



FOAMULAR® 404, 604, 404 RB and 604 RB Extruded Polystyrene (XPS) Rigid Foam Insulation

Product Data Sheet



Energy-Saving¹, Moisture-Resistant High Strength XPS Rigid Insulation

Insulation for PRMA Roofs

404 and 404 RB: ASTM C578 Type VI, 40 psi minimum

604 and 604 RB: ASTM C578 Type VII, 60 psi minimum

Description

FOAMULAR® 404 and FOAMULAR® 604 Extruded Polystyrene (XPS) Rigid Foam Insulations are specially designed for use in Protected Roof Membrane Assemblies (PRMA), where the insulation is placed directly over the membrane. The compressive strength of FOAMULAR® XPS Insulation provides the integrity needed for long-term roof performance. FOAMULAR® XPS Insulation is produced by Owens Corning's patented HYDROVAC® process technology under conditions of strict quality control.

Extruded polystyrene is the only type of insulation recommended for PRMA applications. Owens Corning offers four specific types of FOAMULAR® XPS Insulation for this use: FOAMULAR® 404 and 604 XPS Rigid Foam Insulation,

both featuring drainage channels on all four bottom edges; and FOAMULAR® 404 RB and 604 RB XPS Rigid Foam Insulation. FOAMULAR® 404 RB and 604 RB XPS Rigid Foam Insulation have four bottom edge drainage channels, and drainage channels running the length of the panel on the top surface as well.

With a minimum of 40 psi compressive strength, FOAMULAR® 404 XPS Rigid Foam Insulation meets the needs of many PRMA applications. For even greater strength, specify the 60 psi compressive strength of FOAMULAR® 604 XPS Rigid Foam Insulation. Both products feature rain channels on all four bottom edges to promote drainage below the insulation.

FOAMULAR® 404 RB and FOAMULAR® 604 RB XPS Rigid Foam Insulation products are used when the insulation is to be placed directly beneath concrete or other types of paver blocks, eliminating the need for pedestals resulting in significant labor and material savings. These high compressive strength, high durability products are used as the insulation layer placed under the ballast of the PRMA roof and offer excellent drainage characteristics because they're manufactured with channels that are cut in the surface of the foam the entire length of each panel. Coupled with the standard bottom-side rain channels, the top side channels help drain moisture away from the underside of the paver to protect it from freeze/thaw cycle damage.

Key Features

- FOAMULAR® 404 and 604 XPS Rigid Foam Insulation products protect the roof membrane from physical damage, thermal stress and UV exposure in PRMA systems
- Designed for use directly with pavers, FOAMULAR® 404 RB and 604 RB XPS Rigid Foam Insulation products provide the support necessary for pavers while maintaining the drainage necessary to prevent moisture accumulation at the foam-paver interface
- Excellent long-term stable insulating performance with an R-value² of R-5 per inch
- Exceptional moisture resistance, long-term durability
- Limited lifetime warranty³— maintains 90% of R-value and covers all ASTM C578 properties
- GREENGUARD Gold Certified
- The only XPS foam with certified recycled content— certified by SCS Global Services to contain a minimum 20% recycled content
- Will not corrode, rot or support mold growth
- Zero ozone depletion potential with 70% less global warming potential than our previous formula
- Reusable
- Lightweight, durable rigid foam panels are easy to handle and install
- Easy to saw, cut or score

Technical Information

¹ Savings vary. Find out why in the seller's fact sheet on R-values. Higher R-values mean greater insulating power.

² R means the resistance to heat flow; the higher the R-value, the greater the insulating power.

³ See actual warranty for complete details, limitations and requirements.



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When FOAMULAR® 404, 604, 404 RB and 604 RB Extruded Polystyrene (XPS) Rigid Foam Insulation are used under dark colored, non-white pavers other than concrete, such as rubber, additional solar heat protection should be considered.

For roofing and other horizontal applications, product should be installed with the printed surface facing downward.

This product is combustible. A protective barrier or thermal barrier is required as specified in the appropriate building code. For additional information, consult MSDS or contact Owens Corning World Headquarters at 1-800-GET-PINK®.

All construction should be evaluated for the necessity to provide vapor retarders. See current ASHRAE Handbook of Fundamentals.

FOAMULAR® XPS Insulation can be exposed to the exterior during normal construction cycles. During that time some fading of color may begin due to UV exposure, and, if exposed for extended periods of time, some degradation or “dusting” of the polystyrene surface may begin. It is best if the product is covered within 60 days to minimize degradation. Once covered, the deterioration stops, and damage is limited to the thin top surface layers of cells. Cells below are generally unharmed and still useful insulation.

FOAMULAR® Extruded Polystyrene (XPS) Insulation is a thermoplastic material with a maximum service temperature of

Typical Physical Properties¹

FOAMULAR® 404, 604, 404 RB and 604 RB Extruded Polystyrene (XPS) Rigid Foam Insulation

| Property | Test Method ² | Value | | | |
|--|--------------------------|-------------|-------------|--|-------------|
| | | 404 | 404 RB | 604 | 604 RB |
| Thermal Resistance³, R-Value (180 day) minimum, hr•ft ² •°F/Btu (RSI, °C•m ² /W) @ 75°F (24°C) mean temperature | ASTM C 518 | | | | |
| 2" Thickness | | 10 (1.76) | 9.5 (1.67) | 10 (1.76) | 9.5 (1.67) |
| 2½" Thickness | | 12.5 (2.20) | — | — | — |
| 3" Thickness | | 15 (2.64) | 14.5 (2.55) | 15 (2.64) | 14.5 (2.55) |
| 4" Thickness | | 20 (3.52) | — | — | — |
| @ 40°F (4.4°C) mean temperature | | | | | |
| 2" Thickness | | 10.8 (1.90) | — | 10.8 (1.90) | — |
| 2½" Thickness | | 13.5 (2.38) | — | — | — |
| 3" Thickness | | 16.2 (2.85) | — | 16.2 (2.85) | — |
| 4" Thickness | | 21.6 (3.8) | — | — | — |
| Long Term Thermal Resistance, LTTR-Value³ minimum, hr•ft ² •°F/Btu (RSI, °C•m ² /W) @ 75°F (24°C) mean temperature | CAN/ULC S770-03 | | | | |
| 2" Thickness | | 10.6 (1.87) | — | 10.6 (1.87) | — |
| 2½" Thickness | | 13.4 (2.36) | — | — | — |
| 3" Thickness | | 16.2 (2.85) | — | 16.2 (2.85) | — |
| 4" Thickness | | 22 (3.87) | — | — | — |
| Compressive Strength⁴, minimum psi (kPa) | ASTM D1621 | 40 (276) | | 60 (414) | |
| Flexural Strength⁵, minimum psi (kPa) | ASTM C203 | 115 (793) | | 140 (965) | |
| Water Absorption⁶, maximum % by volume | ASTM C272 | | | 0.05 | |
| Water Vapor Permeance⁷, maximum perm (ng/Pa•s•m²) | ASTM E96 | | | 1.1 (63) | |
| Dimensional Stability, maximum % linear change | ASTM D2126 | | | 2.0 | |
| Flame Spread^{8,9} | ASTM E84 | | | 5 | |
| Smoke Developed^{8,9,10} | ASTM E84 | | | 45-175 | |
| Oxygen Index⁸, minimum % by volume | ASTM D2863 | | | 24 | |
| Service Temperature, maximum °F (°C) | — | | | 165 (74) | |
| Linear Coefficient of Thermal Expansion, in/in/°F (m/m/°C) | ASTM E228 | | | 3.5 × 10 ⁻⁵ (6.3 × 10 ⁻⁵) | |

- Properties shown are representative values for core 1" thick material, unless otherwise specified.
- 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. Because rigid foam plastic insulation products are not all aged in accordance with the same standards, it is useful to publish 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.
- Values at yield or 10% deflection, whichever occurs first.
- 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.
- ASTM E84 is thickness-dependent, therefore a range of values is given.

Maximum Design Load Recommendation, PSF

| FOAMULAR® XPS Insulation Product | Dead Load | Live Load |
|----------------------------------|-----------|-----------|
| 404 | 1,910 | 1,150 |
| 404 RB | 1,110 | 660 |
| 604 | 2,880 | 1,720 |
| 604 RB | 1,660 | 1,000 |



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Product and Packaging Data

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| Material | | Packaging | | | | | | |
|--|--|--|------------------------|-----------------------|--------------------|-------------------|-------------------|--|
| Extruded polystyrene closed-cell foam panel with continuous skin on face and back surface. | | Shipped in poly-wrapped units with individually wrapped or banded bundles. | | | | | | |
| Thickness (in) | 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 | Edges |
| F-404/404 Ribbed | | | | | | | | |
| 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 | Rain channeled on all bottom edges and ribbed channels on the top surfaces |
| Ribbed 3" | 3 x 24 x 96 | 4 x 8 x 8 | 1,536 | 3,072 | 8 | 8 | 64 | |
| F-604/604 Ribbed | | | | | | | | |
| 1½" | 1.5 x 24 x 96 | 4 x 8 x 8 | 2,048 | 3,072 | 8 | 16 | 128 | Rain channeled on all bottom edges. |
| 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 | Rain channeled on all bottom edges and ribbed channels on the top surfaces |
| 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 | |

I. Product availability and lead times vary by region and by product. Consult your local Owens Corning sales representative for availability and lead times.

165°F. In horizontal applications, FOAMULAR® XPS Insulation may experience greater solar exposure than in vertical applications and it may be damaged by heat buildup. Simple precautions during construction can minimize the potential for heat related damage. Install only as much FOAMULAR® XPS Insulation as can be covered in the same day. For horizontal applications always turn the print side down so the black print does not show to the sun which may, at times, act as a solar collector and raise the temperature of the foam surface under the print. Additional protection over FOAMULAR® XPS Insulation such as added cover boards, reflective membrane surfaces, or pavers may be required in areas adjacent to reflective walls, parapets, rooftop equipment areas or other vertical surfaces that may reflect and intensify

the sun's energy. Do not cover FOAMULAR® XPS Insulation either stored (factory wrapped or unwrapped), or partially installed, with dark colored (non-white), or clear (non-opaque) coverings and leave it exposed to the sun. Examples of such coverings include but are not limited to filter fabrics, membranes, temporary tarps, clear polyethylene, etc. If improperly covered, and exposed to the right combination of sun, time and temperature, deformation damage may occur rapidly. When covering is necessary, use only white opaque material, or, cover with the final approved finish material as soon as possible. A white opaque cover reflects energy from the sun rather than absorbing it or passing it which reduces the potential for excessive heat exposure. Clear (non-opaque) coverings allow light energy from the sun to

pass through rather than reflect it which may produce a partial greenhouse effect, trapping hot air and raising the temperature below the cover. See Owens Corning publication number 10015704, "Heat Build Up Due to Solar Exposure" for more information.

Standards and Codes Compliance

- Meets ASTM C578 Type VI (404 and 404 RB) and Type VII (604 and 604 RB)
- UL Classified. A copy of UL Classification Certificate U-197 is available at www.owenscorning.com
- See UL ER8811-01 at UL.com





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- FM (Factory Mutual) Class I Roof Decks
- ASTM E108 Fire Classified Assemblies
- Meets California Quality Standards and HUD UM #71a
- Compliance verification by RADCO (AA-650)

Certifications and Sustainable Features of FOAMULAR® XPS Insulation

- FOAMULAR® XPS Insulation is reusable
- FOAMULAR® XPS Insulation is made with a zero ozone depletion formula
- Certified by SCS Global Services to contain a minimum of 20% recycled content
- Certified to meet indoor air quality standards under the stringent GREENGUARD Indoor Air Quality Certification Program, and the GREENGUARD Gold Certification

- Approved under the Home Innovation Research Labs NGBS Green Certification Program
- Utilizing FOAMULAR® XPS Insulation can help achieve green building certifications including the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) certification
- FOAMULAR® XPS Insulation may qualify for The Buy American provision of the American Recovery and Reinvestment Act (ARRA)

Environmental and Sustainability

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 <http://sustainability.owenscorning.com>.

Warranty

FOAMULAR® XPS Insulation limited lifetime warranty maintains 90% of its R-value for the lifetime of the building and covers all ASTM C578 properties. See actual warranty for complete details, limitations and requirements at www.owenscorning.com.

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

For more information on the Owens Corning family of building products, contact your Owens Corning dealer, call 1-800-GET-PINK®, or access www.owenscorning.com.

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SCS Global Services provides independent verification of recycled content in building materials and verifies recycled content claims made by manufacturers. For more information, visit www.SCSglobalservices.com.

GREENGUARD Certified products are certified to GREENGUARD standards for low chemical emissions into indoor air during product usage. For more information, visit ul.com/gg.

This Home Innovation Research Labs Green Approved mark is your assurance that a product is eligible for points toward National Green Building Certification. Visit www.GreenApprovedProducts.com for details.

LEED is a registered trademark of the U.S. Green Building Council.



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