Lumira® aerogel

What is Lumira®?

Lumira aerogel, formerly Nanogel aerogel, is an insulating gel used to fill polycarbonate, for many architectural systems and applications. Lumira aerogel's main purpose is to increase thermal ratings, but can also greatly reduce sound transmission difference. Lumira aerogel consists of small clear hydrophobic particles, creating an R-Value of 6.5 for a 25mm, 3 wall unit compared to an R-Value of 3 for an unfilled unit. After Lumira aerogel is added to the polycarbonate, the thermal transfer of heat and cold is greatly reduced, minimizing energy costs on installations.

Lumira® aerogel Performance Properties*

Thickness** (mm)	Light Transmission (%)	Direct Solar Transmission (%)	U-value (W/m^2K)	R-value (in)
10	80	80	1.38	3.2
16	70	70	1.00	4.3
20	62	62	0.78	7.2
25	55	55	0.64	8.0
32	47	47	0.51	11.1
40	39	39	0.42	12.0
50	31	31	0.34	16.0
70	19	19	0.25	20.0

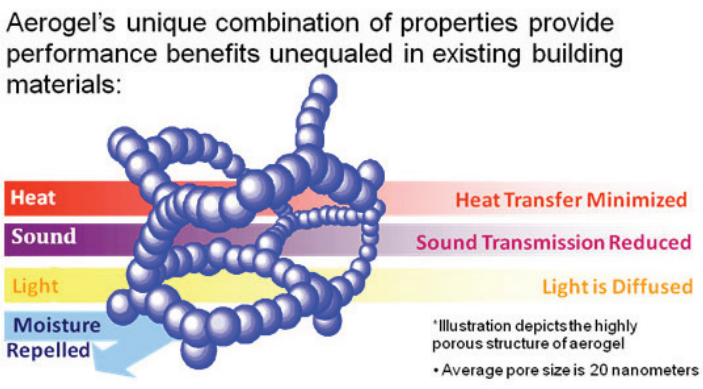
*Values are for Lumira aerogel only
**Does not represent all available thickness options

In certain applications, Lumira aerogel can aid in LEED certifications. Sustainable purchasing, optimum energy efficiency, occupant comfort, low emissions, along with daylight and views, are possible points that Lumira can assist in the achievement of.

An example of Lumira aerogel beads.

What It's Made Of:

The actual Lumira aerogel product is translucent and made out of a dry silica particulate, with the ability to retain a large amount of light transmittance. Values range from 70% light transmittance for a 10mm sheet of polycarbonate to 50% with 25mm of polycarbonate when filled. Another benefit of incorporating Lumira aerogel is glare reduction. If harsh glare is a problem, Lumira aerogel infill can be used to diffuse light. When sunlight and heat gain are reduced in a space, energy savings will likely occur. Lumira particles do not harbor mold, moisture, mildew, or fungus, are completely safe to be around, and do not emit any odors. The aerogel particles are UV-stable and will not deteriorate due to sunlight exposure. If a skylight is filled with Lumira aerogel and requires replacement, the Lumira aerogel particles can be reused and recycled under certain conditions in the replacement skylight.



Thermal Benefits:

Aerogel is among the lightest and most effective insulating materials in the world. Lumira aerogel is a solid which consists largely of air (>90%) contained in a structure with pore sizes that are smaller less than the space required for air molecules to travel through. This severely inhibits heat transfer through the material, enabling world-class performance.

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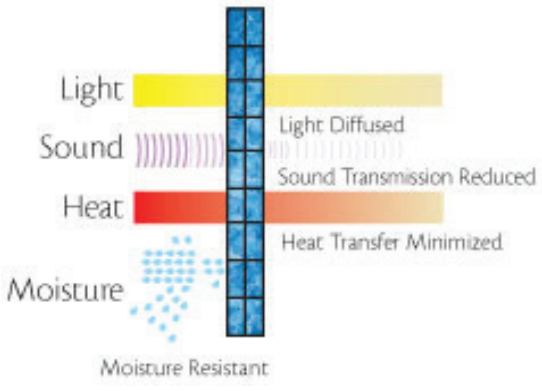
Acoutical Benefits:

When acoustical ratings are required, Lumira aerogel can be used to achieve specific levels. The beads not only block sound, they absorb it. The result is strong sound control by reducing outside noise transfer. With the assistance of Lumira aerogel, interior spaces and rooms become quieter and user comfort levels increase.

The key feature of Lumira aerogel in a sound control application is the low speed of sound waves (airborne) propagating through the porous medium, as well as, poor solid vibration transmission. This is due to Lumira aerogel's tenuous structure. Speed of sound in a medium is a fundamental material property with important implications in the attenuation of sound waves. To attenuate a sound wave of wavelength l, it is necessary to use a layer of sound insulation at least l/2 thick. The wavelength of such sound wave is governed by the speed of sound: C = l.f where f is the frequency and C the speed of sound of the medium. Since the wavelength increases as the frequency decreases, the lower the frequency – the thicker the layer of sound control material needed.

Lower sound velocity in Lumira aerogel makes the material particularly adapted to low frequency sound control where space is a concern.

The noise reduction coefficient is the average of the absorption at four frequencies (250, 500, 1000, and 2000 Hz). The NFRC however does not reflect material performance at specific frequencies of interest for the application. The sound absorption properties of Lumira granules can be modified to match the needs of a particular application by changing both the mechanical properties of the material as well as the particle size distribution.



Translucent Panels :

The inclusion of Lumira in daylighting systems virtually eliminates the historical trade-off of insulation vs. natural light by providing 3 to 6 times the thermal performance of traditional, insulated fenestration products while maintaining optimal light transmission.

Solid, non light-transmissive construction delivers an R-value of 24 (U-value 0.04), which allows daylighting products to deliver a range of R-values from 6 to 20 (U-0.05 to 0.16) while cultivating essential natural daylight.

Increased daylighting designs are proven to have positive effects such as:

» Increased productivity
» Increase in sales
» Shown to increase learning rates
» Decreases absenteeism
» Promotes a healthier, happier work, and educational environment

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Daylighting Benefits:

There are many applications for Lumira aerogel such as curtain walls, interior walls, skylights, sloped sunrooms, pool enclosures, greenhouses, conservatories, walkways, and canopies. These applications all have the potential to benefit from Lumira aerogel fill. Lumira aerogel can also be placed inside bent and radius units.

Commercial hotels, restaurants, multi-family housing, schools, and health care buildings have the ability to incorporate Lumira aerogel into their new glazing construction. Residential Lumira aerogel applications include skylights, glazed structures used for entertaining or plants, or an outside canopy.

Please contact a Solar Innovations, Inc. Representative with any questions at: 800-618-0669

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Lexan* Polycarbonate Sheet — Tough Virtually Unbreakable

* Trademark of SABIC Innovative Plastics IP BV

Sabic Innovative Plastics proprietary and confidential data. Typical properties based on Lexan* Thermoclear* products.

		Wt. lbs/sqft	Insulation		Clear		
			U Value	R Value	LT %	SHGC	ST
10 mm 2 wall	Standard	0.35	0.52	1.87	80	0.80	80
	w/ Lumira®	0.50	0.32	3.12	60	0.70	70
16mm* 3 wall	Standard	0.57	0.39	2.56	74	0.65	78
	w/ Lumira®	0.80	**.26***	3.85	**52***	**0.57***	62
25mm* 3 wall	Standard	0.67	0.34	2.94	72	0.57	71
	w/ Lumira®	1.03	**.16***	6.25	**49***	**0.54***	61
40mm Thermoclear*	Standard	0.82	0.34	2.94	59	0.64	73
	w/ Lumira®	1.03	0.09	11.11	40	0.55	63

- All material in this chart is ClassA/CC1, per ASTM D635 and E84
- % Light Transmission ISO 9050, EN410 D65 (380-780nm)
- Shading Coefficient & SHGC ISO9050, EN410
- U-Value (Btu/h ft^2 F) ISO 1007, EN673

For more information on Lumira® aerogel, please visit our website at www.solarinnovations.com.

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