



**THERMAL
INSULATION
SPECIFICATION
GUIDE**

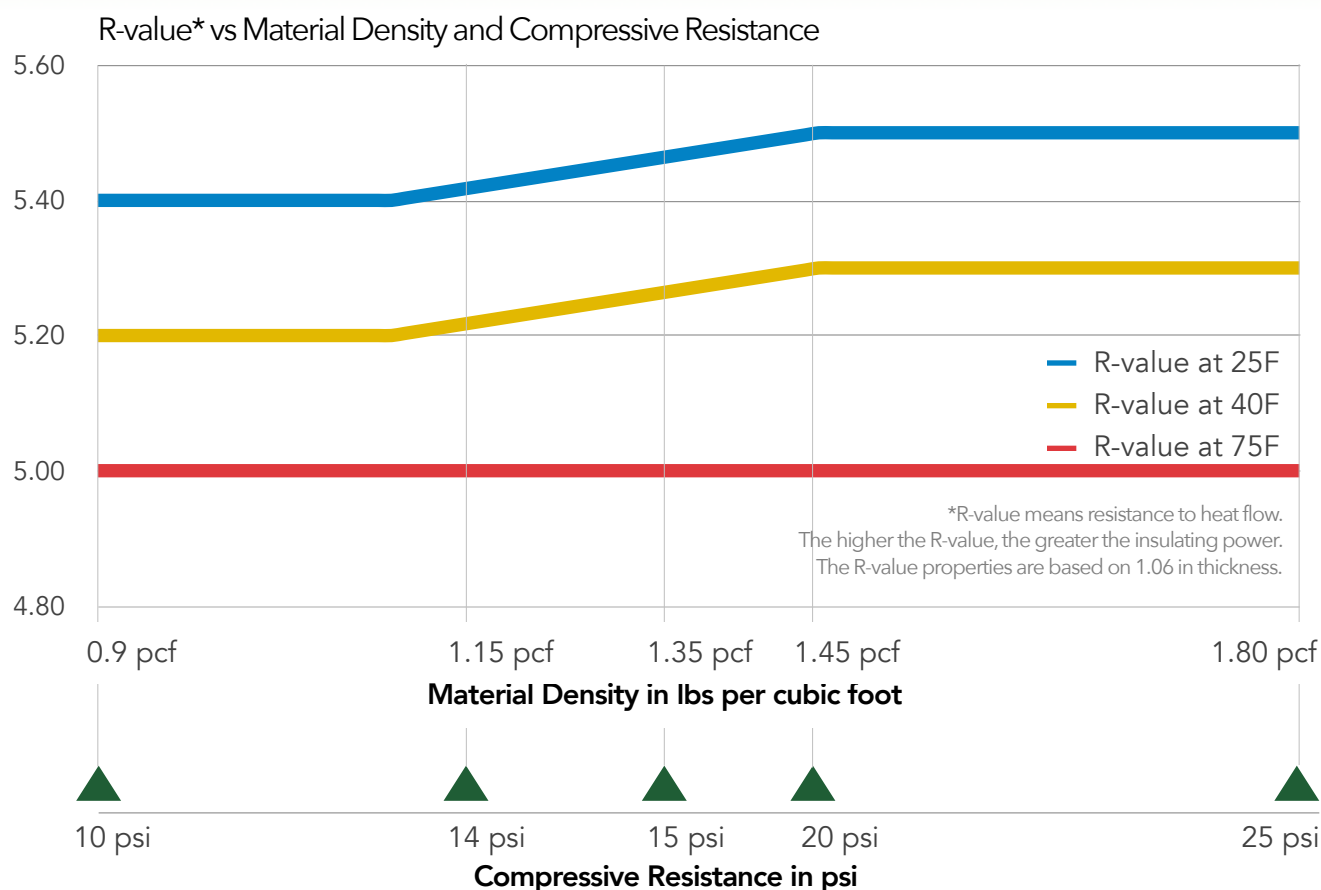




R-5 THERMAL INSULATION
for **NEW AND EXISTING BUILDINGS**

Thermal Insulation Specification Properties

The chart below illustrates for a given foam density, the compressive resistance of OPCORE-G (at the bottom), as well as R-value measured at the temperatures shown.



OPCORE-G can be sized and shaped to your specifications using proprietary processes. Thickness, length and width dimensions can be specified accurate to 1/16 of an inch on dimensions between 4" and 96".

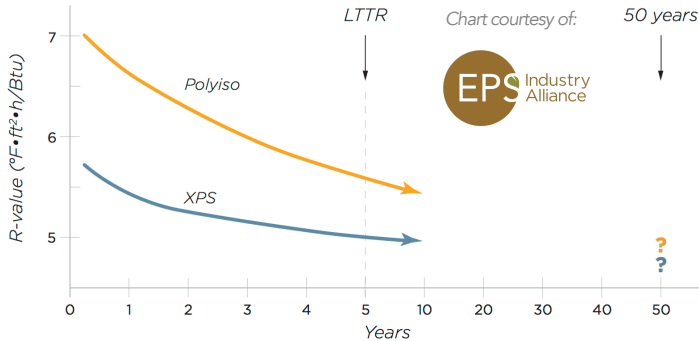
Metric	Thickness	Length	Width
Tolerance (in/in)	1/16"	1/16"	1/16"
Range	1/2" < t < 48"	1/2" < l < 216"	1/2" < w < 36"



TECHNICAL BULLETIN

Long-Term R-value Performance

Polyiso & XPS R-value over time



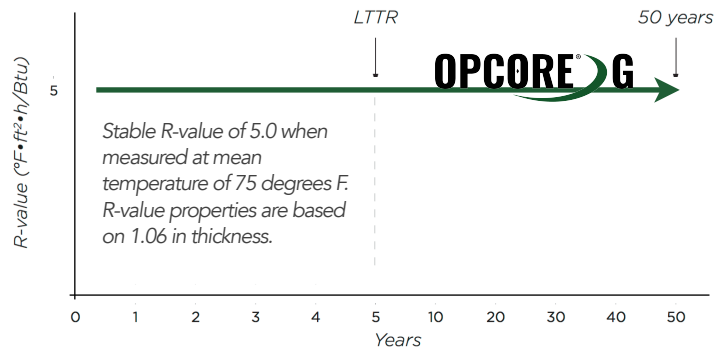
According to the EPS Industry Alliance Technical Bulletin 'XPS & Polyiso Long-Term Thermal Resistance & R-value Performance', polyisocyanurate (polyiso) and XPS (extruded polystyrene) lose R-value over their lifetime. This means the materials ability to resist the flow of heat will lessen well past the five year point reported using common LTTR test methods ASTM C1303 or CAN/ULC-S770.

Both materials make use of gases with a lower thermal conductivity than air. This allows the material to be described with a higher 'on-the-board' R-value than what would be achieved if the cells in the foamed materials contained just air. However, over time, air replaces these gases as the atmosphere in a given cell naturally seeks equilibrium with the atmosphere outside of the cell.

Starting in year five and for the remaining life of the materials, the R-values of polyiso and XPS are below LTTR published R-values.⁽¹⁾

Most insulation users are interested in a true long-term R-value for their energy demand calculations. They need to determine the true cost savings potential of thermal insulation and structure design options to optimize both cost and performance. While five-year LTTR values are of interest, a 50-year LTTR is more suitable for building insulation specifications.

OPCORE-G+ R-value over time



OPCORE recyclable thermal insulation and OPCORE-G graphite-enhanced recyclable thermal insulation demonstrate a stable R-value over time.

Both materials are made of small pockets of air surrounded by a recyclable polymer matrix. This means the R-value of the material is stable over time. The insulating gas in the cells starts as, and stays as, air.

OPCORE-G contains high purity graphite wholly contained in, and evenly dispersed throughout, a recyclable polymer matrix. Graphite naturally absorbs radiant energy, and therefore slows the flow of heat through the material. And, as an added benefit, graphite's effect on the material's radiant heat transfer rate is even more pronounced when measured at lower mean temperatures. This means the R-value of OPCORE-G is stable over time - and powers up as the mean temperature of the material drops.

Summer or winter, now, at five years or throughout the life of the installation, OPCORE and OPCORE-G Recyclable Thermal Insulation helps keep heat where it belongs.



Learn more about OPCORE and OPCORE-G rigid thermal insulation products at www.opcodirect.com.

(1) As stated in EPSIA Technical Bulletin 'XPS & Polyiso Long-Term Thermal Resistance & R-value Performance'.

The information contained herein is subject to change and is provided for informational purposes only is provided without warranty, either express or implied. Opco reserves the right to amend the information in this publication without notice. Opco, Inc. nor it's assigns assume no liability for any errors or omissions in the content of this publication.

Physical Property	Method	Units	Material Property Values				
Density, nominal	ASTM C303	lbs / ft ²	1	1.25	1.4	1.5	2
Density, minimum	ASTM C303	lbs / ft ²	0.90	1.15	1.35	1.45	1.80
Sustainability / Environmental	Summarized conclusions from scientific experiments in the public domain or product specification.	<ul style="list-style-type: none"> • Recyclable as #6 Plastic. • Can reduce carbon emissions by lowering energy needed to heat or cooling buildings, or refrigerate package contents. Retains R-value over time. • Does not contain chlorofluorocarbons. • <i>Can contain recycled content per specification.</i> • UL GreenGuard Gold Certified for Indoor Air Quality. • Material expansion agent has zero ozone depletion potential. 					
ASTM C578 Classification ⁽¹⁾	ASTM C578	Type	I	VIII	II	II +	IV
Compressive Resistance	ASTM D1621	at yield or 10% deformation, psi (kPa)	10 (69)	13 (90)	15 (104)	20 (138)	25 (173)
Thermal Resistance (R-value*), 75F ⁽²⁾	ASTM C518	°F·ft ² ·h/BTU (K·m ² /W) 75 ±2°F (23.9 ±1°C)	5.0				
Thermal Resistance (R-value*), 40F ⁽²⁾	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 ⁽²⁾	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 (173)	30 (207)	35 (241)	40 (276)	50 (345)
Water Vapor Permeance ⁽³⁾	ASTM E96	For 1" (25.4 mm), perm (ng/PA·s·m ²), max	5.0	3.5	3.5	3.5	2.5
Water Absorption by Total Immersion	ASTM C272	Volume % absorbed, max	4.0	3.0	3.0	3.0	2.0
Dimensional Stability	ASTM D2126	max % linear change	< 2.0				
Oxygen Index	ASTM D2863	min, volume %	> 24.0				
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				

⁽¹⁾ OPCORE-G meets and/or exceeds ASTM C578-11b "Standard Specification For Preformed, Cellular Polystyrene Insulation"; published by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959.

⁽²⁾ OPCORE-G rigid thermal insulation, 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. Thermal resistance (R-value) is based on tested values at 1.06-inch thickness at the temperature indicated. It is recommended to multiply your installed thickness by the R-value indicated and divide the result by 1.06.

⁽³⁾ R-value means resistance to heat flow. The higher the R-value, the greater the insulating power. Ask your seller for help with sizing. The R-value properties shown are based on 1 in thickness.

⁽⁴⁾ 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 specifiers option.

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 are subject to normal manufacturing variation. ASTM specifications shown are typical for rigid, cellular polystyrene thermal insulation and are published by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959.



205 W Harrison Avenue
Latrobe, PA 15650
Tel: 724.537.9300 / 800.229.6726
Order Fax: 724.537.9349
www.opcodirect.com

OPCO, Inc. is a proud member of:



Structural Insulated
Panel Association



The information contained herein is subject to change and is provided for informational purposes only is provided without warranty, either express or implied. Opco reserves the right to amend the information in this publication without notice. Opco, Inc. assumes no liability for any errors or omissions in the content of this publication.

The OPCORE-G logo and mark are registered trademarks of Opco, Inc., and the OPCO logo is a trademark of Opco, Inc. The UL logo and the GREENGUARD Certification mark is a trademark of UL LLC. The SIPA mark is a trademark of the Structural Insulated Panel Association. The ICC-ES Evaluation Service mark and the NTA mark are trademarks of ICC Evaluation Service, LLC. The EPS Industry Alliance mark is a trademark of EPS Industry Alliance. All Rights Reserved. Any use of this publication, including reproduction, modification, distribution or republication without prior written consent is strictly prohibited.

OPCORE-G Construction Specification Guide 202301.pdf