

GORE™ POLARCHIP™ CP6000 THERMAL INTERFACE MATERIAL

Product Value Statement

GORE™ POLARCHIP™ CP6000 Thermal Interface Material (TIM) is engineered for applications requiring good conformability, low thermal resistance at low applied pressure, high operating temperatures, and low silicone content. It performs best when compressed 5-25%.

Executive Summary

GORE™ POLARCHIP™ CP6000 Thermal Interface Material is ideal for gap filling applications where the gap is large or variable due to tolerance stack-ups caused by irregular surfaces or the need to cool multiple components of varying heights. By using soft, conformable, highly compressible material, contact is ensured between heat sinks and hot devices, while minimizing the stress placed on the components of the printed circuit board. GORE™ POLARCHIP CP6000 is recommended for applications that require between 5-25% compression, and can be supplied in sheets, rolls, or precision die-cut parts. The die-cut parts are suitable for high volume automated assembly. Gore offers automated installation equipment solutions for thermal interface products.

Benefits

- Provides excellent heat dissipation between large and variable gaps
- Ensures contact with low stress on components (applications with 5-25% compression)
- Easy to handle and install
- Allows re-work of component and heat sinks – tacky on one side only

Material Characteristics

GORE™ POLARCHIP CP6000 Thermal Interface Material is a fluoropolymer composite that consists of an expanded polytetrafluoroethylene (ePTFE) matrix filled with boron nitride (BN) particles. The low elastic modulus of the ePTFE matrix imparts softness, conformability, and a high level of compressibility to the composite. The unique use of ePTFE allows for a minimal silicone content, practically eliminating silicone migration issues. The reinforcing nature of the ePTFE matrix results in a composite that is physically robust, easy to handle, and does not require additional reinforcements (e.g., metal foils, fiberglass carriers, etc). The high thermal conductivity of the BN particles gives the composite its excellent thermal transport characteristics.

Material Properties

(Refer to chart on second/back page for detailed properties)

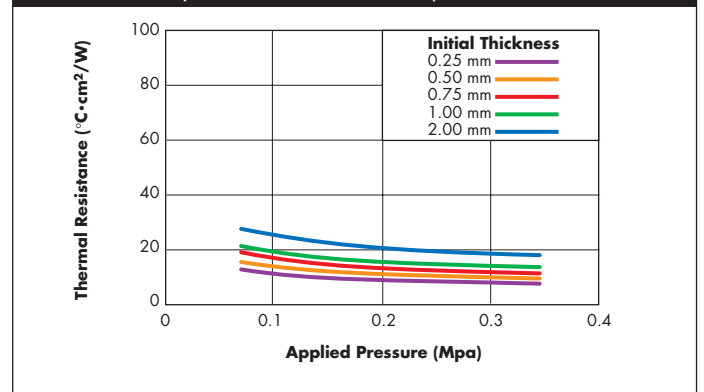
Thickness: 0.25mm (.010 in), 0.50mm (.020 in), 0.75mm (.030 in), 1.0mm (.040 in), 2.0mm (.080 in), Other thicknesses available upon request

Flammability Rating: VO (UL94)

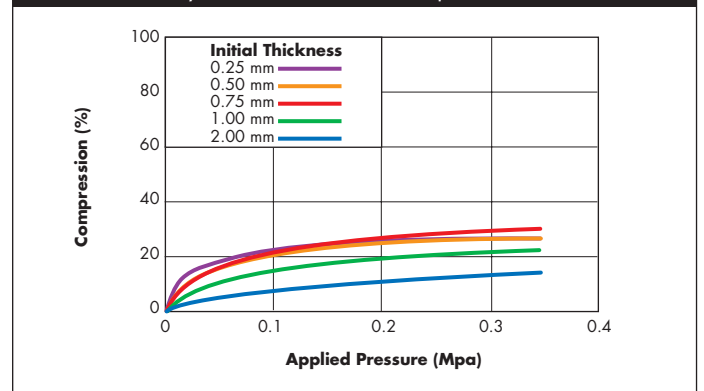
Silicone Extraction: Passes Bellcore Specifications per document TR-NWT-000930



Thermal Resistance vs. Pressure
Thermally Conductive Interfaces per ASTM E1530



Compression vs. Pressure
Thermally Conductive Interfaces per ASTM D575



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POLARCHIP™ CP6000 Thermal Interface Material Properties

Construction							
Property	Units	CP6000					Test Method
Filler	—	Boron Nitride					—
Matrix	—	ePTFE					—
Color	—	White					—
Adhesive	—	1 mil PSA					—
Thickness	mm (mils)	0.25 (10)	0.50 (20)	0.75 (30)	1.0 (40)	2.0 (80)	ASTM D347, method C
Thermal							
Property	Units	CP6000					Test Method
Thermal Impedance @ 0.07 Mpa (10 psi)	°C-cm ² /W (°C-in ² /W)	5.7 (0.88)	9.7 (1.5)	14.8 (2.3)	17.0 (2.6)	27.6 (4.3)	ASTM E1530
Thermal Impedance @ 0.17 Mpa (25 psi)		4.4 (0.68)	7.3 (1.1)	10.6 (1.6)	13.6 (2.1)	21.7 (3.4)	
Thermal Impedance @ 0.34 Mpa (50 psi)		3.6 (0.56)	5.8 (0.90)	8.1 (1.25)	10.1 (1.56)	18.1 (2.8)	
Thermal Conductivity @ 0.07 Mpa (10 psi)	W/m-K	0.84	0.84	0.84	0.84	0.84	
Thermal Conductivity @ 0.17 Mpa (25psi)		1.0	1.0	1.0	1.0	1.0	
Thermal Conductivity @ 0.34 Mpa (50 psi)		1.2	1.2	1.2	1.2	1.2	
Heat Capacity, 40 to 110°C	J/g	1.8	1.5	1.4	1.3	1.2	ASTM E 1269
Flammability Rating	—	V-0					UL94
Mechanical							
Property	Units	CP6000					Test Method
Compression @ 0.07 Mpa (10 psi)	%	20	18	18	12	6	ASTM D575, modified
Compression @ 0.17 Mpa (25 psi)		25	23	26	18	10	
Compression @ 0.34 Mpa (50 psi)		26	27	30	22	14	
Hardness	Shore A	61	60	48	48	60	ASTM D2240
Specific Gravity	g/cm ³	0.9	1.0	1.0	1.1	1.0	ASTM D792
Electrical							
Property	Units	CP6000					Test Method
Volume Resistivity	Ω-cm	10 ¹⁵	10 ¹⁵	10 ¹⁵	10 ¹⁵	10 ¹⁴	ASTM D257
Dielectric Constant	—	2.0	2.1	2.0	2.2	2.4	ASTM D150
Dielectric Breakdown Voltage	Volts/mil	280	167	148	141	114	ASTM D149
Environmental							
Property	Units	CP6000					Test Method
Silicone Extraction	Pass/Fail	Pass	Pass	Pass	Pass	Pass	Bellcore Specs TR-NWT-000930 sec 10.3
Outgassing – Total Mass Loss	%	0.76	0.83	1.07	0.83	0.46	ASTM E595
Outgassing – Collected Volatile Condensable Materials		0.19	0.20	0.17	0.18	0.11	
Outgassing – Water Vapor Recovered		0.04	0.02	0.02	0.02	0.02	