

## 1. PRODUCT NAME

Korolite® GPS 400 Insulation

## 2. MANUFACTURER

Airfoam Industries Ltd.

19402 - 56 Ave, Surrey BC V3S 6K4 Canada

800.663.8162 or 604.534.8626 | www.airfoam.com

## 3. PRODUCT DESCRIPTION

Korolite® Graphite Expanded Polystyrene (GPS) is a high-performance, closed cell, rigid foam insulation material that uses air as main ingredient. GPS insulation resists moisture and mold/fungi growth with low environmental impacts, high & stable Long-Term Thermal Resistance, and good drying potential over the long service lives of buildings. Korolite® GPS is used in many residential and commercial construction applications such as wall, roof and below-grade insulation including under slabs.

Korolite® GPS is an advanced combination of Graphite nanoparticles and Expanded polystyrene (EPS) creating an energy-efficient and cost-effective insulation solution for architects, builders and contractors.

Common **widths and lengths** are 2'x8', 4'x4' and 4'x8' [0.61m x 2.44m, 1.22m x 1.22m and 1.22m x 2.44m] but can be custom ordered in any size to meet your project specifications.

Common **thicknesses** are: 1", 1.5", 2", 2.5", 3", 4", 5" and 6" [25.4mm, 38.1mm, 50.8mm, 63.5mm, 76.2mm, 101.6mm, 127mm and 152.4mm] but can be custom ordered in any size, including factory-tapered, to meet your project specifications.

## 4. TECHNICAL DATA

### Code Compliance

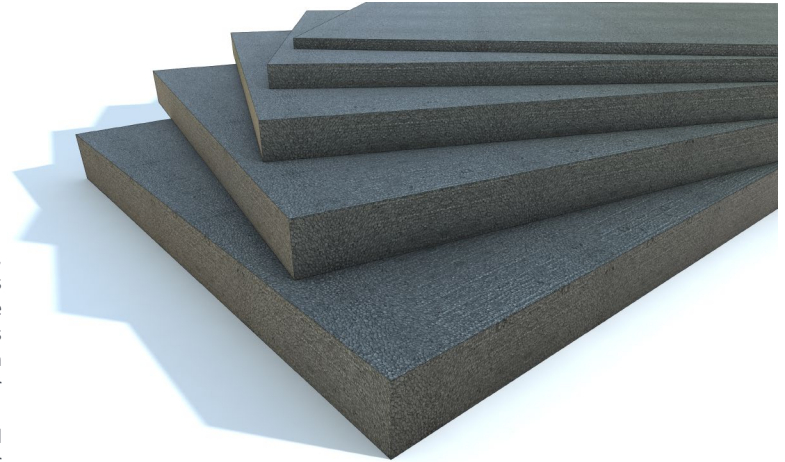
Refer to Airfoam's Code Compliance Research Report CCRR-0379 at [www.airfoam.com/Airfoam-Code-Report-CCRR-0379.pdf](http://www.airfoam.com/Airfoam-Code-Report-CCRR-0379.pdf)

Korolite® EPS insulation is Thermal Insulation with Surface Burning Characteristics.

Korolite® GPS 400 meets ASTM C578, ICC-ES AC12, and ASTM E84 (UL 723).

### Material Properties

Korolite® GPS 400 Insulation exhibits the typical physical properties indicated in Table 1 below when tested as represented. Insulation values for given thicknesses are listed in Table 2.



### Applicable Standards

- ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
- ASTM C203 - Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation
- ASTM C272 - Standard Test Method for Water Absorption of Core Materials for Sandwich Constructions
- ASTM C303 - Standard Test Method for Dimensions and Density of Preformed Block and Board—Type Thermal Insulation
- ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
- ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings
- ASTM C1512 - Standard Test Method for Characterizing the Effect of Exposure to Environmental Cycling on Thermal Performance of Insulation Products
- ASTM D696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics
- ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics
- ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics
- ASTM D2126 - Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging
- ASTM D2863 - Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)
- ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics
- ASTM E2178 - Standard Test Method for Air Permeance of Building Materials
- ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials
- ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials
- ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Material
- CAN/ULC-S101 - Standard Methods of Fire Endurance Tests of Building Construction and Materials
- CAN/ULC-S102 - Standard Method of Test for Surface Burning Characteristics of building Materials and Assemblies
- CAN/ULC-S701.1 - Standard for Thermal Insulation, Polystyrene, Boards & Pipe Covering
- ICC-ES AC12 - Acceptance Criteria for Foam Plastic Insulation
- NFPA 101® - Life Safety Code®
- NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components

## KOROLITE® GPS 400 INSULATION - MATERIAL PROPERTIES

Property <sup>1</sup>	Units, Applicability	KG400	Test Standard
<b>Third Party Certified Type</b>	Canada	*	CAN/ULC-S701.1
	USA	XIV	ASTM C578, ICC-ES AC12
<b>Compressive Resistance<sup>2</sup></b> Minimum @ 10% Deformation	psi	40	ASTM D1621
	kPa	276	Proc.A
<b>Thermal Resistance<sup>3,4</sup></b> Typical at mean temperatures of:	R-Value / inch thickness	ft <sup>2</sup> •hr•°F/(BTU•in)	40°F (when heating) 4.9 <sup>6</sup>
		75°F (when cooling) 4.7	
	Rsi / 25mm thickness	m <sup>2</sup> •°C/(W•25mm)	4°C (when heating) 0.850 <sup>6</sup>
		24°C (when cooling) 0.815	
<b>Water Vapor Permeance<sup>4</sup></b> Maximum @ 1" [25.4mm] thickness	perms	2.3	ASTM E96
	ng/(Pa•s•m <sup>2</sup> )	132	desiccant
<b>Water Absorption<sup>5</sup></b> Maximum	% by volume	USA	2
		Canada	ASTM D272, 1 Day
<b>Flexural Strength</b> Minimum	psi	60	ASTM C203
	kPa	414	Proc. B
<b>Density<sup>6,7</sup></b>	Nominal <sup>8</sup> lbs/ft <sup>3</sup>	2½	ASTM D1622
	Minimum <sup>7</sup> kg/m <sup>3</sup>	38.4	

<sup>1</sup> The test methods used to determine the material properties provide a means of comparing different cellular plastic thermal insulations. They are intended for use in specifications, product evaluations and quality control, but they are not intended to predict end-use product performance.

<sup>2</sup> The elastic limit is between 1% and 2% strain. Compressive resistances at 10% strain are provided for applications where the intended end-use can tolerate plastic (permanent) deformation under load.

<sup>3</sup> R means resistance to heat flow. The higher the R-value, the greater the insulating power.

<sup>4</sup> Values are for 1 inch or 25mm thick samples with natural skins intact. Better values will result for thicker materials.

<sup>5</sup> The lab-test methods for water absorption use complete submersion under a head of water for 24 or 96 hours, so the values are applicable to specific design requirements only when the end-use conditions are similar to test method requirements.

<sup>6</sup> not part of all the industry consensus standards (ASTM C578, CAN/ULC-S701) and provided AS-IS solely for informational purposes.

<sup>7</sup> Minimum Density only applicable to USA-bound products per ASTM C578 (not Canada-bound products per CAN/ULC-S701.1).

\* Not third-party certified; for most applications these products must be separated from a building's interior by at least 1"-thick concrete or masonry (e.g. use under slabs or on exterior of concrete/masonry walls & roofs)

## Fire Characteristics

- Limiting Oxygen Index: min. 24% per ASTM D2863. Airfoam's EPS for construction applications contains a polymeric (non-HBCD) fire retardant modifier.

## Surface Burning Characteristics

- Canada:** CAN/ULC-S102.2: Flame-Spread Rating ≤295, Smoke Developed Classification over 500.
- USA:** NFPA 101: Class A  
ASTM E84 (UL 723)<sup>a</sup>: Flame Spread Index ≤25, Smoke-Developed Index ≤450 up to 6" thick.

<sup>a</sup> Ceiling measurement only, conducted through determination of flame spread index and smoke developed index with the removal of any contribution of molten materials ignited on the floor of the Steiner tunnel.

## Fire Protection

**CAUTION:** GPS products are combustible and must not be exposed to excessive heat, sparks, open flames, or any other sources of ignition. A protective barrier or thermal barrier is required as specified in the appropriate building code.

¼ Hour Fire Rating for a Composite Wall Assembly with EPS c.i. (Continuous Insulation) per **ASTM E119**, see Design No. CPIA/CWP 45-01.

Meets **NFPA 285** with specific limitations for an exterior wall assembly.

For more information consult Airfoam's CCRR-0379 at [www.airfoam.com/Airfoam-Code-Report-CCRR-0379.pdf](http://www.airfoam.com/Airfoam-Code-Report-CCRR-0379.pdf), your engineer, local building department or call Airfoam at 800.663.8162.

## Environment Data

GPS has much lower environmental impacts than most other foam plastic insulation materials. Korolite® GPS insulation may contain up to 30% pre-consumer recycled content or can be ordered without recycled content for EIFS/Stucco applications.

Korolite® GPS insulation **resists mold & fungi growth** per ASTM C1338 and has no nutritional value for insects. To protect against animals place adequate physical barriers such as siding, bug-screens or membranes around GPS.

**Max. Service Temperature:** Long-Term Exposure 74°C [165°F], Intermittent Exposure 79°C [175°F]

**Thermal Expansion Coefficient:** 5-7•10<sup>-5</sup>/°K per ASTM D696

**Capillarity:** None.

## Solubility & Incompatibility

Insoluble in water and in general chemically inert. GPS dissolves in hydrocarbons (e.g. fuels, oils, tar), organic solvents (e.g. acetone/ketones, benzene, paint thinner), ethers, esters, aldehydes and amines.

## 5. JOBSITE STORAGE & INSTALLATION

**CAUTION:** Keep graphite-enhanced (gray) EPS insulation protected from excessive heat at all times!

Excessive heat build-up will damage GPS insulation. When storing Korolite® GPS Insulation products, keep them protected from direct and reflected sunlight at all times because the GPS insulation will deform with excessive heat from solar radiation. Store indoors if possible or keep product tarped or covered to protect from sunlight and weather. Do not use clear plastic covering.

During construction leave GPS products in their white opaque packaging as long as possible, then quickly protect exposed Korolite® GPS surfaces from direct or reflected solar energy. If deformation of the insulation product occurs due to excessive heat transferred from direct or reflected sunlight, shield the exposed insulation from that solar energy with tarps or similar protection. This is only needed while the GPS insulation remains exposed, e.g. until the finishes are applied.

Follow the Installation Guide for Korolite® Expanded Polystyrene (EPS and GPS) Rigid Insulation available at [www.airfoam.com/rigid-insulation/Korolite-Insulation-Installation-Guide.pdf](http://www.airfoam.com/rigid-insulation/Korolite-Insulation-Installation-Guide.pdf). Install Korolite® GPS insulation in compliance with all applicable building codes. Korolite® insulation is easy to handle and install and can be cut with a utility knife or any sharp blade. Butt edges and ends tightly to adjacent GPS boards. Ensure compatibility of any other product (such as adhesives, tapes, coatings or finishes) with Expanded Polystyrene. Korolite® Rigid Foam Insulation is a non-structural material. Korolite® insulation shall only be placed into an assembly where the moisture transport mechanisms are well understood and determined to be acceptable in accordance with accepted engineering practice (e.g. current ASHRAE Handbook of Fundamentals).

**Please contact us for a free estimate or additional information: [www.airfoam.com](http://www.airfoam.com)**

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**TABLE 2. Korolite® GPS 400 Thermal Resistance Properties by Thickness**

Material Thickness	R-Value (ft <sup>2</sup> ·hr·°F/BTU)		Rsi ((m <sup>2</sup> ·°C)/W)	
	40°F	75°F	4°C	24°C
1" 25.4mm	4.9	4.7	0.863	0.83
1.5" 38.1mm	7.4	7.1	1.294	1.242
2" 50.8mm	9.8	9.4	1.73	1.66
2.5" 63.5mm	12.3	12	2.16	2.07
3" 76.2mm	15	14.1	2.59	2.483
4" 101.6mm	20	19	3.452	3.311
5" 127mm	25	24	4.31	4.14
6" 152.4mm	29.4	28.2	5.18	4.97

For safe handling and storage information refer to the Safety Data Sheet (SDS) at [www.airfoam.com/SDS.pdf](http://www.airfoam.com/SDS.pdf) or request a printed copy.

**GHS Classification:** Non-Hazardous.

**UV-light surface degradation:** Avoid prolonged Korolite® GPS exposure to direct sunlight. The ultraviolet light creates a yellow dust on the surface of GPS products which has negligible impact on the products' properties but may require removal before adhering other materials such as stucco or self-adhesive membranes.

## 6. AVAILABILITY

Korolite® GPS insulation is supplied from Surrey, BC and Paris, ON through our extensive distribution network. For product availability or to get in touch with your local distributor, call Airfoam at 800.663.8162 or +1.604.534.8626.

## 7. WARRANTY

Airfoam offers a **30-year limited warranty** for Korolite® GPS Insulation including **retention of 100% of its R-value**. See [www.airfoam.com/Korolite-Insulation-30-Year-Limited-Warranty.pdf](http://www.airfoam.com/Korolite-Insulation-30-Year-Limited-Warranty.pdf) and [www.airfoam.com/terms](http://www.airfoam.com/terms) for Terms and Conditions of Sale.

## 8. MAINTENANCE & RECYCLING

No maintenance is required in normal use. GPS insulation that became wet can be dried out within reasonable times per ASTM C1512 tests using adequate drainage and/or ventilation.



Graphite Expanded Polystyrene (GPS) can be recycled for reuse in a variety of different applications, from construction and landscaping to packaging and park benches. Airfoam Industries Ltd. is a registered Recycling Facility accepting recyclable #6 Graphite Expanded Polystyrene (GPS) from our customers - free of charge, if it is clean, dry, and not mixed with any other materials.

## 9. TECHNICAL SERVICES

Airfoam can provide technical information and support to help address questions when using Korolite® GPS insulation. Technical personnel are available to assist with any insulation project. For technical assistance, contact Airfoam at:

Online: [www.airfoam.com/EPS-Insulation-Support.php](http://www.airfoam.com/EPS-Insulation-Support.php)

Phone: 800.663.8162 or +1.604.534.8626

Fax: +1.604.534.1212

## 10. FILING SYSTEM

Korolite® GPS 400 Insulation Technical Specifications filed at: [www.airfoam.com](http://www.airfoam.com)

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