aspen aerogels™

NANOTECHNOLOGY AT WORK™

CASE STUDY

Outdoor Gear

Products Used

Spaceloft® 3251
Spaceloft® 6251

Aerogel Insulation Enables Extremely Compact, Lightweight Sleeping System

Improves thermal performance while reducing pack size

Fabrication Partner

Slumberjack
(www.slumberjack.com)

Challenges

- Develop a new sleeping system for the Marine Corps that improved thermal performance while reducing pack size.
- Provide acceptable level of comfort, heat retention, and internal humidity in an operating range of 27° to -40°C (80° to -40°F).
- Ensure the system would need minimal reconfiguration or user adjustment in the field.
- The system needed to be water-resistant for use on moist ground or shallow standing water (less than ¼ in).
- It could not use an internal or external power supply or rely on chemical reactions that must be replaced or reset.

Aerogel Solution

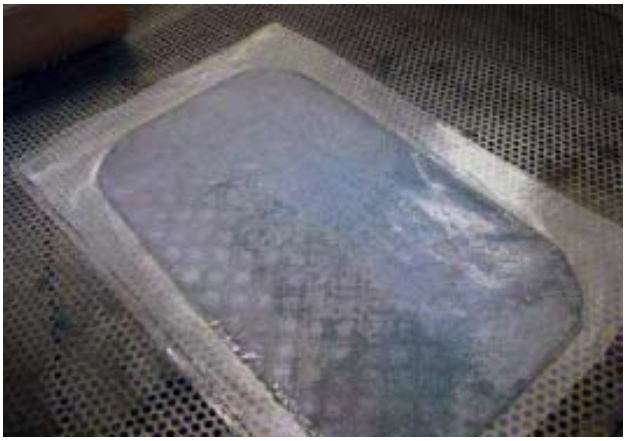
- Aspen Aerogels and Slumberjack designed a new sleeping system with **Spaceloft® 3251** and **Spaceloft® 6251** placed to capitalize on the high thermal value and compression resistance of aerogel.
- This strategic placement of aerogel insulation reduced the pack size while maintaining the Clo value.

Benefits

- Spaceloft displayed Clo values over 11 per inch thickness, superior flexibility and no water absorption.
- Spaceloft outperformed lofted insulations, which lose thermal resistance when compressed by the weight of a person. Spaceloft maintains its ithermal performance even when compressed.

Spaceloft insulation was diamond-scored, giving it the complete flexibility needed for sleeping system use. Scoring had minimal effect on the thermal conductivity of the insulation.

Spaceloft insulation was incorporated into these targeted areas of the sleeping system.



Sections of Spaceloft insulation were laminated for easy insertion into the sleeping system. A fast, efficient lamination process is being developed for mass production.

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