

OPCORE[®] G



**THERMAL
INSULATION**
for
**STRUCTURAL
INSULATED
PANELS**





Sustainability Attributes

Enables high performance building methods

- ✓ Contributes points under LEED® Energy Performance Process⁽¹⁾
- ✓ UL Environment UL2818-2103 Gold Standard Certified for Chemical Emissions for Building Materials, Finishes and Surroundings⁽²⁾
- ✓ Complies with Significant New Alternatives Policy (SNAP, 2015) by the Environmental Protection Agency (EPA) as non-HFC foam insulation⁽³⁾
- ✓ Low Global Warming Potential (GWP)⁽³⁾
- ✓ Eco-Efficiency exceeds standard NEOPOR® and EPS⁽³⁾
- ✓ Stable Long-Term Thermal Resistance (LTTR)⁽⁴⁾
- ✓ Zero ozone depletion potential as foam contains no ozone-depleting CFC's
- ✓ Contains no HBCD
- ✓ Does not support mold or mildew growth, is breathable and semi-permeable

Lowers carbon emissions

- ✓ Less energy is required to heat/cool the building:⁽⁵⁾
 - vs EPS because of it's R-value performance
 - vs ISO in the long-run because of R-value drift due to off-gassing
 - vs fiberglass because of lack of studs and air infiltration
 - vs cellulose because of R-value loss from moisture absorption
- ✓ Less energy is required during construction material manufacturing:⁽⁵⁾
 - as more panels can be shipped per truck vs EPS
 - as less material is required to achieve the same insulation performance⁽⁶⁾

Recyclable

- ✓ Recyclable as #6 plastic
- ✓ Very little to recycle as the material is comprised of up to 98% air

(1) OPCORE-G LEED® Credit Technical Bulletin.
 (2) UL Environment Certificate Number 5253-420.
 (3) BASF Corporation, 2015 BF-10308 11/15r1.
 (4) OPCORE-G Long-Term Thermal Resistance Technical Bulletin.
 (5) Savings vary. Find out why in the seller's fact sheet on R-values. Higher R-values mean greater insulating power.
 (6) Source: Eco-efficiency analysis for average CIFS insulated house in Germany by BASF in 2013, validated by TÜV Rheinland.

R-value Performance

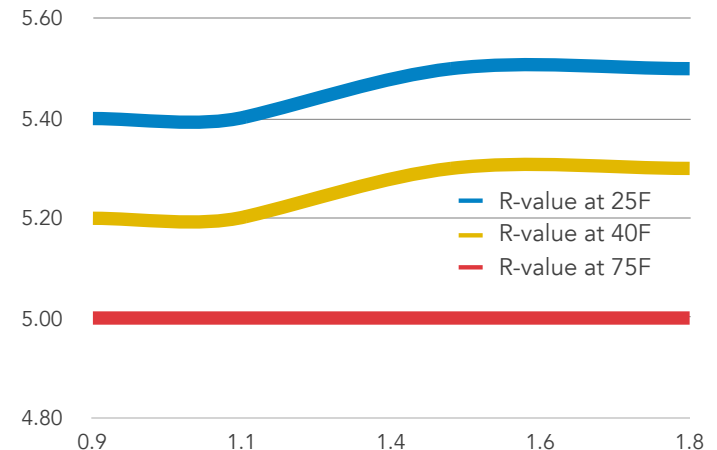
OPCORE-G powers up when it gets colder outside

By absorbing radiant energy, high purity graphite wholly contained in the polymer matrix of OPCORE-G rigid foam slows the flow of heat through the material.

As shown in the chart below, the effect of high-purity graphite on the rate of radiant energy transfer through the material is even more pronounced at lower mean temperatures.

Summer or winter, OPCORE-G Recyclable Thermal Insulation helps keep heat where it belongs.

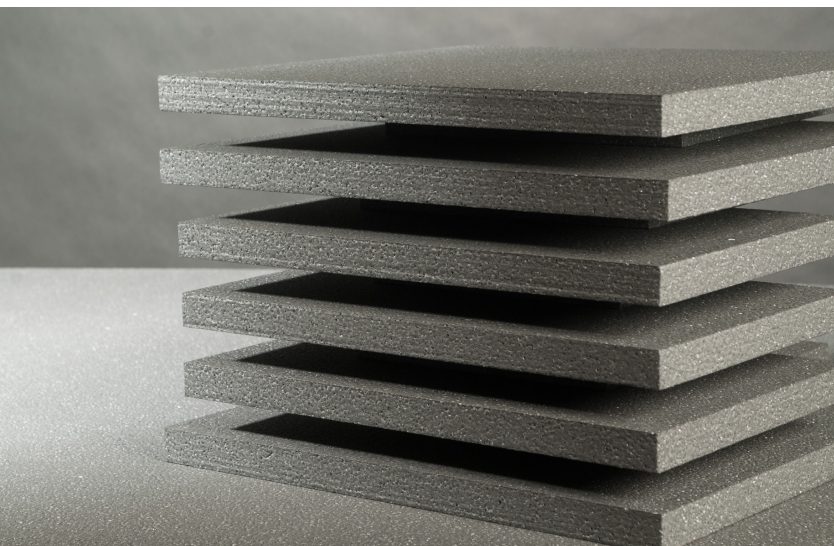
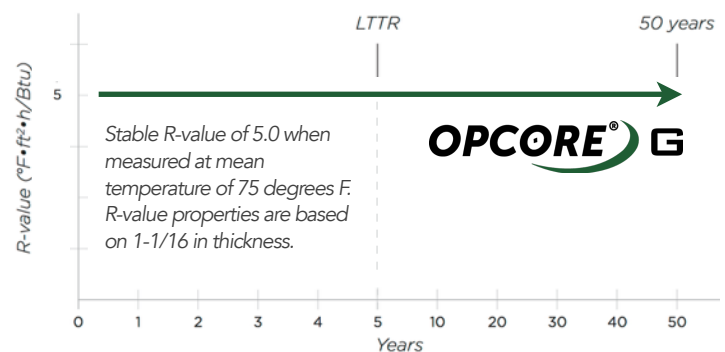
R-value* vs Material Density



*R-value means resistance to heat flow. The higher the R-value, the greater the insulating power. The R-value properties are based on 1-1/16 in thickness. Material density is in pounds per cubic foot.

The R-value of OPCORE-G is stable over time

OPCORE-G is made of small pockets of air surrounded by a recyclable polymer matrix. There are no chemical blowing agents inside the cells of the rigid foam. This means the R-value of the material is stable over time because the insulating gas in the cells starts as, and stays as, air.



OPCORE-G™ Physical Properties

Insulation Density

| Property | Method | Units | 1.00 | 1.15 |
|---|---------------------------|---|---|----------|
| Sustainability / Environmental | Opco and BASF Corporation | | Recyclable as #6 Plastic. Can contain recycled content per specification. Retains R-value over time. Does not contain chlorofluorocarbons. UL GreenGuard Certified for Indoor Air Quality. Material expansion agent has zero ozone depletion potential. | |
| Compressive Resistance | ASTM D1621 | at yield of 10% deformation in psi (kPa) | 10 (69) | 14 (97) |
| Thermal Resistance (R-value*), 75F ⁽¹⁾ | ASTM C518 | °F•ft ² •h/BTU (K•m ² /W) 75 ±2°F (23.9 ±1°C) | 5.0 | 5.0 |
| Thermal Resistance (R-value*), 40F ⁽¹⁾ | ASTM C518 | °F•ft ² •h/BTU (K•m ² /W) 40 ±2°F (4.4 ±1°C) | 5.2 | 5.3 |
| Thermal Resistance (R-value*), 25F ⁽¹⁾ | ASTM C518 | °F•ft ² •h/BTU (K•m ² /W) 25 ±2°F (-3.9 ±1°C) | 5.4 | 5.5 |
| Flexural Strength | ASTM C203 | psi (kPa) | 25 (172) | 32 (221) |
| Water Vapor Permeance ⁽²⁾ | ASTM E96 | For 1" (25.4 mm), perm (ng/PA•s•m ²), max | 4.0 | 3.1 |
| Water Absorption by Total Immersion | ASTM C272 | Volume % absorbed, max | 1.1 | 1.1 |
| Dimensional Stability | ASTM D2126 | max % linear change | < 1.5 | |
| Oxygen Index | ASTM D2863 | volume % | > 24 | |
| Surface Burning Characteristics | ASTM E-84 or UL 723 | Flame Spread / Smoke Developed | Flame Spread 5, Smoke Developed 25 | |
| Biological Behavior | | | Will not support growth of mold or mildew. No harmful effects on health known. | |
| Chemical Resistance | | | Insensitive to water, the majority of acids and alkalis. Sensitive to organic solvents. | |
| Application Limiting Temperature | | ° F / ° C | 165 (73.9) nominal / 180 (82.2) max | |
| Fire and Code Approvals | | | ASTM E84, NFPA 286, NFPA 285 | |
| CAN/ULC S701 Classification | | | I | |
| ASTM C578 Classification ⁽³⁾ | | | I | VIII |
| ICC-ES ESR ⁽⁴⁾ | | | ESR available at www.opcodirect.com/library | |

(1) R-value means resistance to heat flow. The higher the R-value, the greater the insulating power. Ask your seller for the fact sheet on OPCORE-G R-values. The R-value properties are based on 1-1/16 inch thickness.

(2) Values quoted are maximum values for 1 inch (25mm) thick samples and are based upon most recent raw material product quality audit data. Actual water vapor permeance data decreases as thickness increases. Where water vapor permeance is a design concern, use of the product is subject to professional engineering review at the specifier's option. Values are from data provided by BASF AG for NEOPOR F5300 PLUS.

(3) OPCORE-G made of NEOPOR meets and exceeds ASTM C578-14 "Standard Specification For Preformed, Cellular Polystyrene Insulation"; published by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959.

(4) OPCORE-G rigid thermal insulation foam, and its use and application requirements per building code, are described in ICC-ES ESR 3463 available at www.opcodirect.com/library and from ICC-ES.

The physical property data shown above are presented as typical average values as determined by industry accepted and standard test methods, except where noted, and may vary with normal manufacturing variation.



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Structural Insulated Panel Association

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