

## Easy Integration Into Structures and Shelters

Aspen Aerogels' fully encapsulated tent insulation solutions integrate into modular roofs and walls using existing shell fabrics and existing construction techniques.

Typical encapsulation (below) consists of sealing the aerogel within two vinyl fabrics - tent shell material for the exterior and reinforced vinyl for the interior. Edges are sealed using RF (Radio Frequency) Welding.



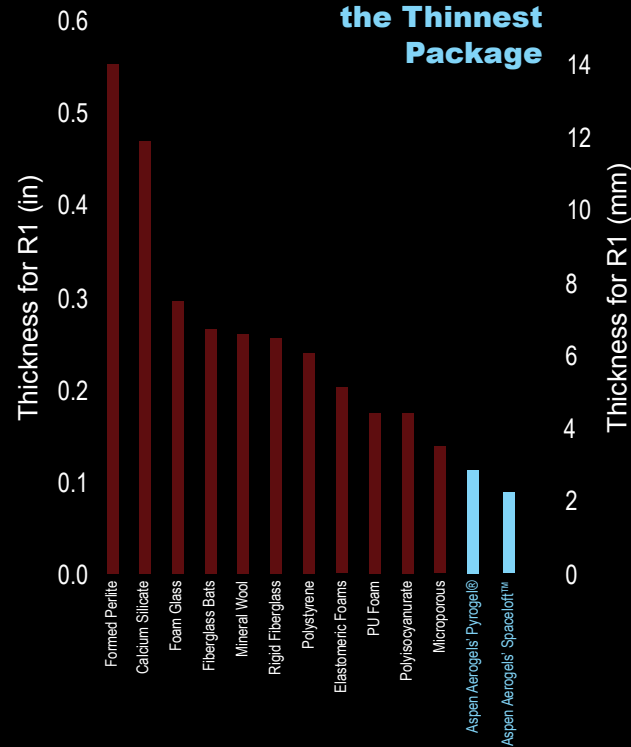
### What is Aerogel?

Aerogel is a nanoporous solid, sometimes called "puffed up sand," composed of over 90 percent air. Pore diameters are less than 1/10,000th the width of a human hair. Aerogel's nano-scale lattice and pores give it the lowest thermal conductivity of any known solid.



Aspen Aerogels has developed breakthrough technology to manufacture aerogel in flexible blanket form that is strong, durable, thin, compression-resistant, and waterproof – ideal for structures and shelters.

### Aerogel Packs the Most Insulating Power Into the Thinnest Package



# Aerogel Insulation

## For High Performance Modular Structures

Custom Insulation Kits Available for Indoor and Outdoor Applications

Aspen Aerogels' fully encapsulated tent insulation solutions deliver:

- Highest R value and Clo value per unit thickness
- Dramatic fuel savings on heating and cooling
- Up to eight-times reduction in thickness
- Reduced weight and pack size
- Completely waterproof
- Infrared and acoustic signature suppression
- Easy installation and retrofit



**Advantages of Aspen Aerogels' fully encapsulated tent insulation solutions:**

- Highest R value and Clo value per unit thickness
- More efficient environmental control
- Dramatic fuel savings on heating and cooling of structure
- Up to eight-times reduction in thickness
- Reduced weight and pack size
- Packs in existing transport bag (no increase in transport cube)
- Completely waterproof
- Compression resistant
- IR and acoustic signature reduction
- Insulation systems that are fully integrated into tent structure
- Repairable in the field
- Assembly fits existing units in the field
- Kits available for retrofit in the field with no additional parts

# Advanced Insulation Proven Effective for Structures in Hot and Cold Environments



**Does not add significant weight or cube**

**Aerogel Roof Liner for Modular Command Post Cold and Hot Temperature Tests**  
McKinley Climatic Chamber, Eglin Air Force Base, FL

- Hot environment: 125°F ambient
- Cold environment: -25°F ambient



At ambient conditions of -25°F, aerogel-insulated tent roof appears dark or cold. Compared to non-aerogel roofs, the integrated aerogel roof liner reduced heat losses by 44%. Testing in 125°F environment validated cold environment results.

**Aerogel Roof Liner and Wall Liners for Modular Command Post Hot Temperature Tests**  
Doriot Climatic Chamber, Soldier Systems Center, Natick, MA

- 11 tent configurations tested
- 120°F ambient

Internal Temperature Reduction From 120°F Ambient			
Roof	Aerogel Integral (2 mm)	MCP Type III Liner (50 mm)	Standard (no insulation)
<b>Walls</b>			
Aerogel Hung Liner (2 mm)	61		54
Standard Hung Liner	58	55	50
MCP Type III Hung Liner (50 mm)		61	
Standard Outer Wall (no insulation)	51	49	46
Aerogel Outer Wall Integral	56		
Aerogel Outer Wall With Standard Liner	59		

Tent with aerogel-insulated solution delivered top thermal performance. Preliminary estimates show this would save up to 30% in fuel, resulting in 3-6 month payback.

Two millimeters of aerogel matched the performance of 50 millimeters of the MCP Type III non-integrated insulation, while offering these additional benefits:

- 27 pounds lighter
- 10 cubic feet smaller when packed
- Less expensive
- Half the setup time
- Waterproof

**Aerogel Roof Liner for Modular Command Post Outdoor Cold Temperature Tests**  
Northborough, MA

- 24°F ambient temperature
- Tents were heated; equilibrium temperatures recorded at multiple locations
- Energy balance used to calculate insulation efficiency (U-value) for enclosure



Aerogel roof liner (left tent) reduced heat losses by 34%. While maintaining a higher inside temperature, the exterior remained cool enough for snow to stick. Aerogel kept the tent warmer inside, increasing occupant comfort and reducing fuel usage.



Significantly more heat escaped from the non-aerogel roof (right tent), while the aerogel roof (left tent) kept heat inside, as seen in this infrared image. Aerogel also lowered the infrared signature of the roof.