality concerns. Walls built using the STYROFOAM Composite Connector System or the THERMOMASS Building Insulation System may help alleviate those problems.

Walls built using the STYROFOAM Composite Connector System or THERMOMASS Building Insulation System limit the transmission of moisture through the building envelope. Because of the inert materials used, these walls also reduce the potential for mold and mildew. In addition, using precast panels produces no dust or airborne contaminants

from drying or curing of compounds during the construction phase.

**EQ CREDIT 7.1
(ONE POINT POSSIBLE)
THERMAL COMFORT**

The USGBC encourages the construction industry to provide a thermally comfortable environment that supports the productivity and well-being of building occupants.

Managing moisture, especially that caused by dew point condensation, is an effective way to enhance thermal comfort for building occupants. The STYROFOAM Composite Connector System and THERMOMASS Building Insulation System effectively manage moisture caused by dew point condensation.

When moisture-laden air meets a surface cooler than the dew point temperature, it condenses into liquid water. This is common in cavity walls and under the roof, where ambient temperature is warmer than a wall surface.

Integrated insulated concrete systems like those mentioned above provide edge-to-edge insulation with no cavity, thus eliminating convective looping and thermal bridging, while reducing air infiltration and increasing the overall effective R-value of the building envelope.

Insulated sheathing, such as rigid foam insulation from Dow, moderates the temperature of the wall cavity, reducing the potential for dew point condensation.

Rigid foam insulation from Dow can also help meet the requirements of ASHRAE 55-1992 for humidity control.

Innovation & Design Process (ID)

ID CREDITS 1.1 TO 1.4 (FOUR POINTS POSSIBLE) INNOVATION IN DESIGN

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

Design teams and projects that exceed LEED requirements and/or demonstrate innovation in green building categories not specifically addressed by the LEED System may be eligible to receive "Innovation and Design" credits. Protected membrane roof assemblies and insulated concrete wall systems are two examples of construction methods that may qualify a team or project for these credits.

STYROFOAM extruded polystyrene insulation can be used in protected membrane roof assemblies, promoting sustainable design by incorporating reusable materials.

The STYROFOAM Composite Connector System and THERMOMASS Building Insulation System may indirectly contribute to "Innovation and Design" credits, depending on the design of the building. For example, because the insulated concrete precast panels can be cast with the interior and/or exterior finishes in place, the additional requirement for applying drywall or exterior brick can be eliminated, saving both resources and costs.

IN THE U.S.:

- For Technical Information: **1-866-583-BLUE (2583)**
- For Sales Information: **1-800-232-2436**

THE DOW CHEMICAL COMPANY

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- www.dowstyrofoam.com/architect

IN CANADA:

- For Technical Information: **1-866-583-BLUE (2583)** (English); **1-800-363-6210** (French)
- For Sales Information: **1-800-232-2436** (English); **1-800-565-1255** (French)

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COMBUSTIBLE: Protect from high heat sources. Local building codes may require a protective or thermal barrier. For more information, consult MSDS, call Dow at 1-866-583-BLUE (2583) or contact your local building inspector. In an emergency, call 1-989-636-4400 in the U.S. or 1-519-339-3711 in Canada.

Building and/or construction practices unrelated to insulation could greatly affect moisture and the potential for mold formation. No material supplier including Dow can give assurance that mold will not develop in any specific system.



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