



FOAMULAR[®]

Energy-Saving, Moisture-Resistant XPS Insulation

**SUSTAINABLE
BUILDING
WITH XPS**
THE SINGLE LARGEST POINT
SCORING OPPORTUNITY IN LEED^{®*}

TOPTO BOTTOM
WE'VE GOT YOU COVERED

*LEED Green Building Rating System



INNOVATIONS FOR LIVING®

Demand for proven commercial building insulation systems is increasing. At Owens Corning, we deliver advanced insulation solutions and leading-edge commercial design and construction tools designed to help our customers maximize their investment — today, tomorrow and for future generations.

Our mission — *to deliver value capable of driving our customers' business growth* — is achieved through understanding how to maximize commercial building capital investment through building protection systems including insulation.

Supported by our team of building science experts, our complete line of FOAMULAR® Extruded Polystyrene (XPS) insulation products provide advanced commercial building solutions. From below grade and under slab to exterior walls and roof applications, our insulation products deliver:

- Long-term stable thermal performance of R-5 per inch, measured after real-time aging
- Some of the highest moisture resistance ratings in the market today
- ASTM C578 compliant compressive strength that ranges from 15 psi to 100 psi minimum

www.foamular.com



FOAMULAR[®]

Energy-Saving, Moisture-Resistant XPS Insulation

TRUST

DELIVERING INSULATION PERFORMANCE YOU CAN TRUST



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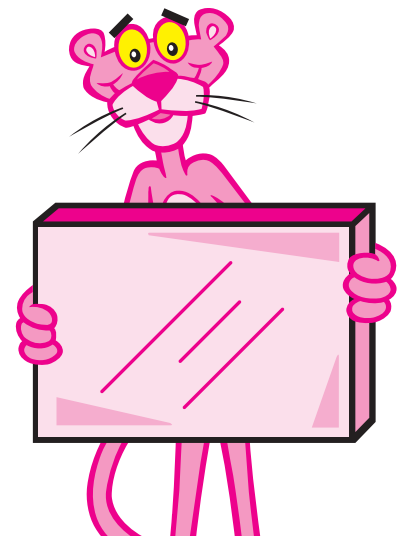
GREEN

FOAMULAR[®] INSULATION IS PERFECT FOR GREEN ROOFING



PERFORM

FOAMULAR[®] INSULATION IS TESTED, PROVEN & READY TO PERFORM





INNOVATIONS FOR LIVING®

DELIVERING INSULATION PERFORMANCE YOU CAN TRUST



Owens Corning World Headquarters

Owens Corning is a leader in delivering energy-saving products and services.

FOAMULAR® Insulation's R-value is based on real-time aging and the product is warranted to maintain 90 percent of its insulating value for 20 years. FOAMULAR® insulation has a combination of characteristics that yield very low water absorption and is available in a range of compressive strengths that accept loads up to their design limit with little deformation.

REAL TIME R-VALUE


We test and report our FOAMULAR® insulation's R-value under real time conditions. Unlike other types of foam plastic insulation that use artificial means to accelerate and estimate aged R-value, FOAMULAR® insulation's R-value is based upon real-time 5-year aging.



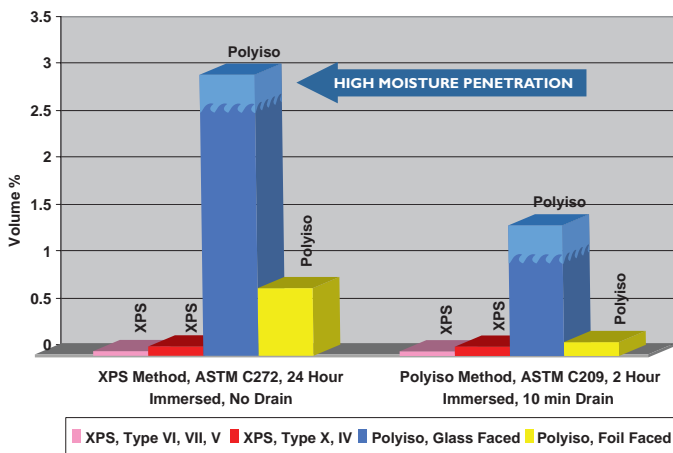
Why?

Because accelerated test methods can underestimate aged R-loss. We want to recognize the true aged performance of our insulation. Regardless its manufacturing process, all foam plastic insulations have a higher R-value when first manufactured, which drops for a period of time and then levels off over the life of the product.

The Polyiso industry uses a different method. Rather than use real-time aging to estimate R-value for 20 years it uses CAN/ULC/S770¹, to artificially accelerate aging and estimate "thermal drift". The S770 method has been shown to underestimate aged R-loss².



Unlike competing types of rigid insulation, FOAMULAR® insulation is warranted to maintain 90 percent of its R-value for 20 years with no caveats for exposure to moisture or facer delamination.




MOISTURE PROTECTION

Water — an ever present element in building construction — gets in by design in applications like rain screen systems, or as a result of natural aging, design or construction flaws. Almost all construction applications, at some time, must resist water in the form of a liquid, a vapor or solid ice.



Not all insulations, however, provide adequate water resistance necessary to meet real world construction applications. Insulation that absorbs water loses R-value and other important physical properties resulting in costly customer complaints, call-backs and damaged reputations.



Significant differences in water absorption occur when different test methods are used to measure the same property. Compared with other types of foam insulation, FOAMULAR® insulation delivers the lowest water absorption via its moisture-resistant, uniform hydrophobic polymer cells with continuous walls.

FOAMULAR® (XPS) Board Resists Moisture

Extruded Polystyrene (XPS) insulation is a closed cell, homogeneous board structure recognized for its proven durability and ability to resist moisture.

EPS Board Can Absorb Moisture

Expanded Polystyrene (EPS) insulation allows water and air to penetrate its board structure through air spaces between beads, resulting in lower R-value, greater moisture penetration and less resistance to degradation from freeze/thaw cycles.

ISO Board Can Allow Moisture Penetration

Polyisocyanurate (ISO) insulation – comprised of an irregular, brittle, open-cell structure with an inherent hydrophilic tendency – can allow water penetration.

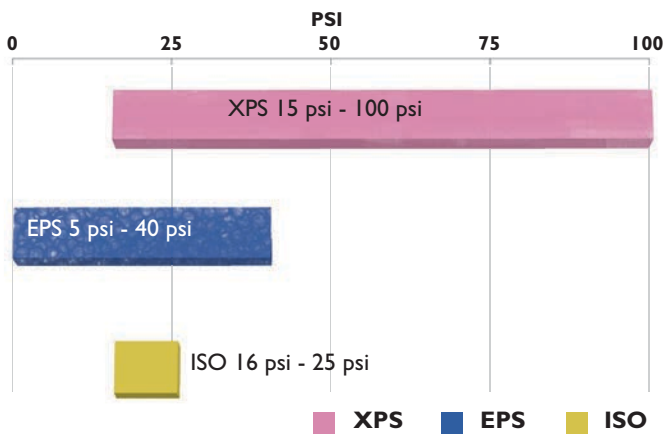
COMPRESSIVE STRENGTH

The compressive strength of FOAMULAR® Insulation, which ranges from 15 psi to 100 psi, allows designers to select an appropriate strength that may not be available with other types of foam plastic insulation.

Manufactured to comply with ASTM C578³ FOAMULAR® insulation accepts its design load with little deformation and is available in a wide variety of strengths suitable for many applications.

Unlike brittle ISO products, which tend to fracture and crush at load limits, FOAMULAR® holds its strength.

COMPRESSIVE STRENGTH COMPARISON CHART



PERFORMANCE TOOLS

The commercial and residential building environment is changing. The design/build industry has a new set of drivers created as a result of:

- Escalating energy costs
- Growing evidence that energy efficient buildings are starting to command a premium price
- Changing energy codes which mandate energy efficient continuous insulation (ci)
- The demand for more sustainable products

At Owens Corning, not only do we warranty proven performance, we give you access to exclusive tools designed to differentiate specification/construction options, provide pay-back analysis and strengthen sustainable product recommendations.

Ask your Owens Corning representative about our:

- **Global Energy Master Tool:** An energy calculator that compares thermal performance and cost effectiveness of construction options providing users with energy savings, lifecycle cost savings and simple payback analysis.
- **Continuous Insulation AIA/CES Training**

FOAMULAR® INSULATION PHYSICAL PROPERTIES

Properties	FOAMULAR® XPS INSULATION PRODUCTS					
	150	250	400	600	1000	High R CW Plus
R-value per in. (hr x ft ² x °F / Btu)						
@ 75°F	5.0	5.0	5.0	5.0	5.0	5.6
@ 40°F	5.4	5.4	5.4	5.4	5.4	6.0
@ 25°F	5.6	5.6	5.6	5.6	5.6	6.2
Compressive, min. psi	15	25	40	60	100	25
Water Absorption, % vol.	0.10	0.10	0.05	0.05	0.05	0.10
ASTM C578 Type	X	IV	VI	VII	V	IV



INNOVATIONS FOR LIVING®

TOP TO BOTTOM WE'VE GOT YOU COVERED



Owens Corning is the leader in developing high performance building envelopes.

Durability, reusability, moisture resistance and the ability to retain R-value in the presence of water enable FOAMULAR® extruded polystyrene insulation to be used in a wide variety of building applications from roof insulation to below-grade use where the insulation will be in constant contact with moisture.

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Establishing the Right Foundation

On foundations, moisture-resistant FOAMULAR® insulation insulates while at the same time its durability protects waterproofing membranes from backfilling damage, putting one more obstacle in water's path (soil to foundation).

Going Under Slab

For use under slabs, in a variety of compressive strengths suitable for the lightest residential to the heaviest industrial floor loads, FOAMULAR® insulation is durable enough to be walked on while placing slab reinforcing and concrete.

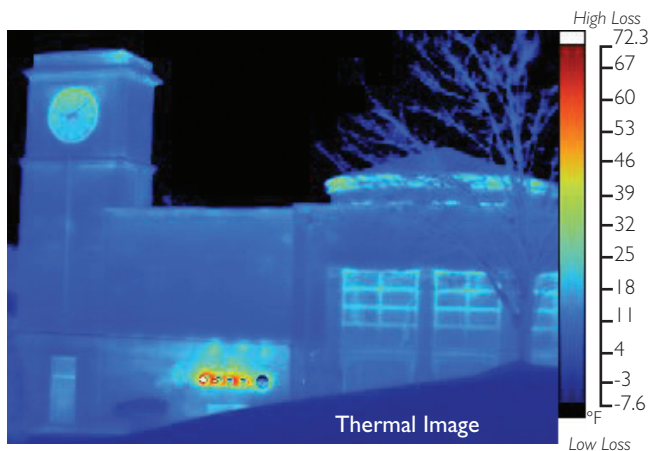
Insulating Below Grade

In below-grade applications, FOAMULAR® insulation's high resistance to water absorption makes it the only choice to protect against constant and relentless moisture threats present throughout a building's lifecycle.

Sheathing and Masonry Wall

FOAMULAR® sheathing and masonry wall insulation products are highly water resistant for cavity applications. They maintain their R-value over the life of the building and provide a "continuous insulation" layer prescribed by ASHRAE 90.1⁴.

CONTINUOUS INSULATION



Continuous insulation reduces energy loss due to thermal bridging.

FOAMULAR® continuous insulation (ci), an important part of the prescriptive insulation packages specified in ASHRAE 90.1⁴, is intended to minimize the effects of thermal bridging through steel studs or solid masonry construction.

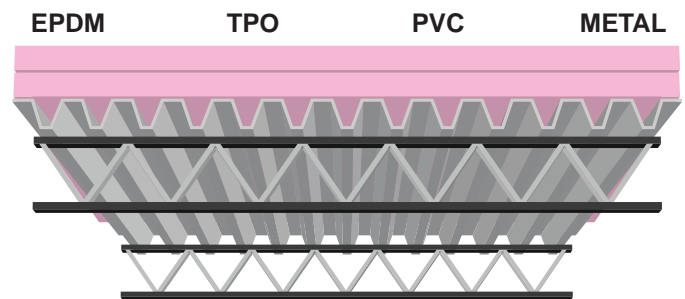
The absence of red thermal imaging — a sign of heat loss — at wall studs in this steel stud and masonry veneer wall system (pictured left), prove the clear advantage of continuous insulation. Continuous wall insulation has become a critical part of energy codes and associated compliant designs throughout North America due to ever rising energy costs.

VERSATILE CONFIGURATIONS

FOAMULAR® XPS Insulation is available in a wide range of versatile configurations specifically designed for use in many types of above-grade wall construction. Our edge configurations include straight, tongue and groove and ship-lap.

- **Masonry Cavity Walls:** Available in precut 16" widths, our scored sheets can be easily snapped to 24" or 16" widths depending on jobsite requirements
- **Z-Furring:** Available in 23 7/8" width designed to fit tightly between Z-furring
- **Concrete Sandwich Panels:** Our 4' x 8' sheets enable maximum coverage in insulated concrete panels.

THERMAPINK® roof insulation can be installed with a variety of roof coverings.



ROOFING

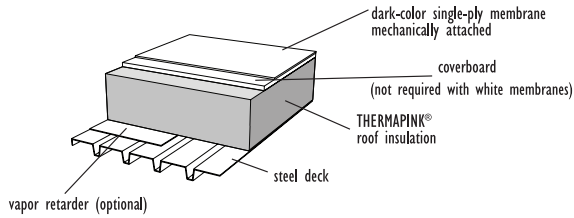
THERMAPINK® extruded polystyrene is the ideal roof insulation option when long-term, reliable properties such as R-value and dimensional stability are desired, along with durable resistance to normal foot traffic, high moisture resistance and reusability.

Used over all types of roof decks, including steel, concrete and wood, THERMAPINK® insulation can be installed directly over steel decks without the need for an additional thermal barrier layer.⁵

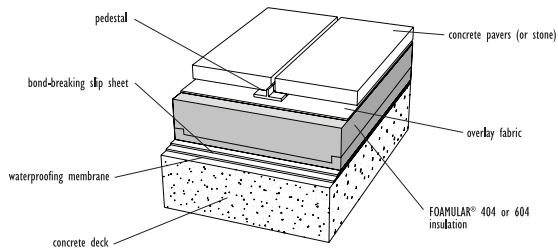
See the "FOAMULAR® Roofing and Waterproofing Manual"⁶ for complete system details.

COVERED

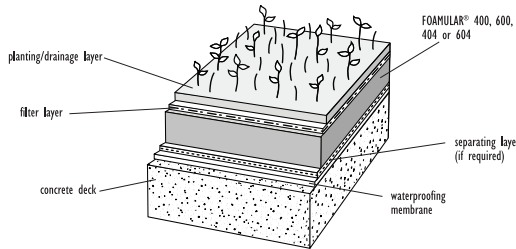
BELOW THE MEMBRANE



ABOVE THE MEMBRANE



VEGETATED SYSTEM



RECOVER ROOFING

DURAPINK® insulation, installed directly over existing built-up roofing (BUR) and other types of existing membranes, provides a way to “recover” and reuse existing roofs. DURAPINK® insulation can be placed over old insulation, when its not too wet and is appropriate to do so. By leaving existing systems in place, tear-off of the old roof system is avoided, saving labor, hauling and landfill economic and environmental costs.

Placed over an existing membrane, DURAPINK® insulation provides a protective layer for the new membrane. It cushions over gravel and other small sharp edges. Other types of insulation, including the traditionally used wood fiber board, cannot perform these functions in a recover roofing environment because they are so susceptible to water absorption damage.

RE-ROOFING

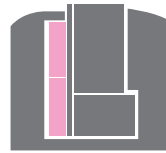
When today's roof reaches the end of its useful life, it must be replaced. Install FOAMULAR® insulation today and avoid replacement costs tomorrow.

Unlike other roofing insulation, FOAMULAR® insulation's high moisture resistance supports reuse, saving tear off labor, disposal fees and environmental costs.

OTHER APPLICATIONS

Durability, reusability, superior water resistance properties and the ability to retain R-value in the presence of water enable FOAMULAR® extruded polystyrene insulation to be used as frost protection in many structural applications, such as shallow foundations, roadways and runways, as lightweight fill in geotechnical applications, and as concrete forming aids.

PROTECTING SHALLOW FOUNDATIONS



When used as frost protection FOAMULAR® XPS insulates the ground, slowing the rate of heat loss and delaying the onset of freezing. Properly designed and installed, FOAMULAR®

insulation can prevent sub-grade freezing altogether around protected foundations making it a suitable system for building shallow foundations (foundations above the frost line).⁷

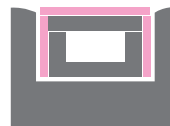
INSULATING PAVED SURFACES



Used below pavement surfaces, FOAMULAR® insulation increases the time needed for the sub-grade to freeze.

It also delays thawing, thus reducing freeze-thaw cycles and reducing stress on paved surfaces. FOAMULAR® insulation properties comply with industry standards including AASHTO M230⁸ for below pavement applications.

PROTECTING SHALLOW UTILITIES & TUNNELS



When sub-grade conditions prevent deep burial of utility lines that are subject to freezing, FOAMULAR® XPS can be used to thermally protect utilities

in shallow cover situations. FOAMULAR® insulation's durability and R-value retention in the presence of ground moisture make it ideal for below grade insulation projects.

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PROTECTING WATERPROOFING



FOAMULAR® insulation is used to protect below grade waterproofing, even when insulating qualities are not needed. It is durable and light compared to asphalt board or other types of protective board often used. One person can place 4' x 8' sheets, saving time and labor.

PRESERVING VOID SPACES



Some construction forming systems need void space inside the form. Durable and reusable FOAMULAR® insulation can be used to preserve such void spaces.

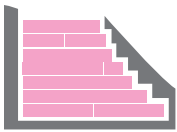
FOAMULAR® insulation can be used during the concrete forming process to preserve a void space under grade beam foundations installed over expansive soils.

FOAMULAR® insulation can also be used inside traditional concrete forms to create the voids needed to form brick ledges.

In grade beams, the foam can be left in place.

In brick ledge forming — after the concrete is placed and the forms removed — reusable FOAMULAR® insulation can be removed, leaving the formed ledge needed to support placement of brick veneer.

GEOTECHNICAL APPLICATIONS



Durable, water resistant FOAMULAR® insulation is often used as lightweight fill for building and road construction, or as a lightweight replacement for soil.

FOAMULAR® XPS can be stacked to create contours and landscape features on vegetated plaza decks. It can also be used to replace the overburden on soft and unstable soil, for ground stabilization, pavement or sub-slab insulation.





INNOVATIONS FOR LIVING®

FOAMULAR® INSULATION IS PERFECT FOR GREEN ROOFING

Photo: Antonio Vernon.



City of Chicago City Hall Green Roof Garden project.

FOAMULAR® Insulation makes possible the design of energy efficient building envelopes that can achieve LEED® energy efficiency goals. Durable and water resistant extruded polystyrene (XPS) insulates even when buried under wet soil and enables the creation of vegetated roofs. FOAMULAR® Insulation is the only extruded polystyrene insulation that is certified for both recycled content and indoor air quality.

SUSTAINABLE BUILDING

FOAMULAR® insulation is durable and recyclable with a proven history of removal and reuse^{9 11} eliminating hauling and landfill fees and associated environmental impact.

With FOAMULAR® insulation, new insulation does not need to be manufactured, shipped and installed, unlike other types of foam plastic insulation that don't have the water resistance and durability necessary to be removed and reused.

FOAMULAR® XPS INSULATION

Production Facts 100% Scrap Reclamation ZERO Landfill Waste	Third Party Certification	
	Recycled Content 20%* *Based on a weighted 3-plant average	Air Quality GREENGUARD Indoor Air Quality Certified®
	Scientific Certification Systems SCS Certification No. SCS-MC-01132 	Certified by the GREENGUARD Environmental Institute to meet its stringent indoor air quality standards. FOAMULAR® Certification No. In4P191213-2 

PERFECT FOR GREEN BUILDINGS

The single largest point scoring opportunity in the LEED® Green Building Rating System¹⁰ is in levels of energy performance above that prescribed in ASHRAE 90.1.⁹

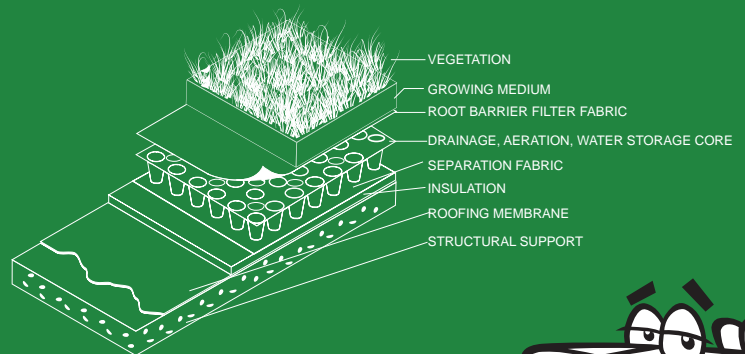
FOAMULAR® continuous insulation sheathing over steel studs, or in masonry walls, enables buildings to achieve LEED energy efficiency design goals and standards.



RAISING THE ROOF ON GREEN STANDARDS

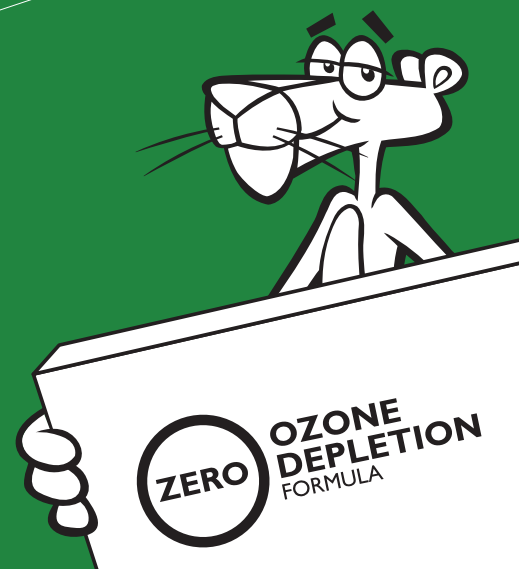
FOAMULAR® insulation supports energy efficient building design, enabling innovative roof surfaces that help manage storm water run-off and contribute to the total recycled content of projects.

Durable and water resistant, FOAMULAR® insulation works even when buried under wet soil and enables the creation of vegetated roofs, a critical component of sustainable design.



GREENGUARD CERTIFIED

FOAMULAR® insulation is the only extruded polystyrene insulation product certified by the GREENGUARD Environmental Institute under the GREENGUARD Standard for Low Emitting Products.





FOAMULAR® INSULATION IS TESTED, PROVEN AND READY TO **PERFORM**



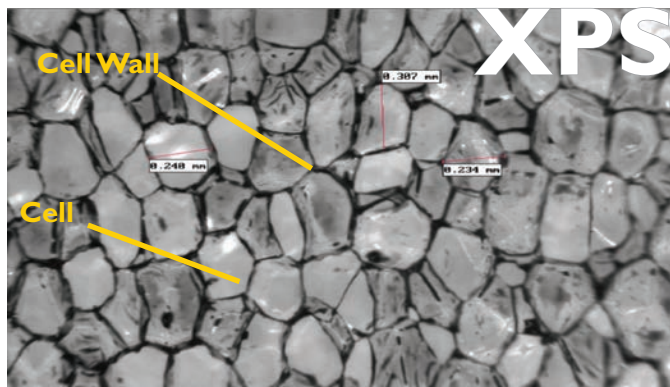
The Kent State University Dormitory project, featured in Construction Specifier Magazine and Metal Home Digest, addressed the need for continuous insulation in steel stud construction with FOAMULAR® Insulation products

Rigid board foam plastic insulation must be strong, moisture resistant and maintain its R-value for the life of the building in conditions that are sometimes hostile. When comparing the ability of foam insulation to do these things it is helpful to know the basic types of foam and their properties.

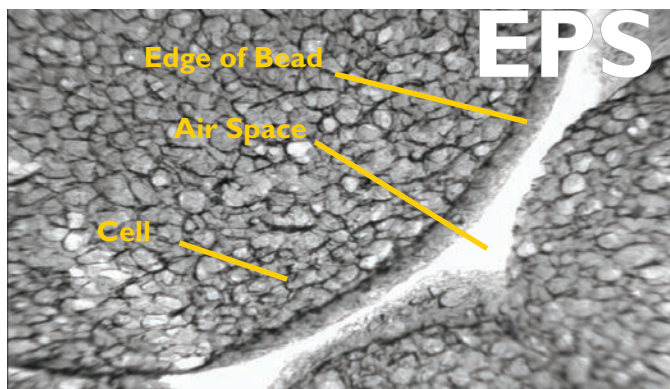
COMPARING RIGID FOAM INSULATIONS

Rigid board foam plastic insulation must be strong, moisture resistant and maintain its R-value for the life of the building in conditions that are sometimes unfavorable.

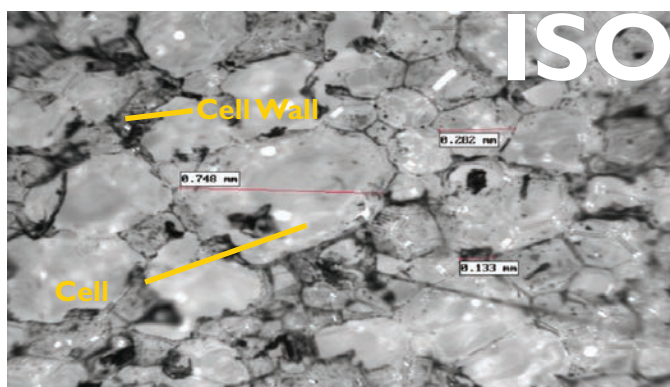
The three types of rigid foam plastic insulation are very different:



FOAMULAR® (XPS) is a thermoplastic polystyrene board made in an extrusion process resulting in a durable homogenous cross section



Expanded Polystyrene (EPS) is a collection of thermoplastic beads pressed together in a mold under heat and pressure



ISO or Polyiso is a thermoset plastic manufactured in a continuous lamination process using liquid raw material that expands between facing materials

Extruded Polystyrene (XPS), which includes FOAMULAR® insulation, does not have individual beads like EPS that can fall apart. It is not brittle like ISO, and it does not depend on facers for certain properties as ISO does. Facers may de-

laminate and cause installation and durability problems.

Expanded Polystyrene (EPS) insulation has air spaces between its beads, allowing water and air to penetrate the board structure, which lowers the R-value of the board.

Polyiso (ISO) insulation has an irregular, more open cell structure that, combined with the material's hydrophilic chemical tendency, results in higher water absorption compared to FOAMULAR® insulation.



Rather than use real-time aging to estimate R-value, the polyiso industry uses CAN/ULC/S7701 to artificially accelerate aging and estimate "thermal drift." The S770 method has been shown to underestimate aged R-loss.²

Due to their high levels of water absorption, both polyiso and EPS are not reusable when they become wet due to roofs leaks.

All foam plastic insulations are combustible. Although they do contain a flame-retardant additive to inhibit ignition from small fire sources, if exposed to fire of sufficient heat and intensity, FOAMULAR® insulation and other foam plastic insulations will ignite. Do not expose these products to open flame during shipping, storage, installation or use. In most applications, a code compliant thermal barrier must be used to separate foam plastic insulation from the building interior.

COMPARING TEST METHODS

Published properties for foam plastic insulations are not always directly comparable. Different test methods may be used to measure the same properties for different types of insulation. To fully understand how the materials compare, ask questions. If different methods are used to measure performance, they should be identified because not doing so may conceal significant differences in properties or performance. For example, a significant difference in water absorption can be minimized when different test methods are used to measure the same property (see graph on page 5).



FOAMULAR® INSULATION MAY BE THE PERFECT CHOICE



For decades, countless building designers and engineers have found FOAMULAR® extruded polystyrene insulation to be the perfect choice for a myriad of applications. FOAMULAR® insulation has a long term stable thermal resistance of R-5 per inch, measured after real time aging. It has a high resistance to moisture because it is closed cell and composed of hydrophobic polystyrene polymer, achieving its resistance to water without relying on facers. FOAMULAR® insulation has a wide range of compressive strengths and it enables sustainable building design concepts.














Choose FOAMULAR® insulation for your current and future projects.

FOOTNOTES

1. CAN-ULC-S770-03. Standard Test Method for Determination of Long-Term Thermal Resistance of Closed Cell Thermal Insulating Foams; Underwriters Laboratories of Canada, 7 Underwriters Road Toronto ON M1R 3B4
2. Testing LTTR, Testing Reveals the LTTR Method May be Over-Reporting Results, by Mark S. Graham; Professional Roofing, January 2006. National Roofing Contractors Association, 10255 W. Higgins Road Suite 600, Rosemont, IL 60018-5607
3. ASTM C 578-06. Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959
4. ASHRAE 90.1: "Energy Standard for Buildings Except Low-Rise Residential Buildings"; American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1791 Tullie Circle, N.E. Atlanta, GA 30329
5. Underwriters Laboratories Roof Deck Construction #457, tested in accordance with UL Standard 1256.
6. FOAMULAR® Roofing and Waterproofing Manual, Owens Corning Publication No. 23149-A
7. Design Guide for Frost-Protected Shallow Foundations: NAHB Research Center, Upper Marlboro, MD; June 1994
8. Standard Specification for Extruded Foam Insulation Board (Polystyrene); AASHTO Designation: M230; American Association of State Highway and Transportation Officials
9. "FOAMULAR® Extruded Polystyrene Insulation Recycled After 17 Years on the Job at DFW Airport," Owens Corning Publication No. 59400
10. LEED-NC for New Construction, Version 2.2, U.S. Green Building Council, 1015 18th Street NW, Suite 508, Washington, D.C. 20036
11. Metal roof insulation case study, "Pink FOAMULAR® Insulation Holds its Value," Owens Corning Publication No. 10004083

FOAMULAR® EXTRUDED POLYSTYRENE INSULATION

Product Selection Guide

Construction Application	FOAMULAR® Product	SCS	GG	ASTM C578 Type	
GENERAL PURPOSE	150	+		X	Slab edge, foundation, under light slab, steel stud sheathing, masonry cavity wall, concrete tilt-wall, etc
	250	+		IV	
WALL					
Sheathing	Insulating Sheathing	+		X	Laminated film on both sides for added strength
	ProPink®	+		X	Reinforced laminated film on both sides for extra added strength
Masonry Cavity Wall	CW15	+		X	15 and 25 psi, 16" wide, fits between wall ties
	CW25	+		IV	
	High-R CW Plus	+		IV	25 psi, 16" wide, fits between wall ties. Higher R per in
Z-Furring	InsulPink Z®	+		X	Fits between Z-furring on inside surface of unit masonry or concrete walls
Insulated Concrete Sandwich Panels	PinkCore®	+		IV	Connector ties also available as part of structural wall system
ROOF					
Low Slope Commercial Roofing, Architectural Metal Roofing	ThermaPink® 18	+		X	18, 25, 40 psi, used in a variety of roofing systems over a variety of deck types
	ThermaPink® 25	+		IV	
	ThermaPink® 40	+		VI	
Recover Roofing	DuraPink®	+		IV	Used over existing membrane and under new mechanically attached single-ply
	DuraPink® Plus	+		IV	Fabric facer to separate XPS from new PVC membrane
PRMA, Plaza Deck, Waterproofing	404	+		VI	Bottom side drainage channels on 4 edges for PRMA
	604	+		VII	
	404RB	+		VI	Bottom side drainage channels and top side ribbed surface for use under pavers in PRMA
	604RB	+		VII	
	600	+		V	High load, vehicular traffic
	1000	+		V	Higher load, vehicular traffic
UNDER SLAB					
Load Bearing, High Strength, Under Industrial Slabs	400	+		VI	40, 60, 100 psi compressive strength. Engineer to match FOAMULAR® compressive strength needed to load on slab and slab design. Ranges from light pedestrian to heavy equipment and storage.
	600	+		VII	
	1000	+		V	
Under Slab, Low Temperature Storage	LT30	+		IV	30 psi. Light to medium loads
	LT40	+		VI	40 psi. Heavier loads
FOUNDATION					
Foundation	Insul-Drain®	+		IV	Filtration fabric faced with drainage channels in foam



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