No One Likes Giving Up Space To Insulation

ASPEN AEROGELS, INC.

THIN, FLEXIBLE AEROGEL BLANKETS for AEROSPACE

In the adjacent picture, a flame at 1030°C is impinging on a 1/4 inch thick piece of our insulation. Despite such a thin layer and high temperature, you can still touch the side opposite the flame without incident. To achieve this with typical insulations, you would generally need to increase the thickness by a factor of two to six.

Aspen Aerogels

Due to the promise of delivering high insulation values in a thin lightweight form, Aerogels have been sought after since the 1930's. Many organizations tried unsuccessfully to solve the technical hurdles that prevented the economic and reproducible isolation of Aerogels, thus relegating Aerogels to intellectual curiosity and research use.

In 1999, Aspen Aerogels broke through these barriers, and with continued refinement of their technology, cost effective Aerogel blankets have been available in commercial quantities since 2002.

Thermal Performance of Materials

As shown below, Aerogels have the lowest thermal conductivity compared to existing insulations:

Material	mW/mK
Aerogels	11-12
Min K®	19-23
Polyurethane Foam	21-24
Microporous Silica	19-33
Pyrell®	33-37
Saffil®	40-80

Min K is a registered trademark of Thermal Ceramics
Pyrell is a registered trademark of Foamex
Saffil is a registered trademark of Saffil Corp.

According to Ed Hogan, Market Development Manager at Aspen Aerogels, these values mean that the thermal performance of a system can be improved by 40-600% without increasing thickness. Alternatively, thickness can be reduced by the same factor while maintaining performance at incumbent levels.

Aerogel Blankets

Aerogels were available in limited amounts in monolithic form, which delivered high insulation capacity but was stiff, brittle and hard to work with.

In contrast, Aspen Aerogels' blankets are thin, flexible and easy to work with, while delivering the same insulating capacity as the monolith. Blankets can be handled in the same manner as most existing insulations, and don't require vacuum to provide high performance.

Space Applications

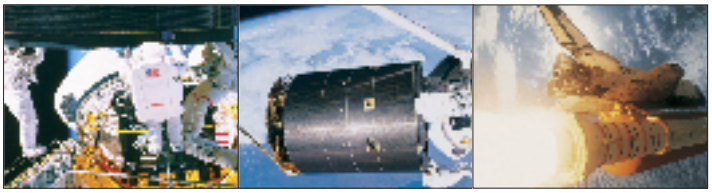
NASA has worked with Aerogel blankets for a variety of applications.

The durability and flexibility of Aerogel blankets provide an ideal solution for Freezer Systems. Blankets easily conform to non cylindrical geometries without loss of thermal performance, resulting in repeatable, uniform insulation for long duration missions.

In Dewars, the high thermal capacity of the blankets at reduced thickness results in the improved insulation and transport of cryogenically cooled specimens.

Aerogel blankets help to increase uniformity and repeatability, while at the same time reducing costs in Cryogenically Cooled Optics.

In vehicles the high insulating capacity of aerogel blankets at reduced thickness and weight increases available payload and lowers parasitic weight. Alternatively, blankets can be used to dramatically improve the level of thermal insulation, enabling an increase in mission profile.



Maximize Payload with Thin, Flexible Aerogel Insulations

For more information, please contact Dan Bullock, Director of Government Business at Aspen Aerogels; 508-481-5058 or dbullock@aerogel.com.

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