



Vibration Testing Report

Scope

The purpose of this test study was to determine the affect of vibration and shock on Aspen Aerogel AR5100 flexible aerogel blanket. The samples were tested initially for thermal conductivity, put through shock and vibration testing for four hours and then tested again for thermal conductivity.

Testing

Three pieces of AR5100 were cut to 8 inch by 8 inch samples and tested for thermal conductivity by Aspen Aerogels using an instrument that conforms to ASTM C 518. These samples were then sent out for shock and vibration testing. Sample 1 was tested using a 20 gram weight and it saw vibrations which ranged randomly from 5 to 500 Hz for four hours. Samples 2 and 3 were both tested using a 20 gram weight and also saw vibrations that ranged randomly from 5 to 500 Hz and also saw 15 db in frequency of 1 – 10 kHz and 30 DB in 10-100 kHz for 4 hours. The samples were returned to Aspen Aerogels for thermal conductivity testing.

The summary of the results are below:

Sample No:	Thermal Conductivity (mW/m-K)		Shock and Vibration Testing
	Before	After	
1	13.4	12.0	20g at 5-500Hz random for 4 hours
2	13.0	11.6	20g at 5-500Hz Random plus 15DB in frequency of 1-10kHz and 30 DB in 10-100 kHz for 4 hours
3	12.8	11.4	

Discussion of Results

The samples visually showed little change before and after thermal conductivity testing. One complication in the testing occurred because two different thermal conductivity test units were used. One machine was used to test the samples before vibration. This machine was replaced with an upgraded unit. The newer unit was used to test the samples after vibration. The newer unit placed slightly more force on the specimens and compressed the sample more than the older machine. The minor difference in thermal conductivity numbers is believed to be due to the different machines used.

Conclusion

Testing performed on the AR5100 flexible aerogel blanket showed little change in the visual characteristics and thermal performance before and after shock and vibration testing. The small difference in thermal conductivity is due to a change in the test equipment.

Feb 4, 2003