

THERM-A-GAP™

976

Reliability Test Report

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Chomerics Approved Signatory:

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SUMMARY OF PHYSICAL PROPERTIES

List of Acronyms and Initials

TIM	Thermal Interface Materials
HSP	Heat Spreader Materials
SPR	Standard Product Requirements
IEC	International Electrotechnical Commission

List of Definitions

Laboratory Environment	A temperature between 20 and 25 °C and a relative humidity between 40 and 60%
Room Temperature	A temperature between 20 and 25 °C
Normal Performance	Fulfillment of specified performance requirement
Thermal Decomposition:	Allowed as long as the material still remains in spec. after testing
Mechanical Decomposition	Allowed as long as the material still remains in spec. after testing
Visible Decomposition	Minimal visible decomposition is allowed. This will be further defined at a later date.

1.0 Introduction

1.1 Purpose

The purpose of the document is to explain the mechanical and environmental tests and the corresponding measurements that were performed on samples of Chomerics thermally conductive gap filler THERM-A-GAP™ 976.

1.2 Sample Set-Up Summary

The samples were tested at a thickness of 0.100 inches (2.5 mm). The thermal impedance and compression as a factor of pressure were measured for each sample. The measurements were taken initially and after heat aged processes. The heat aged processes were steady temperature at 125°C and damp heat 85°C/85%RH.

2.0 Steady Temperature Test

2.1 Introduction and Reference

The purpose of the steady temperature test is to ensure the reliability of the samples after exposure to a range of air temperatures.

2.2 Procedure

The samples were placed into the test chambers at 125°C and 85°C/85%RH and held for 1000 hours. After the first 96 hours, the first set of samples were taken out of the 125°C and left at room temperature. Measurements of three of the samples were taken after a minimum of 2 hours. The process was repeated after 240, 504, and 1000 hours. Damp heat at 85°C/85%RH was tested only after 504 and 1000 hours. After the two hour recovery period, the final measurements were taken in a laboratory environment to test for the normal performance of the samples.

2.3 Acceptance Criteria

Minimal visible decomposition will be allowed. The acceptable level of decomposition is to be defined.

Mechanical decomposition is allowed as long as the material still remains within specification after testing.

Thermal decomposition is allowed as long as the material still remains within specification after testing.

3.0 Test Procedure

3.1 Sample Preparation

The thermal impedance samples were cut to 1 in² (6.45 cm²) discs before aging and the deflection samples were cut to 0.5 inch diameter discs or 0.196 in² (1.26 cm²) before aging. Liners were left on and the samples were spread out and not stacked during aging.

3.2 Thermal Impedance

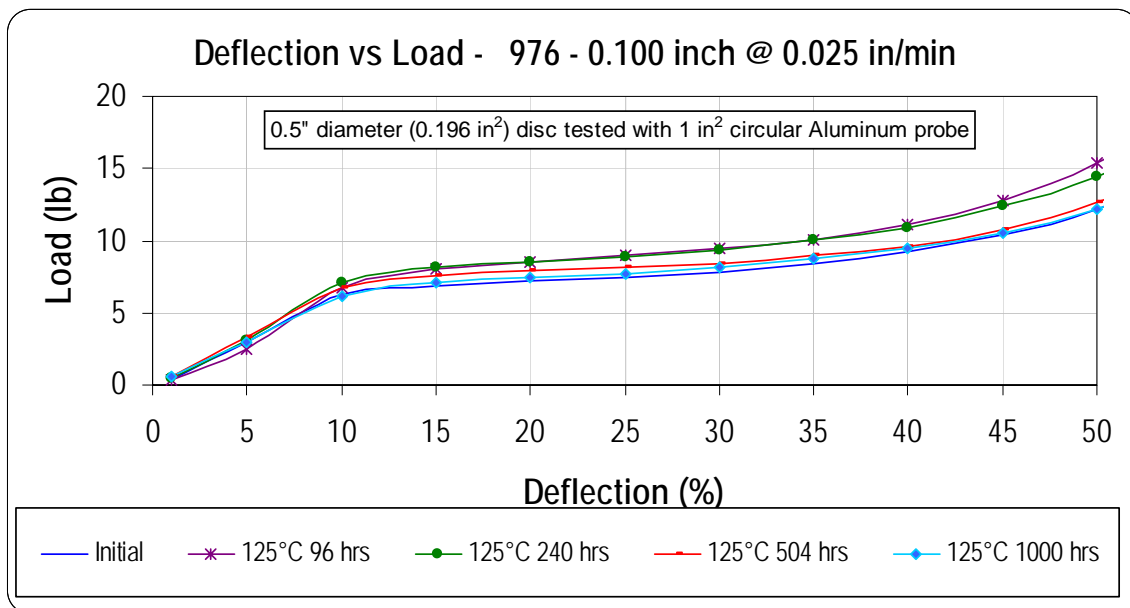
Three samples were tested at 50°C and 10 PSI (0.069 MPa) of pressure at each aging condition per ASTM D5470.

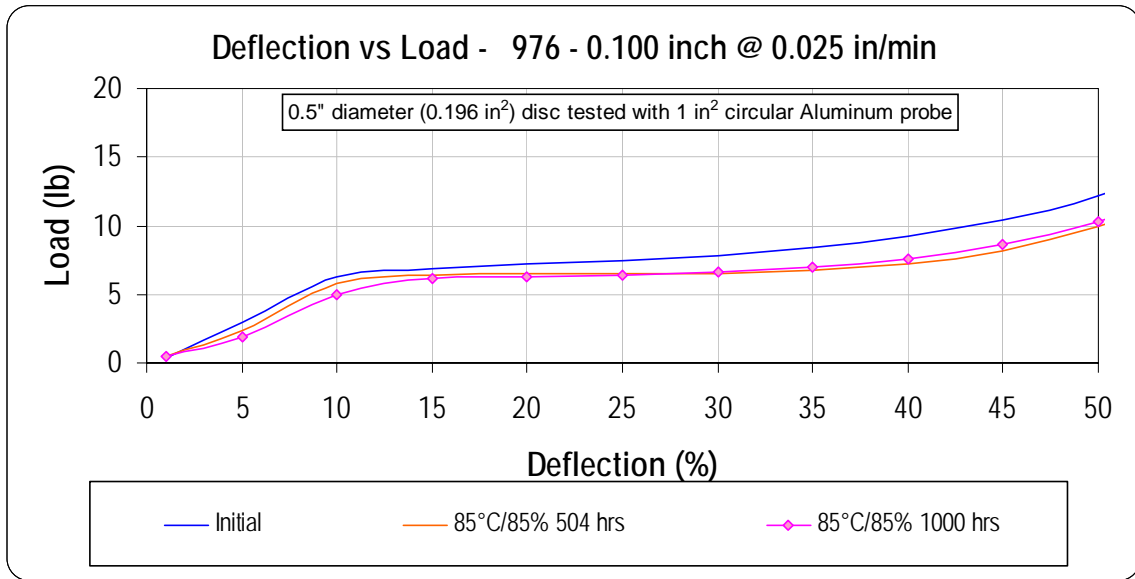
3.3 Compression Deflection

Samples were tested in a laboratory environment on a Texture Analyzer (from Texture Technologies) per Chomerics NBD-001, which is a modified version of ASTM C165. Three samples were tested at each aging condition. Samples were tested at 0.025 inches/min (0.01 mm/sec) up to 50% deflection or 50kg, the limit of the load cell.

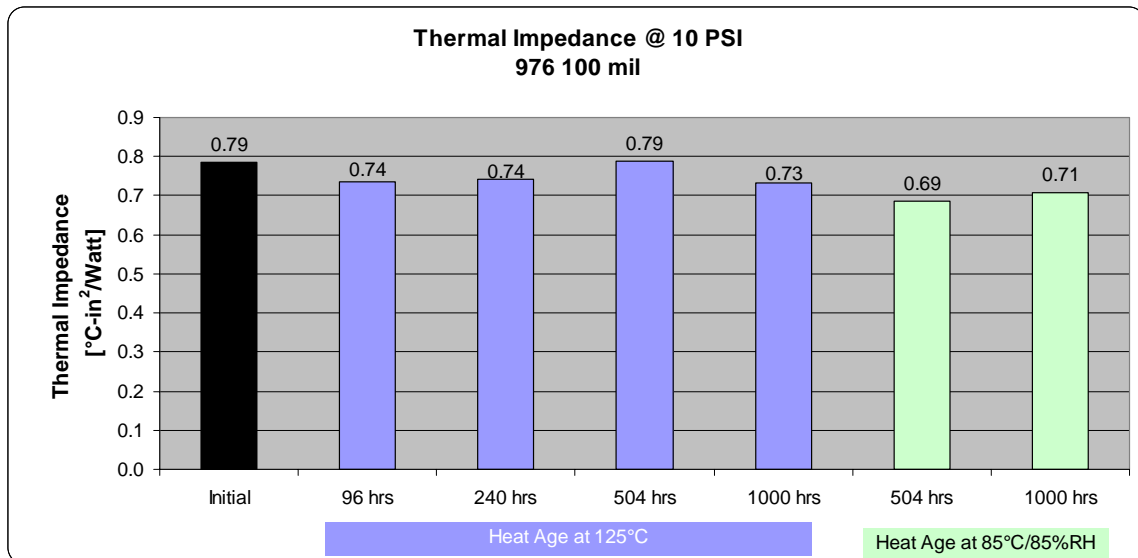
4.0 Results

4.1 Compression Deflection





4.2 Thermal Impedance



5.0 Conclusion

Following environmental testing of Chomerics 976; no significant changes are evident in the materials performance.

Appendix A: Typical Properties

	Typical Properties	976	Test Method
Physical	Color	Gold	Visual
	Carriers	No Carrier	
	Standard Thicknesses, mm (inch)	1.00 to 5.00 (0.040 to 0.200)	ASTM D374
	Specific Gravity	1.3	ASTM D792
	Hardness, Shore A / Penetrometer	10 / 60	ASTM D2240
	Percent Deflection @ Various Pressures, %		
	@ 34 kPa (5 psi) @ 69 kPa (10 psi) @ 172 kPa (25 psi) @ 345 kPa (50 psi)	6 10 11 45	ASTM C165 MOD (0.50 in diameter disc, 0.025 in/min rate)
Thermal	Thermal Conductivity, W/m-K	6	ASTM D5470
	Heat Capacity, J/g-K	0.9	ASTM E1269
	Coefficient of Thermal Expansion, ppm/K	100	ASTM E831
	Continuous Use Temperature, °C	-65 to 150°C	
Electrical	Dielectric Strength, KVac/mm (Vac / mil)	5.1 (200)	ASTM D149
	Volume Resistivity, ohm-cm	10 ¹⁴	ASTM D257
	Dielectric Constant @1,000 kHz	3.2	ASTM D150
	Dissipation Factor @ 1,000 kHz	< 0.001	Chomerics Test
Regulatory	Flammability Rating (See UL File E140244 for Details)	V-0	UL 94
	RoHS Compliant	Yes	Chomerics Certification
	Outgassing, %TML	0.7	ASTM E595
	Shelf Life, years from date of manufacture	1	Chomerics

Appendix B: 976 Thermal Impedance vs. Sample Thickness

