



# Polarchip®

THERMAL INTERFACE MATERIAL

## Product Value Statement

GORE™ POLARCHIP® Thermal Interface Material (TIM) is engineered for heat transfer in silicone sensitive applications requiring conformability and low thermal resistance at low applied pressure.

### EXECUTIVE SUMMARY

GORE™ POLARCHIP® Thermal Interface Material is used to fill the undesirable air gaps between the heat generating devices and the heat dissipating surfaces.

GORE™ POLARCHIP® Thermal Interface Material is ideal for gap-filling applications where the gap is variable due to surface irregularities (roughness, flatness, planarity, etc.), large tolerance stack-ups, or multiple device heights.

GORE™ POLARCHIP® Thermal Interface Material reduces interfacial contact resistance while minimizing the stress placed on the device components, by being soft, conformable, and highly compressible.

GORE™ POLARCHIP® Thermal Interface Material is an ePTFE based thermal pad ideal for silicone sensitive applications.

GORE™ POLARCHIP® CP8000 Thermal Interface Material provides maximum compressibility, and is recommended for applications that require greater than 40% compression.

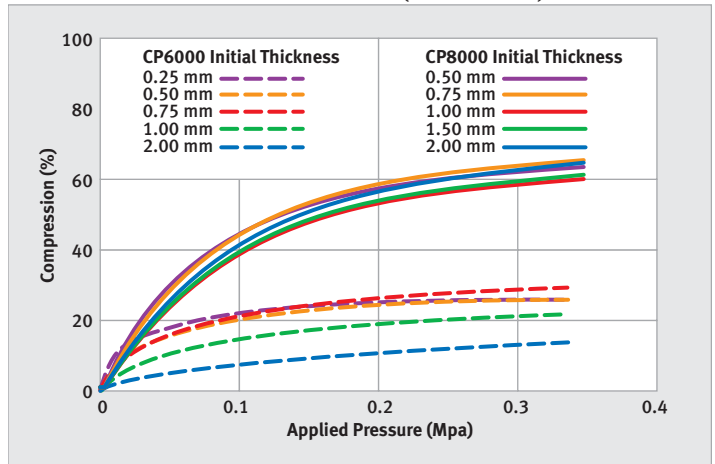
GORE™ POLARCHIP® CP6000 Thermal Interface Material provides higher thermal conductivity and is recommended for applications requiring 5-25% compression.

### BENEFITS

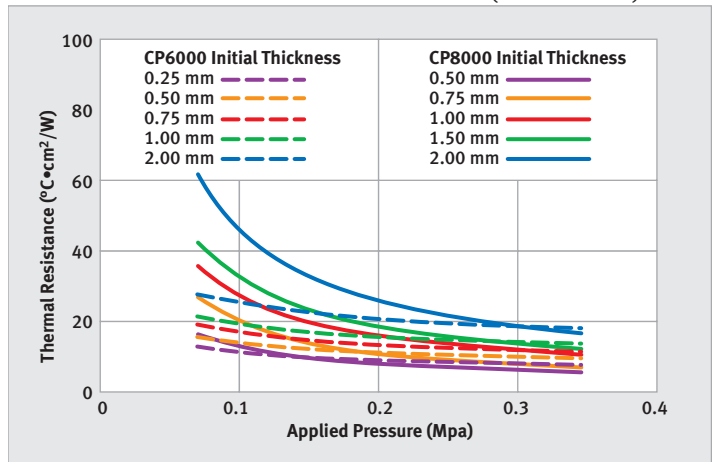
- Soft, conformable, and compliant
  - use thinner pad to absorb larger tolerance range
  - use of thinner pad reduces total thermal resistance
  - take up larger tolerance stacks to eliminate costly secondary machining operations
  - use single pad to cover multiple components
- Highly compressible at low pressures with no lateral flow
  - reduces mechanical stress on sensitive components
- Physically robust, durable, easy to handle and install
  - produced in continuous rolls suitable for automation
  - no reinforcement layers (e.g., metal foil, fiberglass mesh, ...)
  - non-tacky surface allows for “no-mess” rework
- Low in silicone content eliminates “silicone bleeding”
- Electrically Insulative



### COMPRESSION VS. PRESSURE (ASTM D575)



### THERMAL RESISTANCE VS. PRESSURE (ASTM E1530)





# Polarchip®

Thermal Interface Material

## POLARCHIP® THERMAL INTERFACE MATERIAL PROPERTIES

Construction Property	Units	CP6000					CP8000					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)	0.5 (20)	0.75 (30)	1.0 (40)	1.5 (60)	2.0 (80)	ASTM D347, method C
Thermal Property	Units	CP6000					CP8000					Test Method
Thermal Resistance @ 0.07 Mpa (10 psi)	°C-cm <sup>2</sup> /W (°C-in <sup>2</sup> /W)	5.7 (0.88)	9.7 (1.5)	14.8 (2.3)	17.0 (2.6)	27.6 (4.3)	16.1 (2.5)	26.5 (4.1)	34.8 (5.4)	43.2 (6.7)	61.9 (9.6)	ASTM E1530
Thermal Resistance @ 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)	8.4 (1.3)	12.9 (2.0)	18.1 (2.8)	20.6 (3.2)	29.0 (4.5)	
Thermal Resistance @ 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)	5.2 (0.81)	6.5 (1.0)	9.7 (1.5)	12.3 (1.9)	16.1 (2.5)	
Thermal Conductivity @ 0.07 Mpa (10 psi)	W/m-K	0.84	0.84	0.84	0.84	0.84	0.28	0.28	0.28	0.28	0.28	
Thermal Conductivity @ 0.17 Mpa (25psi)		1.0	1.0	1.0	1.0	1.0	0.46	0.46	0.46	0.46	0.46	
Thermal Conductivity @ 0.34 Mpa (50 psi)		1.2	1.2	1.2	1.2	1.2	0.74	0.74	0.74	0.74	0.74	
Heat Capacity, 40 to 110°C	J/g	1.8	1.5	1.4	1.3	1.2	1.24	1.22	1.25	1.12	1.23	ASTM E 1269
Flammability Rating	—	V-0					HB					UL94, file E 130607
Mechanical Property	Units	CP6000					CP8000					Test Method
Compression @ 0.07 Mpa (10 psi)	%	20	18	18	12	6	33.8	35.8	30.3	31.7	30.3	ASTM D575, modified
Compression @ 0.17 Mpa (25 psi)		25	23	26	18	10	52.5	56.0	49.6	51.4	50.4	
Compression @ 0.34 Mpa (50 psi)		26	27	30	22	14	60.6	65.3	61.9	61.3	60.9	
Hardness	Shore A	61	60	48	48	60	20	18	25	19	23	ASTM D2240
Specific Gravity	g/cm <sup>3</sup>	0.9	1.0	1.0	1.1	1.0	0.37	0.37	0.39	0.36	0.51	ASTM D792
Electrical Property	Units	CP6000					CP8000					Test Method
Volume Resistivity	Ω-cm	10 <sup>15</sup>	10 <sup>15</sup>	10 <sup>15</sup>	10 <sup>15</sup>	10 <sup>14</sup>	10 <sup>14</sup>	10 <sup>14</sup>	10 <sup>14</sup>	10 <sup>14</sup>	10 <sup>14</sup>	ASTM D257
Dielectric Constant	—	2.0	2.1	2.0	2.2	2.4	1.21	1.24	1.25	2.13	1.39	ASTM D150
Dielectric Breakdown Voltage	Volts/mil	280	167	148	141	114	82	68	104	76	76	ASTM D149
Environmental Property	Units	CP6000					CP8000					Test Method
Silicone Extraction	Pass/Fail	Pass	Pass	Pass	Pass	Pass	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	0.76	0.60	0.58	0.58	0.57	ASTM D575 E595
Outgassing – Collected Volatile		0.19	0.20	0.17	0.18	0.11	0.12	0.09	0.08	0.08	0.09	
Outgassing – Water Vapor Recovered		0.04	0.02	0.02	0.02	0.02	0.04	0.03	0.03	0.03	0.06	

\*Additional thickness available by request

### ROHS STATUS

RoHS Material*	Pass/Fail
Lead (Pb) Content	Pass
Cadmium (Cd) Content	Pass
Hexavalent Chromium (Cr6) Content	Pass

RoHS Material*	Pass/Fail
Mercury (Hg) Content	Pass
Bromine Compounds	Pass

\*W. L. Gore & Associates declares that we do not intentionally add substances listed in Directive 2002/95/EU to GORE™ POLARCHIP®. Independent lab tests have been performed and results are available upon request.

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