THERM-A-GAP™
G569

Reliability Test Report

Prepared By:

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Chomerics Approved Signatory:

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

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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 ^{o}C and a relative humidity between 40 and 60%
Room Temperature	A temperature between 20 and 25 ^{o}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™ G569.

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 70 and 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 70°C, 125°C, and 85°C/85%RH and held for 1000 hours. After the 96 hours, the first set of samples were taken out of the 70°C and 125°C and left at room temperature. Measurements of three of the samples for each thickness 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 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 in^2 (6.45 cm^2) discs before aging and the deflection samples were cut to 0.5 inch diameter discs or 0.196 in^2 (1.26 cm^2) before aging. Liners were left on and the samples were spread out and not stacked during aging.

3.2 Thermal Impedance

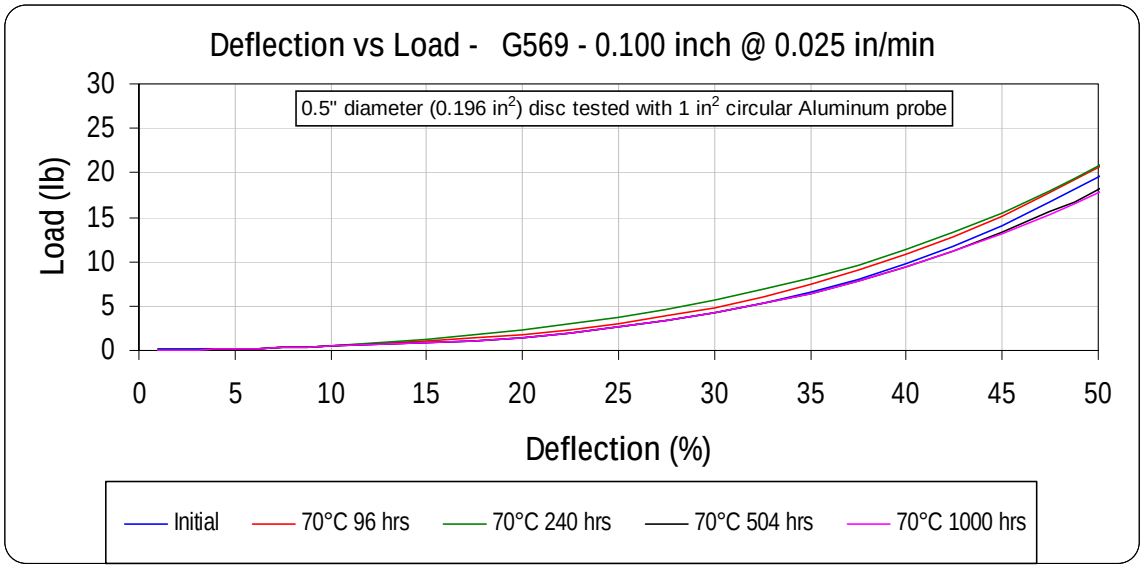
Three samples were tested at 50°C and 10 PSI (0.069 MPa) of pressure at each aging condition per ASTM D5470.

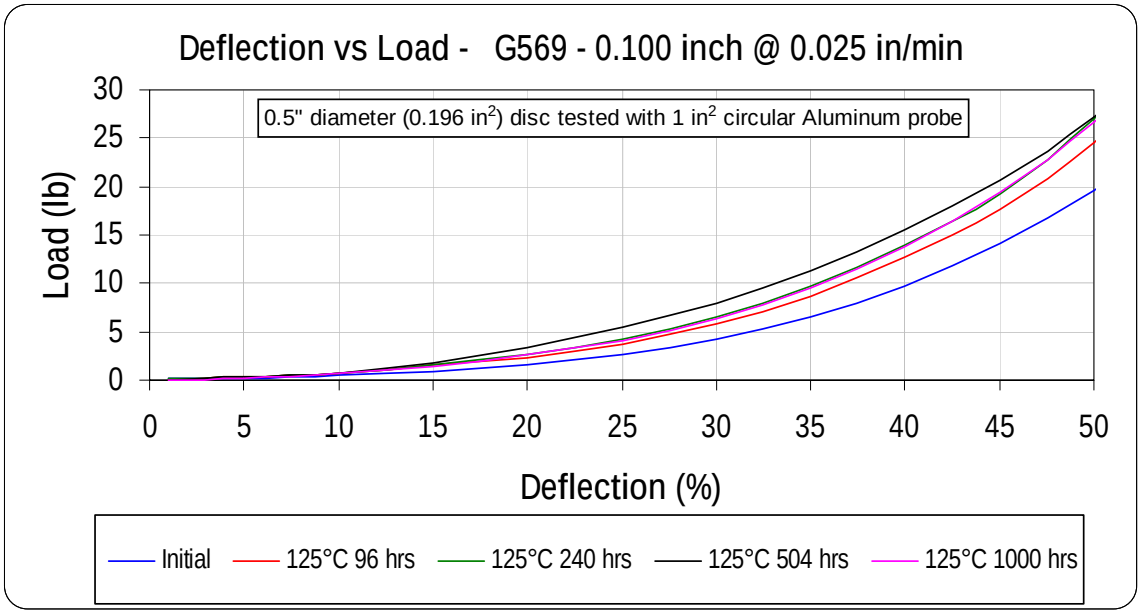
3.3 Compression Deflection

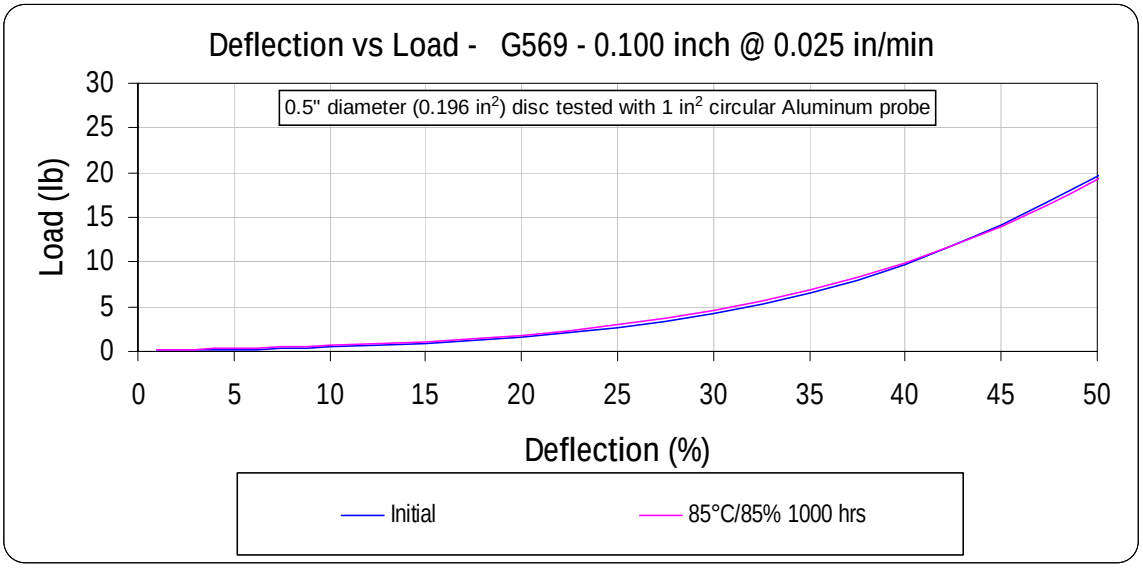
Samples were tested in a laboratory environment on a Texture Analyzer (from Texture Technologies) per Chomerics NBD-001, which is a modified version of ASTM C165. Three samples were tested for each aging condition. Samples were tested at 0.025 inches/min (0.01 mm/sec) up to 50% deflection or 50kg, the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

4.0 Results

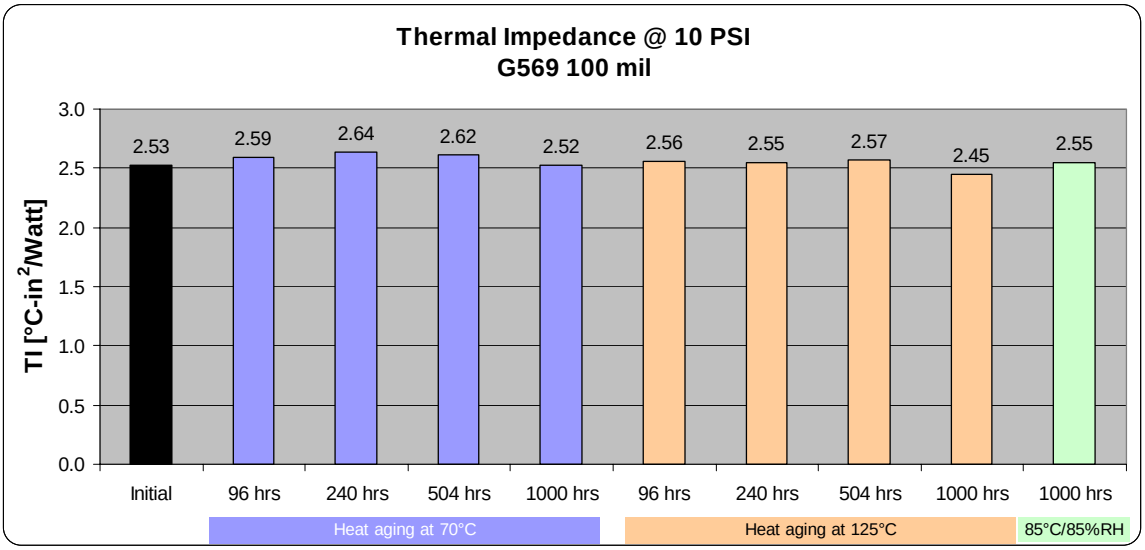
4.1 Compression Deflection




Deflection vs Load - G569 - 0.100 inch @ 0.025 in/min
0.5" diameter (0.196 in2) disc tested with 1 in2 circular Aluminum probe
Load (lb)
Deflection (%)
Initial
125°C 96 hrs
125°C 240 hrs
125°C 504 hrs
125°C 1000 hrs


Deflection vs Load - G569 - 0.100 inch @ 0.025 in/min
0.5" diameter (0.196 in2) disc tested with 1 in2 circular Aluminum probe
Load (lb)
Deflection (%)
Initial
85°C/85% 1000 hrs

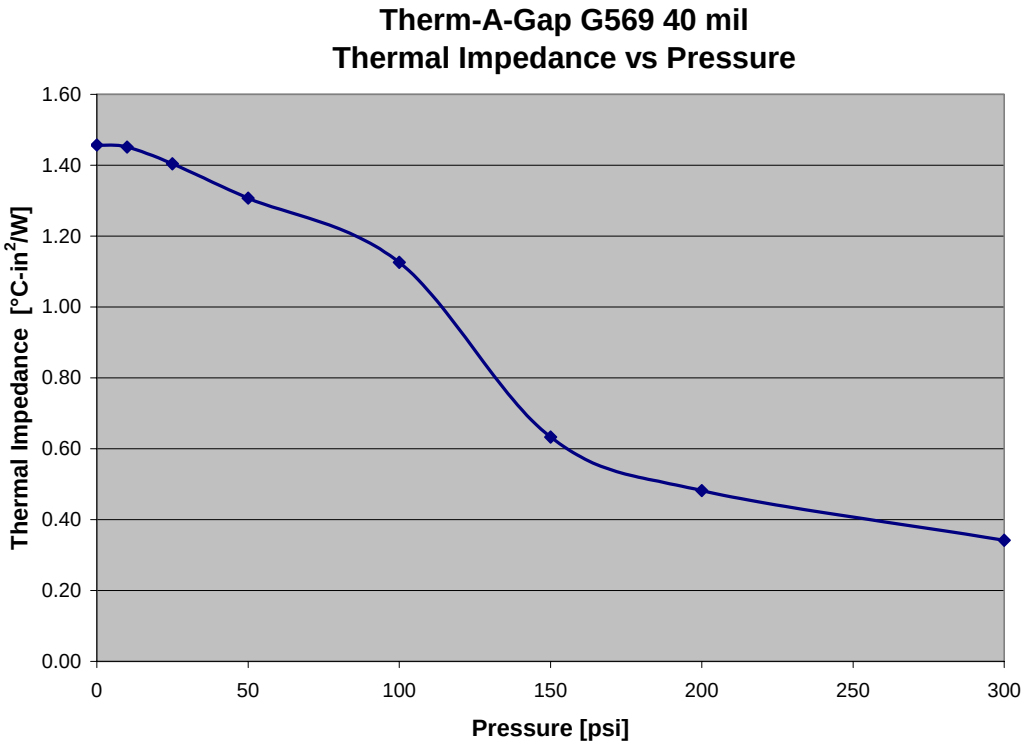
4.2 Thermal Impedance



Appendix A: Typical Properties

G569 Typical Properties			
Physical	Color		Grey
	Carrier		A or G
	Standard Thicknesses, inch (mm)		0.020-0.20 (0.5-5.0)
	Specific Gravity		2.2
	Hardness, Shore 00		10
	Extractable Silicone %		10
	Continuous Use Temperature °C		-55 to 200
	Percent Deflection at Various Pressures	5 psi (34 kPa)	20
		10 psi (69 kPa)	30
		25 psi (172 kPa)	50
		50 psi (345 kPa)	65
Thermal	Thermal Impedance, °C-in²/W (°C-cm²/W) at 10 psi (69 kPa) and 0.040 in (1 mm) thick		1.5 (9.7)
	Apparent Thermal Conductivity, W/m-K		1.2
	Heat Capacity, J/g-K		1
	Coefficient of Thermal Expansion, ppm/K		250
Electrical	Dielectric Strength, Vac/mil (Kvac/mm)		200 (8)
	Volume Resistivity, ohm-cm		10^{14}
	Dielectric Constant at 1,000 kHz		6.5
	Dissination Factor at 1,000 kHz		0.013
Regulatory	Flammability Rating		V-0
	RoHS Compliant		Yes
	Outgassing, % TML (%CVCM)		0.42 (0.08)
	Shelf Life, years from date of manufacture		2

Appendix B: G569 Thermal Impedance vs Pressure



Appendix C: G569 Compression Deflection After High Temperature Heat Aging