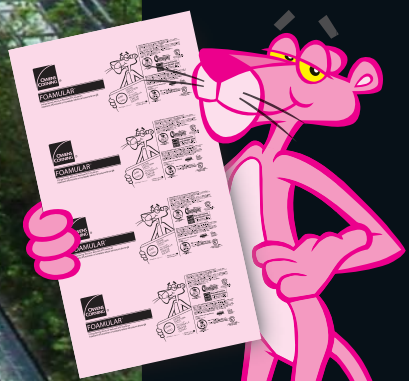




INNOVATIONS FOR LIVING®

# FOAMULAR® XPS Roof Insulation FOR COMMERCIAL BUILDINGS







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INNOVATIONS FOR LIVING®

## FOAMULAR® XPS ROOF INSULATION FOR COMMERCIAL BUILDINGS

### THE RIGHT PRODUCT FOR COMMERCIAL ROOFING PROJECTS

FOAMULAR® insulation comes in a variety of sizes, thicknesses and compressive strengths to meet the demands of almost every application. Suited for a wide range of applications, FOAMULAR® extruded polystyrene (XPS) insulation is ideal for roofing applications including single-ply, protected roof membrane assemblies (PRMA), tapered, vegetative roofs, plaza decks, architectural metal roofing and recover roofing. For more information about the specific FOAMULAR® insulation products below, please review each product's data sheet available at [www.owenscorningcommercial.com](http://www.owenscorningcommercial.com) or [www.foamular.com](http://www.foamular.com).

**FOAMULAR® THERMAPINK® XPS insulation is an excellent insulation choice for single-ply roofing systems or architectural metal roofing.** THERMAPINK® insulation, with a variety of compressive strengths, high resistance to water absorption, and a stable long term R-value of 5 per inch, is an excellent insulation layer for use below single-ply membrane roofing systems. Membrane systems vary in color and chemical composition, and may be mechanically attached, loose laid/ballasted or fully adhered. Depending on the type of system specified, cover boards, or slip sheets may be required over FOAMULAR® THERMAPINK® XPS insulation. Single-ply systems with THERMAPINK® XPS insulation have a wide variety of Underwriters Laboratories (UL) and Factory Mutual (FM) performance ratings for fire and wind resistance including ASTM E108 Class A, ASTM E119 hourly fire resistance, FM 4450 Class I, UL 1256 direct to steel deck with no thermal barrier layer, and 90 psf and higher wind classifications. THERMAPINK® 25 insulation has a 25 psi compressive strength that is also strong enough to hold the retention clips used to secure metal roofing. Bearing plates under the clips sit into the surface of the insulation as they are tightened. No adhered facer means no extra labor needed to trim the surface to achieve proper seating.

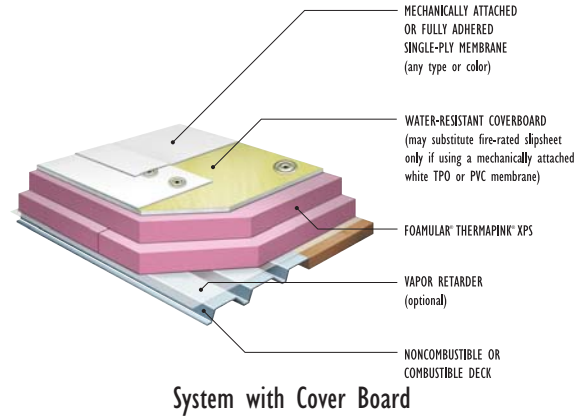
**FOAMULAR® XPS insulation products 404, 604, 404RB and 604RB are used in PRMA applications.** FOAMULAR® XPS insulation is the only insulation used in PRMA roof systems due to its excellent resistance to water absorption compared to any other type of rigid board insulation. Since the insulation is installed above the waterproofing membrane and is exposed to water through its service life, resistance to water while maintaining physical properties is critical.

FOAMULAR® 404 and 604 insulations have channels cut into the bottom edges on all four sides of the board to enhance drainage at the board/membrane interface. FOAMULAR® 404RB and 604RB insulations have ribs cut into the top surface of the board in addition to the channels on the bottom. The ribs serve as drainage enhancement under pavers when the pavers are laid directly on top of the foam board. This is in lieu of using pedestals to support and create drainage under the pavers.

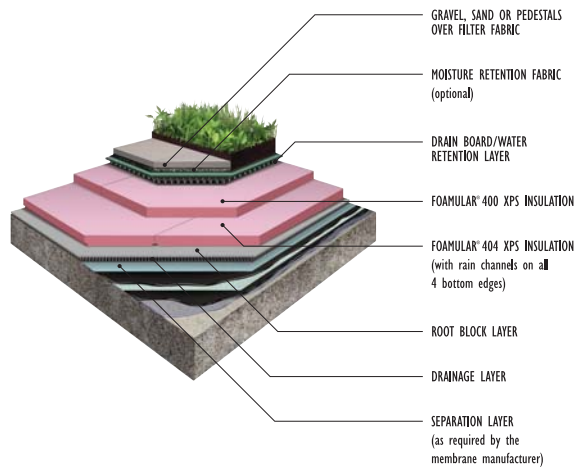
**FOAMULAR® DURAPINK® XPS insulation is an excellent insulation choice for recover single-ply roofing systems.** Unlike other cover boards sometimes used for recover, DURAPINK® XPS insulation has high resistance to water absorption, maintaining all of its insulation and strength properties while any latent water that may be in the old system dissipates. DURAPINK® recover insulation systems have a wide variety of UL and FM performance ratings including ASTM E108 Class A, and wind uplift resistance classifications.

**FOAMULAR® Tapered Roof Insulation provides a thermally efficient, moisture-resistant positive drainage slope for use under single-ply or other types of roofing systems.**

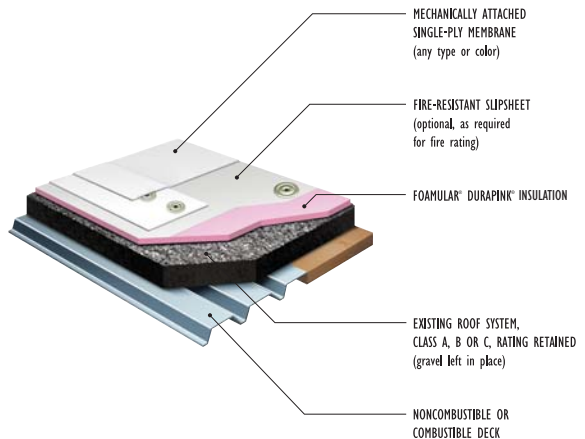
### LOW SLOPE SINGLE-PLY ABOVE DECK ROOF INSULATION



### PRMA, VEGETATIVE ROOF INSULATION



### RECOVER ROOF INSULATION





## FOAMULAR® XPS ROOF INSULATION FOR COMMERCIAL BUILDINGS

FOAMULAR® XPS insulation is a rigid foam insulation which meets the needs of today's design professionals for a truly sustainable insulation product.

Owens Corning™ insulation products help improve thermal performance and control moisture in commercial, institutional and high-rise residential buildings. Owens Corning™ FOAMULAR® XPS insulation is a closed cell, moisture-resistant rigid foam board ideal for many roofing applications, including single-ply, protected roof membrane assemblies (PRMA), tapered, vegetative roofs, plaza decks, architectural metal roofing and recover roofing.

FOAMULAR® XPS is made with Owens Corning's patented Hydrovac® process technology which makes it highly resistant to moisture and permits the product to retain its high R-value year after year even after exposure to moisture and freeze/thaw cycling.

### KEY FEATURES

- Exceptional moisture resistance, long-term durability
- Limited lifetime warranty covers all ASTM C578 properties with a 90% R-value retention.<sup>1</sup>
- The only XPS foam with certified recycled content—certified by Scientific Certification Systems (SCS) to contain a minimum 20% recycled content
- The only XPS foam to be GREENGUARD Children & Schools Certified<sup>SM</sup>
- Will not corrode, rot or support mold growth
- Zero ozone depletion potential with 70% less global warming potential than the previous formula
- Reusable
- Lightweight, durable rigid foam panels are easy to handle and install
- Easy to saw, cut or score

### WHAT MAKES FOAMULAR® XPS INSULATION SUSTAINABLE?

Sustainability has many definitions in the design community, but in short it's all about how the construction, use and maintenance of buildings can minimize the demand for resources over the long-term life of the building.

FOAMULAR® XPS insulation is a highly effective insulation. FOAMULAR® roof insulation is highly resistant to moisture and mold. This resistance to moisture, combined with excellent compressive strength and dimensional stability, makes FOAMULAR® roof insulation reusable. Building owners can be confident that in choosing FOAMULAR® roof insulation, they will not need to replace the insulation when the roofing membrane needs updating.

FOAMULAR® roof insulation is made with a high percentage of pre-consumer recycled material. It is the only XPS insulation with certified recycled content, certified by Scientific Certification Systems.

FOAMULAR® roof insulation can help contribute to credits under the Leadership in Energy and Environmental Design (LEED®) program of the U.S. Green Building Council in the following categories: Energy and Atmosphere (various credits), Materials and Resources (Resource Re-use, Recycled Content, Local Regional Materials), and Innovation in Design. Refer to the Owens Corning publication, FOAMULAR® XPS Commercial Roofing Insulation—HELPING YOU ACHIEVE LEED® CERTIFICATION for more details.

- FOAMULAR® XPS insulation is reusable
- FOAMULAR® XPS insulation is made with a zero ozone depletion formula
- Certified by Scientific Certifications Systems to contain a minimum of 20% pre-consumer recycled polystyrene
- Certified to meet indoor air quality standards under the stringent GREENGUARD Indoor Air Quality Certification Program®, and the GREENGUARD Children & Schools Certification Program<sup>SM</sup>
- Approved under the National Association of Home Builders (NAHB) Research Center Green Seal of Approval
- Utilizing FOAMULAR® XPS insulation can help achieve green building certifications including the U.S. Green Building Council's LEED® certification
- FOAMULAR® XPS insulation may qualify for The Buy American provision of the American Recovery and Reinvestment Act (ARRA)

Owens Corning is a worldwide leader in building material systems, insulation and composite solutions, delivering a broad range of high-quality products and services. Owens Corning is committed to driving sustainability by delivering solutions, transforming markets and enhancing lives. More information can be found at [www.sustainability.owenscorning.com](http://www.sustainability.owenscorning.com).



## FOAMULAR® XPS INSULATION PRODUCT DATA

### STANDARDS, CODES COMPLIANCE

- FOAMULAR® XPS insulation meets ASTM C578
- UL (Underwriters Laboratories) Classified. UL Classification Certificate U-197 is available at [www.foamular.com](http://www.foamular.com)
- See ICC-ES Evaluation Report ESR-1061 at [www.icc-es.org](http://www.icc-es.org)
- UL Roof Deck Constructions tested in accordance with UL 1256, "Standard for Fire Test of Roof Deck Constructions" including direct to deck Roof Deck Construction #457
- FM Class I Roof Decks
- ASTM E108 Fire Classified Assemblies
- ASTM E119 Fire Resistance Rated Roof/Ceiling Assemblies
- UL and FM Wind Uplift Rated Assemblies.
- Refer to [www.ul.com](http://www.ul.com) "Certifications" or FM Approval RoofNav for details on listings, constructions and assemblies
- Meets California Quality Standards and HUD UM #71a
- Compliance verification by RADCO (AA-650)



### LIFETIME LIMITED WARRANTY

FOAMULAR® XPS insulation is warranted to maintain 90% of its R-value and to retain all other properties defined in ASTM C578 for the lifetime of the building. See the actual warranty for complete details, limitations and requirements at [www.owenscorningcommercial.com](http://www.owenscorningcommercial.com) or [www.foamular.com](http://www.foamular.com).

### NOTES

1. See actual warranty for complete details, limitations and requirements.

### APPLICATION NOTES

- Assess the necessity for providing vapor retarders (see current ASHRAE Handbook of Fundamentals).
- Solvent-based adhesives and mastics are not compatible with polystyrene insulations.
- Cover insulation as soon as possible to protect it from excessive exposure to direct sunlight.
- Product should be installed with the printed surface facing downward.
- Additional protection may be required when product is placed near reflective surfaces.
- THERMAPINK® roof insulation can be used with BUR or Modified Bitumen systems. For heat protection, a cover board (typically, ½" gypsum board) must be adhered or mechanically fastened over the polystyrene roof insulation.
- See Owens Corning Roofing Systems Guide Specifications for details.



## FOAMULAR® XPS INSULATION PHYSICAL PROPERTIES

### FOAMULAR® XPS INSULATION PHYSICAL PROPERTIES<sup>1</sup>

	TEST METHOD <sup>2</sup>	FOAMULAR® THERMAPINK® 18	FOAMULAR® THERMAPINK® 25 DURAPINK®	FOAMULAR® 404/404RB TAPERED 400	FOAMULAR® 604/604RB TAPERED 600
Thermal Resistance <sup>3</sup> , R-Value (180 day), minimum hr•ft <sup>2</sup> •°F/Btu (RSI, m <sup>2</sup> •°C/W)	ASTM C518	R-5/inch	R-5/inch	R-5/inch	R-5/inch
Compressive Strength <sup>4</sup> , minimum psi (kPa)	ASTM D1621	18 (124)	25 (172)	40 (276)	60 (414)
Flexural Strength <sup>5</sup> , minimum, psi (kPa)	ASTM C203	60 (414)	75 (517)	115 (793)	115 (793)
Water Absorption <sup>6</sup> , maximum, % by volume	ASTM C272	0.1	0.1	0.05	0.05
Water Vapor Permeance <sup>7</sup> , maximum perm (ng/Pa•s•m <sup>2</sup> )	ASTM E96	1.5 (86)	1.5 (86)	1.1 (63)	1.1 (63)
Dimensional Stability, maximum, % linear change	ASTM D2126	2.0	2.0	2.0	2.0
Flame Spread <sup>8,9</sup>	ASTM E84	5	5	5	5
Smoke Developed <sup>8,9,10</sup>	ASTM E84	45-175	45-175	45-175	45-175
Oxygen Index <sup>8</sup> , minimum, % by volume	ASTM D2863	24	24	24	24
Service Temperature, maximum, °F (°C)	—	165 (74)	165 (74)	165 (74)	165 (74)
Linear Coefficient of Thermal Expansion, in/in/°F (m/m/°C)	ASTM E228	3.5 x 10 <sup>-5</sup> (6.3x10 <sup>-5</sup> )	3.5 x 10 <sup>-5</sup> (6.3x10 <sup>-5</sup> )	3.5 x 10 <sup>-5</sup> (6.3x10 <sup>-5</sup> )	3.5 x 10 <sup>-5</sup> (6.3x10 <sup>-5</sup> )
Type Classifications	ASTM C578	Type X	Type IV	Type VI	Type VII

- Properties shown are representative values for 1" thick material, unless otherwise specified. Testing modified as needed for products less than 1/2" thickness.
- Modified as required to meet ASTM C578.
- R means the resistance to heat flow; the higher the value, the greater the insulation power. This insulation must be installed properly to get the marked R-value. Follow the manufacturer's instructions carefully. If a manufacturer's fact sheet is not provided with the material shipment, request this and review it carefully. R-values vary depending on many factors including the mean temperature at which the test is conducted, and the age of the sample at the time of testing. The R-value for FOAMULAR® XPS insulation is provided from testing at two mean temperatures, 40°F and 75°F, and 180 day real-time aged (as mandated by ASTM C578). The R-value at 180 day real-time age and 75°F mean temperature is commonly used to compare products and is the value printed on the product.
- Values at yield or 10% deflection, whichever occurs first. Testing modified as needed for products less than 1/2" thickness.
- Value at yield or 5%, whichever occurs first.
- Data ranges from 0.00 to value shown due to the level of precision of the test method.
- Water vapor permeance decreases as thickness increases.
- These laboratory tests are not intended to describe the hazards presented by this material under actual fire conditions.
- Data from Underwriters Laboratories Inc.® classified. See Classification Certificate U-197.
- Smoke developed is thickness-dependent, therefore a range of values is given.



# FOAMULAR® XPS INSULATION

## PRODUCT SIZE AVAILABILITY

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THICKNESS	PRODUCT DIMENSIONS THICKNESS (IN) X WIDTH (IN) X LENGTH (IN)	PALLET (UNIT) DIMENSIONS (TYPICAL) WIDTH (FT) X LENGTH (FT) X HEIGHT (FT)	SQUARE FEET PER PALLET	BOARD FEET PER PALLET	BUNDLES PER PALLET	PIECES PER BUNDLE	PIECES PER PALLET
<b>FOAMULAR® 404/404 RIBBED INSULATION</b>							
1.5"	1.5x24x96	4 x 8 x 8	2,048	3,072	8	16	128
2"	2 x 24 x 96	4 x 8 x 8	1,536	3,072	8	12	96
2½"	2.5 x 24 x 96	4 x 8 x 8	1,152	2,880	8	9	72
3"	3 x 24 x 96	4 x 8 x 8	1,024	3,072	8	8	64
4"	4 x 24 x 96	4 x 8 x 8	768	3,072	8	6	48
Ribbed 2"	2 x 24 x 96	4 x 8 x 8	1,536	3,072	8	12	96
Ribbed 3"	3 x 24 x 96	4 x 8 x 8	1,536	3,072	8	8	64
<b>FOAMULAR® 604/604 RIBBED INSULATION</b>							
1½"	1.5 x 24 x 96	4 x 8 x 8	2,048	3,072	8	16	128
2"	2 x 24 x 96	4 x 8 x 8	1,536	3,072	8	12	96
3"	3 x 24 x 96	4 x 8 x 8	1,024	3,072	8	8	64
Ribbed 1½"	1.5 x 24 x 96	4 x 8 x 8	2,048	3,072	8	16	128
Ribbed 2"	2 x 24 x 96	4 x 8 x 8	1,536	3,072	8	12	96
Ribbed 3"	3 x 24 x 96	4 x 8 x 8	1,024	3,072	8	8	64
<b>DURAPINK® INSULATION</b>							
½"	½ x 48 x 96	4 x 8 x 8	5,120	2,560	8	20	160
1"	1 x 48 x 96	4 x 8 x 8	3,072	3,072	8	12	96
<b>THERMAPINK® 18 INSULATION (special order)</b>							
1"	1 x 48 x 96	4 x 8 x 8	3,072	3,072	8	12	96
1½"	1.5 x 48 x 96	4 x 8 x 8	2,048	3,072	8	8	64
2"	2 x 48 x 96	4 x 8 x 8	1,536	3,072	8	6	48
3"	3 x 48 x 96	4 x 8 x 8	1,024	3,072	8	4	32
4"	4 x 48 x 96	4 x 8 x 8	768	3,072	8	3	24
<b>THERMAPINK® 25 INSULATION</b>							
1"	1 x 48 x 96	4 x 8 x 8	3,072	3,072	8	12	96
1½"	1.5 x 48 x 96	4 x 8 x 8	2,048	3,072	8	8	64
2"	2 x 48 x 96	4 x 8 x 8	1,536	3,072	8	6	48
3"	3 x 48 x 96	4 x 8 x 8	1,024	3,072	8	4	32
4"	4 x 48 x 96	4 x 8 x 8	768	3,072	8	3	24
<b>THERMAPINK® 25 TAPER INSULATION</b>							
½ slope A	0.5-0.75 x 24 x 96	4 x 8 x 8	4,608	2,880	24	12	288
½ slope B	0.75-1 x 24 x 96	4 x 8 x 8	3,456	3,024	18	12	216
½ slope C	1-1.25 x 24 x 96	4 x 8 x 8	2,688	3,024	14	12	168
½ slope D	1.25-1.5 x 24 x 96	4 x 8 x 8	2,304	3,168	12	12	144
¼ slope E	0.5-1 x 24 x 96	4 x 8 x 8	3,840	2,880	10	12	240
¼ slope F	1-1.5 x 24 x 96	4 x 8 x 8	2,304	2,880	12	12	144
½ slope G	0.5-1.5 x 24 x 96	4 x 8 x 8	2,688	2,688	14	12	168
<b>FOAMULAR® 400 TAPER INSULATION</b>							
¼ slope E	0.5-1 x 24 x 96	4 x 8 x 8	3,840	2,880	20	12	240
¼ slope F	1-1.5 x 24 x 96	4 x 8 x 8	2,304	2,880	12	12	144
½ slope G	0.5-1.5 x 24 x 96	4 x 8 x 8	2,688	2,688	14	12	168
<b>FOAMULAR® 600 TAPER INSULATION</b>							
½ slope A	0.5-.75 x 24 x 96	4 x 8 x 8	4,608	2,880	24	12	288
½ slope B	0.75-1 x 24 x 96	4 x 8 x 8	3,456	3,024	18	12	216
½ slope C	1-1.25 x 24 x 96	4 x 8 x 8	2,688	3,024	14	12	168
½ slope D	1.25-1.5 x 24 x 96	4 x 8 x 8	2,304	3,168	12	12	144
¼ slope E	0.5-1 x 24 x 96	4 x 8 x 8	3,840	2,880	20	12	240
¼ slope F	1-1.5 x 24 x 96	4 x 8 x 8	2,304	2,880	12	12	144
½ slope G	0.5-1.5 x 24 x 96	4 x 8 x 8	2,688	2,688	14	12	168

All products described here may not be available in all geographic markets. Consult your local sales office representative for more information.





## FOAMULAR® XPS FOAM INSULATION LOW SLOPE SINGLE PLY INSULATED ROOF SYSTEMS

### SINGLE-PLY ROOFING SYSTEMS

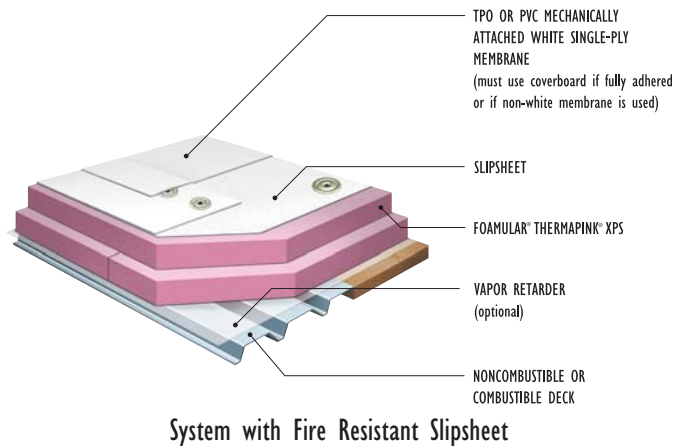
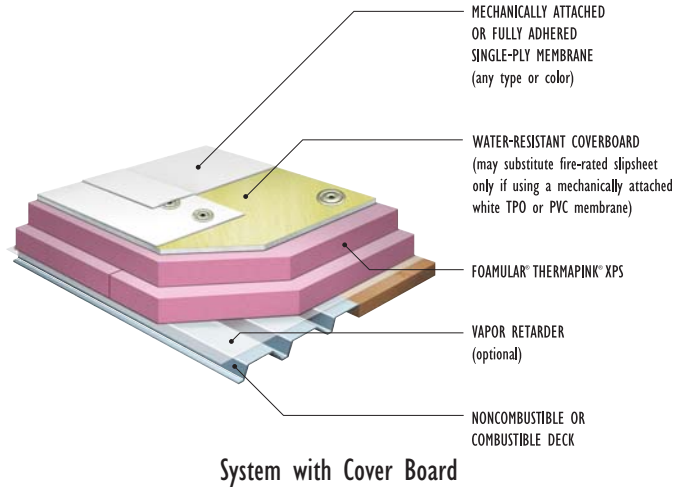
Single-ply roofing membranes are flexible sheets of compounded synthetic materials that are manufactured in a factory. Single ply roof systems provide strength, flexibility, durability and installation speed. The inherent advantages of single-ply systems is the consistency of the quality of the plant manufactured membrane, and the versatility of product types, installation and attachment methods, all resulting in broader system appeal. Single-ply systems are different than another common category of roofing known as BUR (built up roofs), which utilize alternating layers of hot asphalt and reinforcing fabrics to construct a roof in place.

### FOAMULAR® THERMAPINK® XPS RIGID INSULATION

FOAMULAR® THERMAPINK® XPS insulation is an excellent insulation choice for single-ply roofing systems. THERMAPINK® XPS insulation, with a variety of compressive strengths, high resistance to water absorption, and a stable long term R-value of 5 per inch, is an excellent insulation layer for use below single-ply membrane roofing systems. Membrane systems vary in color and chemical composition, and may be mechanically attached, loose laid/ ballasted or fully adhered. Depending on the type of system specified, cover boards or slip sheets may be required over FOAMULAR® THERMAPINK® XPS insulation. Single-ply systems with THERMAPINK® XPS insulation have a wide variety of UL and FM performance ratings for fire and wind resistance including ASTM E108 Class A, FM 4450 Class 1, UL 1256 direct to steel deck with no thermal barrier layer, and, 90 psf and higher wind classifications.

See pages 7 and 8 for FOAMULAR® THERMAPINK® insulation physical properties and size availability.

### LOW SLOPE SINGLE-PLY ABOVE DECK ROOF INSULATION





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# FOAMULAR® XPS FOAM INSULATION PRMA, VEGETATIVE AND PLAZA DECK INSULATED ROOF SYSTEMS

## PRMA, VEGETATIVE AND PLAZA DECK WATERPROOFING

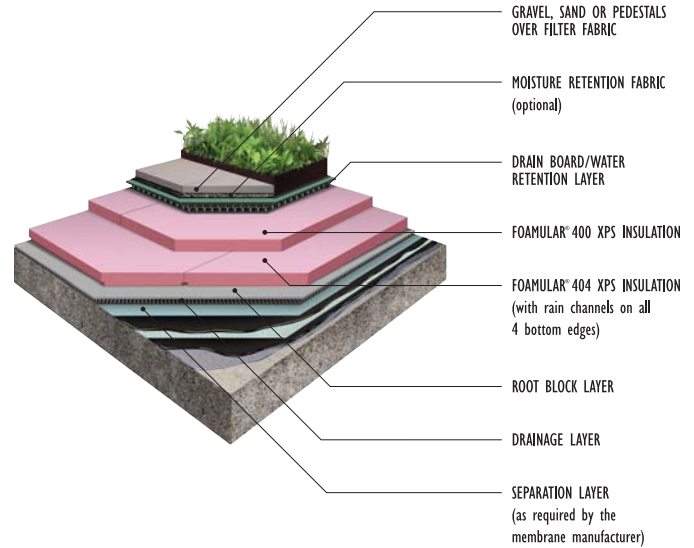
Protected roof membrane assemblies (PRMA) provide high value and long term durability on long life cycle buildings. PRMA roofs range in function from infrequently accessed stone ballasted systems, to paver/plaza deck walking surfaces, to fully landscaped vegetative roof gardens. PRMA extends the life of roofing components and reduces building maintenance costs by eliminating UV exposure and minimizing thermal cycling. Vegetative roofs are gaining widespread acceptance due to the practical, financial, and environmental benefits they provide. In addition to creating more usable landscaped space in the form of rooftop terraces, walkways, plazas and gardens, a well insulated PRMA vegetative roof assembly improves energy efficiency and reduces heating and cooling costs. In some instances, vegetative roofs receive financial funding incentives from government agencies responsible for reducing environmental impact. Vegetative roofs provide a number of important environmental benefits such as reducing storm water runoff and sewer fees, helping keep contaminants out of lakes and streams, reducing the urban heat island effect, and improving air quality by converting carbon dioxide to oxygen.

## FOAMULAR® XPS INSULATION FOR PRMA

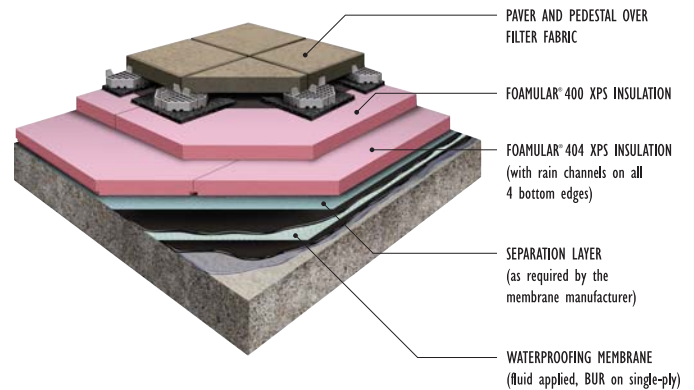
FOAMULAR® XPS insulation products 404, 604, 404RB and 604RB are used in PRMA applications. FOAMULAR® XPS insulation is the only insulation used in PRMA roof systems due to its excellent resistance to water absorption compared to any other type of rigid board insulation. Since the insulation is installed above the waterproofing membrane and is exposed to water through its service life, resistance to water while maintaining physical properties is critical. FOAMULAR® 404 and 604 insulations have channels cut into the bottom edges on all four sides of the board to enhance drainage at the board/membrane interface. FOAMULAR® 404RB and 604RB insulations have ribs cut into the top surface of the board in addition to the channels on the bottom. The ribs serve as drainage enhancement under pavers when the pavers are laid directly on top of the foam board.

See pages 7 and 8 for 404, 604, 404RB and 604RB insulation physical properties and size availability.

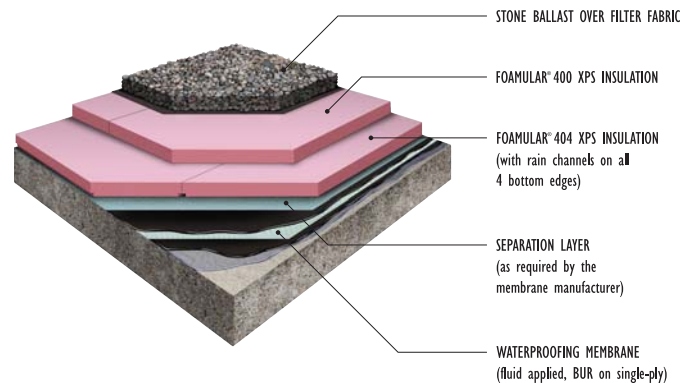
## PRMA, VEGETATIVE AND PLAZA DECK ABOVE DECK ROOF INSULATION



Vegetated Waterproofing System



Plaza Deck/Paver Waterproofing System



Stone Ballasted Waterproofing System



## FOAMULAR® XPS FOAM INSULATION RECOVER ROOFING INSULATED ROOF SYSTEMS

### RECOVER SINGLE-PLY ROOFING SYSTEMS

When an existing BUR reaches the end of its service life and it must be replaced, a decision must be made to either: 1) completely remove the existing BUR/insulation and replace it with another system or 2) “recover” the existing BUR with a new FOAMULAR® DURAPINK® XPS insulation layer and single-ply membrane roofing system.

The first option, total tear off, requires the cost of time and labor to remove the old system, haul and dispose of the waste in a landfill, and completely replace the system with new insulation/membrane from the deck up. The second option, “recover,” salvages the existing system and its insulation layers by placing a new layer of insulation and membrane on top of the existing BUR, avoiding the time, labor and landfill costs required to dispose of a torn off system. Recover systems save time and money by avoiding tear off and landfill costs, while salvaging the useful R-value of existing insulation layers by keeping them on the roof. However, not every roof is a candidate for recover. Before choosing recover, it must be verified that the existing roof deck is structurally sound, and that the existing insulation layers are dry, or capable of drying after recover roofing is complete.

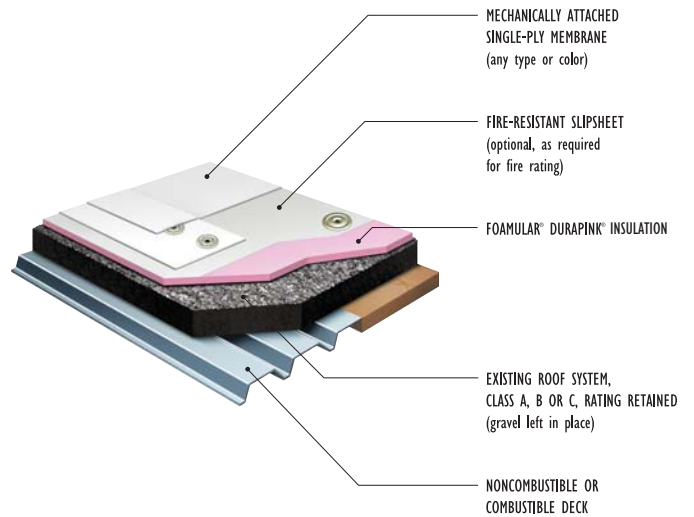
Recover roofing systems are typically factory produced single-ply roofing membranes that provide strength, flexibility, durability and installation speed. They are usually mechanically attached to avoid additional weight on the existing structure from ballast or cover boards in fully adhered systems.

### FOAMULAR® DURAPINK® XPS RIGID INSULATION

FOAMULAR® DURAPINK® XPS insulation is an excellent insulation choice for recover single-ply roofing systems. Unlike wood fiberboard often used for recover, DURAPINK® XPS insulation has high resistance to water absorption, maintaining all of its insulation and strength properties while any latent water that may be in the old system dissipates. DURAPINK® recover insulation systems have a wide variety of UL and FM performance ratings for fire and wind resistance including ASTM E108 Class A and wind uplift resistance classifications.

See pages 7 and 8 for FOAMULAR® DURAPINK® insulation physical properties and size availability.

### RECOVER ROOF INSULATION





## FOAMULAR® XPS FOAM INSULATION ARCHITECTURAL METAL INSULATED ROOF SYSTEMS

### ARCHITECTURAL METAL ROOFING SYSTEMS

The exceptional performance of architectural metal roofing makes it one of the most specified products in commercial roofing. Architectural metal roofing systems are energy efficient with various levels of solar reflectance and emittance depending on the heating or cooling needs of a given climate. Metal roofs are recyclable, lightweight and easy to install. They provide protection against extreme weather conditions. With strong corrosion resistance they also offer long lasting durability. Metal roofs are aesthetically pleasing, versatile and cost efficient throughout their life cycle. They come in many colors and seam profiles including standing seam, curved, exposed fastener, concealed fastener, suitable for many applications including new and retrofit projects and any type of commercial or residential projects.

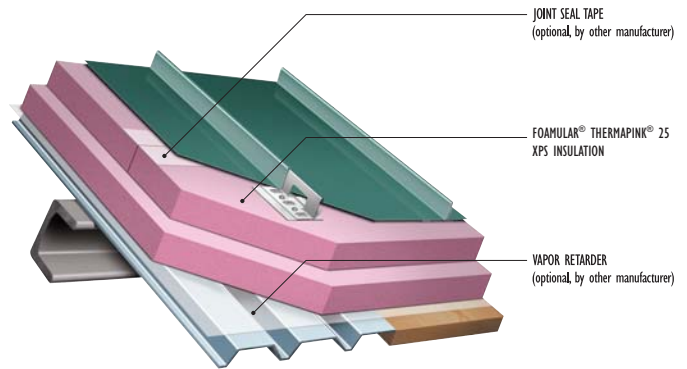
### FOAMULAR® THERMAPINK® XPS RIGID INSULATION

FOAMULAR® THERMAPINK® XPS insulation is strong, lightweight and easily cut making it an excellent insulation choice for architectural metal roofing systems. THERMAPINK® 25 insulation has a 25 psi compressive strength that is strong enough to hold the retention clips used to secure the metal roofing system. Bearing plates under the clips sit into the surface of the insulation as they are tightened. No adhered facer means no extra labor needed to trim the surface to achieve proper seating.

THERMAPINK® XPS insulation has high resistance to water absorption, and a stable long-term R-value of 5 per inch. Since FOAMULAR® THERMAPINK® XPS insulation is highly water resistant it is easier to stage on job sites than products like polyisocyanurate and EPS that are more moisture sensitive and subject to restrictive storage and warranty rules. Also, with moderate perm ratings and high, long-lasting R-value, THERMAPINK® insulation layers with sealed joints help limit the formation of condensation under metal roofing and help drain it away when it forms. Sealed joints and high water resistance also makes THERMAPINK® XPS insulation a temporary water shed while the job is awaiting final installation of the metal roof covering.

See pages 7 and 8 for FOAMULAR® THERMAPINK® insulation physical properties and size availability.

### ARCHITECTURAL METAL ROOFING SYSTEM





# FOAMULAR® XPS FOAM INSULATION TAPERED ROOFING INSULATION SYSTEMS

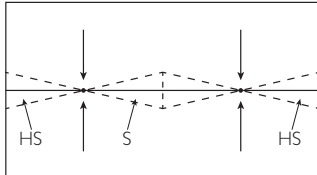
## KEY FEATURES

- Owens Corning™ FOAMULAR® XPS tapered roofing insulation products provide performance and value in low slope roofing systems and are designed to be used over structural roof decks. THERMAPINK® tapered roof insulation provides a thermally efficient, moisture-resistant positive drainage slope for use under single-ply or other types of roofing systems.
- FOAMULAR® tapered roof insulation products are available in three types. Tapered THERMAPINK® 25 (ASTM C578 Type IV) insulation is the most commonly used tapered product, but for applications that require higher compressive strengths, tapered FOAMULAR® 400 (ASTM C578 Type VI) and tapered FOAMULAR® 600 (ASTM Type VII) insulations are available.
- Owens Corning provides tapered roofing design services with detailed tapered layouts and material quantities to describe how the insulation is to be installed. See your Commercial Area Sales Representative to request tapered roofing services or call 1-800-GET-TECH.
- See the FOAMULAR® Tapered Roof Insulation Product Data Sheet for more details.

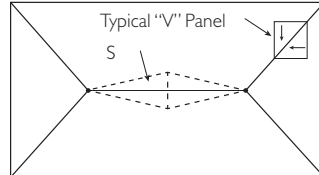


## TYPICAL TAPERED ROOFING LAYOUTS AND R-VALUES

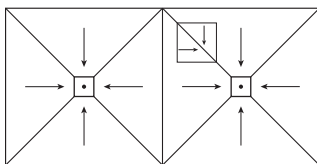
Cricket and saddle material are included in the design package for field fabrication.



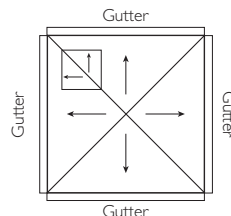
**1. Two-Directional Taper System**  
Utilizes tapered panels installed in two directions, accompanied with saddles ("S") between the drains, and half saddles ("HS") between drains and outside walls. The saddles assist in directing the water flow to the drains.



**2. Modified Two-Directional Taper System**  
Utilizes tapered panels installed primarily in two directions with saddle ("S") placed between the drains; however, two of the four sides utilize mitered valleys. This system is desirable when a constant thickness of insulation is required at the outside perimeter of the roof.



**3. Four-Directional Taper System**  
This system utilizes tapered panels installed in four different directions. Mitered valleys lead to drains.

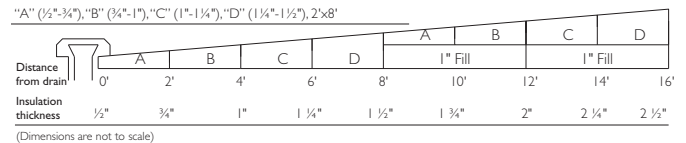


**4. Four-Directional Taper System—Perimeter Drainage**  
Utilizes a four-way taper system directing the water flow to the outside perimeter. This system may be selected when gutters are employed rather than roof drains. Desired drainage is obtained with the creation of hip miters.

Typical Tapered Roofing Section, 1/8" per foot slope

Utilizes four tapered panel sizes, A, B, C and D panel

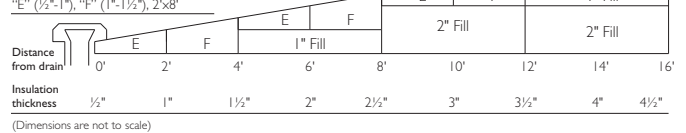
"A" (1/2"-3/4"), "B" (3/4"-1"), "C" (1"-1 1/4"), "D" (1 1/4"-1 1/2"), 2'x8'



Typical Tapered Roofing Section, 1/4" per foot slope

Utilizes two tapered panel sizes, E and F panel

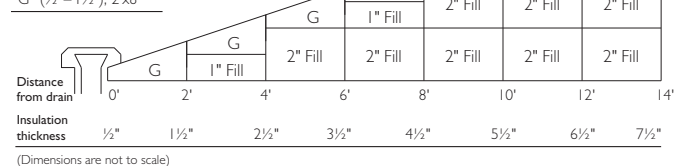
"E" (1/2"-1"), "F" (1"-1 1/2"), 2'x8'



Typical Tapered Roofing Section, 1/2" per foot slope

Utilizes one tapered panel size, G panel

"G" (1/2"-1 1/2"), 2'x8'



### SYSTEM AVERAGE R-VALUE

DISTANCE FROM DRAIN	0'-4'	0'-8'	0'-12'	0'-16'	0'-20'
Average R-value <sup>1</sup>					
1/8" slope	3.75	5.00	6.25	7.50	8.75
1/4" slope	5.00	7.50	10.00	12.50	15.00
1/2" slope	7.50	12.50	17.50	22.50	27.50

1. Average R-value @ 75°F (24°C) mean temperature



## KEY DIFFERENCES BETWEEN XPS AND OTHER RIGID FOAM INSULATIONS

The greatest attribute of FOAMULAR® XPS insulation is its ability to retain R-value and compressive strength even when exposed to water. Insulation products that absorb water lose R-value and structural integrity. Water is a good conductor of energy, so if insulation is water soaked, R-value is lost.

The FOAMULAR® insulation manufacturing process provides closed cell foam with uniform cells and continuous walls. The cell walls are comprised of hydrophobic (does not bond with water) polystyrene polymer, which results in a very low rate of water absorption compared to other types of foam plastic insulation.

Published properties for different types of insulation are not always directly comparable because different test methods may be used to measure the same properties. If different methods are used to measure performance, identify the differences. They may be significant.

For example, the material standard that defines properties for all XPS and EPS is ASTM C578.<sup>1</sup> It requires that polystyrene insulation be tested for water absorption in accordance with ASTM C272.<sup>2</sup> C272 requires the polystyrene sample to be immersed in water for 24 hours, and weighed immediately upon removal from immersion to determine the amount of absorbed water. The material standard for polyisocyanurate is ASTM C1289.<sup>3</sup> It requires that polyiso be tested for water absorption in accordance with ASTM C209.<sup>4</sup> C209 requires the polyiso sample to be immersed in water two hours, and drained for 10 minutes before weighing for water absorption.

Figure 1 shows the significant differences in XPS and polyiso water absorption that result from using different measuring techniques. Note that the water absorption level for polyiso increases greatly when tested by the same method used for XPS. Figure 2 shows the significant differences in the water absorption levels between XPS and EPS when immersion time is increased. EPS absorbs up to 10 times more water than XPS. Over time, water creeps into the spaces between EPS beads, lowering R-value and raising the risk of beads breaking apart with the expansion forces of freezing and thawing. See the Technical Bulletin “Resisting Water Absorption, the Key for High Performance Foam Plastic Rigid Insulation”, for more details.

Published properties for R-value also vary depending on testing methods. R-values vary depending on many factors including the mean temperature at which the test is conducted, and the age of the sample at the time of testing. Owens Corning publishes comparison R-value data. The R-value for FOAMULAR® XPS insulation is provided from testing at two mean temperatures, 40°F and 75°F, and from two aging (conditioning) techniques, 180 day real-time aged (as mandated by ASTM C578) and a method of accelerated aging sometimes called “Long Term Thermal Resistance” (LTTR) per CAN/ULC S770-03. The R-value at 180 day real-time age and 75°F mean temperature is commonly used to compare products and is the value printed on the product.

### NOTES

1. ASTM C578, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
2. ASTM C272, Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions
3. ASTM C1289, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
4. ASTM C209, Standard Test Methods for Cellulosic Fiber Insulating Board

FIGURE 1—WATER ABSORPTION, XPS VS. POLYISO

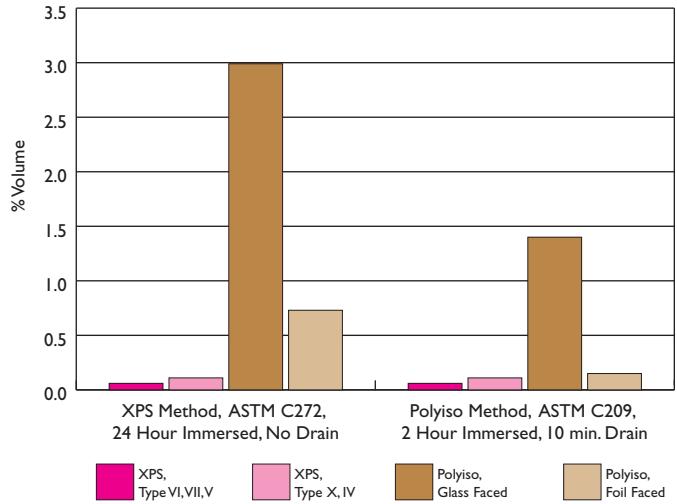
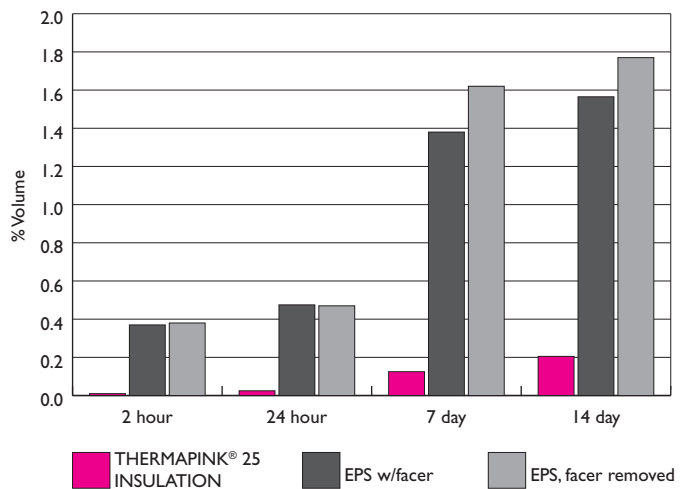


FIGURE 2—WATER ABSORPTION, XPS VS. EPS



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